



**CONCORD-2011**  
**3<sup>rd</sup> European Conference on Corporate R&D**  
The dynamics of Europe's industrial structure  
and the growth of innovative firms

**Summary Report**

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EUR 25244 EN - 2012

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JRC 68674

EUR 25244 EN  
ISBN 978-92-79-23195-7

ISSN 1831-9424  
doi:10.2791/74768

Luxembourg: Publications Office of the European Union

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# Synthesis of Conference Results

The aim of CONCORD-2011 was to provide a forum for an academic discussion about recent findings on the role of R&D and innovation in terms of industrial dynamics and company growth. From the 102 abstracts submitted in response to the initial call, 30 papers were selected for detailed presentation and discussion during the Conference. In addition, 20 posters were displayed.

The conference was structured along three thematic strands:

- I. R&D and innovation: Sources and constraints at company level
- II. Industrial dynamics & the role of R&D and innovation for Europe's competitiveness
- III. New avenues for policy and for management practices

The papers and the presentations given during the conference examined very different topics and issues, ranging from evidence of certain sector-specific matters in the area of industrial innovation to broad systemic issues. At the same time, the papers shared a common methodology: they were all empirical and most of them used advanced econometric tools. This methodological consistency was very well-received and contributed positively to the scientific quality of the conference.

Obviously, data limitations prevented some papers from going too far in terms of interpretations and policy implications. In fact, in some cases, the unavailability of longitudinal datasets hindered a better investigation into causal links rather than focusing on simple correlations. This was the case, for instance, with regard to several analyses of the EU innovation deficit.

The scientific findings reinforce the broad existing evidence on the subjects covered and, in a number of cases, present conclusions with clear policy implications, as illustrated in this report. This synthesis is structured along the logic of the three thematic strands of CONCORD-2011: (1) micro-level evidence and firm behaviour, (2) evidence at meso-level, i.e. sector and industry dynamics, and (3) evidence from the assessment of concrete policy tools and management practices. Throughout the text, we refer to papers from which the corresponding evidence and conclusions were extracted.<sup>1</sup> Please note that this report is a synthesis of what was said in the course of the Conference and does not necessarily reflect the position of the European Commission. The list of papers is provided in Annex I.

## Acknowledgments

This document is a synthesis of a series of reports provided by the Conference's rapporteurs reflecting the individual scientific contributions to CONCORD-2011 along the three main thematic strands. JRC-IPTS is grateful to the valuable contributions made by Prof. Susana Borrás (Copenhagen Business School), Prof. Michele Cincera (Free University Brussels), Prof. Bronwyn B. Hall (University of California at Berkeley), Prof. Reinhilde Veugelers (Catholic University Leuven), and Prof. Marco Vivarelli (Catholic University of Milan).

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<sup>1</sup> Please note that, for a given paper, different messages might appear in different thematic strands, independently of the assignment done *ex ante* for presentation and discussion during the Conference.

## I. R&D AND INNOVATION: SOURCES AND CONSTRAINTS AT COMPANY LEVEL

In general, across the thematic subjects, a number of papers explicitly or implicitly look at the determinants of corporate R&D and innovation activities and largely reinforce what is already known from the literature: large mature firms are more likely to have an internal R&D programme and the level of their R&D tends to be stickier than that of smaller firms.<sup>11</sup> Engaging in R&D is associated with having more skilled staff (absorptive capacity) and with exporting. Innovative firms tend to have lower leverage, but this is a simultaneous relationship: leverage is persistent, and changes in leverage are very weakly related to innovative activity, if at all. Competitive pressure encourages innovation but in different ways for product and process innovation<sup>(5)</sup>, with price pressure, international competition, and higher marketing expenditures being associated with product innovation, and barriers to entry and market growth being more important for process innovation. Finally, the most advanced economies, in general, have fewer barriers to innovation.

### ***The impact of business and economic cycles on R&D investments***

The allocation of funds between R&D and tangible investment has been investigated, revealing a relationship between the R&D investment intensity rate and growth in sales and the presence of credit constraints.<sup>(22)</sup> As in Aghion et al. (2007), pro-cyclicality in R&D was associated with the presence of credit constraints. Note, however, that cyclicality was measured here at the *firm* level, i.e. it is approximated by the firm's own sales growth, rather than at a growth aggregate which tends to refer to macro-economic cycles.

The latter, in turn, was investigated in a series of papers studying the effect of the economic and financial crises (e.g. see papers (2), (11), (22) and (24) according to the attached list of papers). While devoting special attention to the cyclicality of R&D investments and its impact on the levels of innovative performance, there was consensus on the fact that research and innovation together are crucial for enhancing the competitiveness of European firms and, in general, are perceived to be central aspects to be taken into consideration in any policy efforts aimed to increase the rate of economic growth in Europe. Accordingly, innovation and knowledge creation continues to be a crucial and strategic area that deserves both political attention and public action. In fact, evidence has shown that innovation policy is providing (at least) short-term incentives to encourage private R&D, indicating the fundamental role of public funding in this regard. It is therefore suggested that the levels of public investment in R&D should remain stable during periods of crises (even in case of tight public budgets). More specifically, countercyclical macroeconomic policies should provide support to R&D activities and productivity growth in firms that are more credit-constrained and more dependent on external financing, which are typically small / young / highly innovative firms.

### ***In-house versus outsourced R&D: the role of cooperation and collaboration***

Another subject comprehensively discussed in the course of the Conference has been cooperation and collaboration in the area of corporate R&D. Admittedly, half of all innovative firms do not engage in R&D and, according to a study presented at CONCORD-2011, there is no difference in their business performances.<sup>(17)</sup> However, formal R&D appears to be crucial to the innovativeness of SMEs, at the least. In fact, SMEs conducting their own R&D perform better in terms of productivity<sup>(4)</sup> and also

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<sup>11</sup> For evidence on the smoothness of R&D spending in large R&D-performing firms in the U.S., see Hall, B. H., Z. Griliches, and J. A. Hausman (1986): Patents and R&D: Is There a Lag?, *International Economic Review* 27: 265-283 and Lach, S., and M. Shankerman (1989): Dynamics of R&D investment in the Scientific Sector, *Journal of Political Economy* 97: 881-904.

have a superior capacity to absorb external flows of knowledge in connected networks, something which is performed quite poorly by non-R&D innovators.<sup>III</sup>

Moreover, evidence suggests that internal and external R&D are generally weak substitutes (in-house R&D is especially pivotal for high-techs), that their individual impact on firms' performance across Europe appears to be different,<sup>(1)</sup> and that a firm's reliance on external knowledge increases its 'potential absorptive capacity'.<sup>(14)</sup> A positive link to the latter was found, for instance, for patenting activities, co-operation in terms of innovation, and organisational distance. In turn, outsourcing corporate R&D activities can be detrimental to 'potential absorptive capacity'. Further evidence suggested that funding S&T collaboration might be most beneficial if targeting firms which are organisationally different.

Overall, for both outsourcing and doing R&D in-house, cooperating and collaborating on R&D matters seems to be a good approach. In other words: combining external with in-house R&D is the innovation strategy that pays off the most,<sup>(3)</sup> In the low-tech sector, where arguably less internal R&D is undertaken, adding imported technology improves the productivity of R&D. Hence, European policies targeted towards R&D and innovation within SMEs should encourage (and possibly subsidise) R&D Joint Ventures between SMEs and both their larger counterparts and universities/research centres. However, SMEs' in-house R&D is also crucial in order to develop the necessary absorptive capacity and to realise super-additive effects.<sup>(3)</sup> In this context, the most important issue from a policy perspective is the presence of so-called 'Edgeworth externalities',<sup>IV</sup> that is, the possibility of obtaining synergic effects from the joint adoption of different sources of innovation (such as internal and external R&D or in-house R&D and cooperation with outside actors.<sup>V</sup> As getting these 'super-additive' effects is far from easy (especially for SMEs), a toehold for policy emerges, especially when a 'market failure' is obvious. One such case is when SMEs are credit-constrained and therefore cannot create their own absorptive capacity, which is evidently a necessary pre-condition for engaging with external sources of innovation and cooperation.

### **Young innovative companies and fast-growing firms**

Besides the cross-cutting issue of R&D and innovation in SMEs, a number of studies were explicitly devoted to analysing specifics of Young Innovative Companies [YIC] and Fast-Growing Firms [FGF]. Evidence suggests that YICs, in deciding if and how much to invest in R&D, are less persistent, less sensitive to market structure and more sensitive to demand-pull conditions than their mature counterparts.<sup>(15)</sup> By the same token, innovative marketing and R&D are both important in fostering innovation performance in general, but they turn out to be *substitutes* in the case of YICs.<sup>(6)</sup> Moreover, it was demonstrated that FGFs (of which a high percentage are also young firms) systematically perceive specific innovation hurdles as being higher than other firms would.<sup>(18)</sup>

All these points clearly highlight that there are a number of specifics to be taken into account when dealing with YICs, with the latter being currently at the core of the European policy makers' agenda.<sup>VI</sup> In particular, YICs seem to be affected by severe credit constraints, which make them more vulnerable to cyclical markets and unable to invest jointly in complementary activities such as R&D and innovative marketing. From a policy point of view, these evidences call for a specific intervention capa-

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<sup>III</sup> See: Cohen, W.M. and Levinthal, D.A. (1989), "Innovation and learning: the two faces of R&D", *Economic Journal*, vol.99, pp.569-96 and Cohen, W.M. and Levinthal, D.A. (1990), "Absorptive capacity: a new perspective on learning and innovation", *Administrative Science Quarterly*, vol.35, pp.128-52.

<sup>IV</sup> For definition see Milgrom, P., Roberts, J. (1990): The Economics of Modern Manufacturing - Technology, Strategy, and Organization, *American Economic Review* 80, 511-528; Milgrom, P., Roberts, J. (1995), Complementarities and Firms: Strategy, Structure and Organisational Change in Manufacturing, *Journal of Accounting and Economics* 19, 179-208.

<sup>V</sup> See Veugelers, R. (1997), Internal R&D Expenditures and External Technology Sourcing, *Research Policy*, 26, 303-315; Veugelers, R. and Cassiman, B. (1999), Make and Buy in Innovation Strategy: Evidence from Belgian Manufacturing Firms, *Research Policy*, 28, 63-80 and Piga, C. and Vivarelli, M. (2004), Internal and External R&D: A Sample Selection Approach, *Oxford Bulletin of Economics and Statistics*, 66, 457-82.

<sup>VI</sup> As outlined, for instance, by Clara de la Torre, Director DG Research and Innovation, in the opening of the CONCORD 2011 conference on "Unleashing growth through innovation".

ble of removing those credit constraints that severely damage the innovative performance and the growth perspectives of the European YICs, since the weaknesses of the European YICs are cited in turn as the main explanations for the persistent transatlantic productivity divide between the EU and the US.

If we summarise the evidence concerning determinants and the role of R&D and innovation for any company's performance, as presented at CONCORD-2011, the impact of R&D and innovation appears to be quite diverse and company behaviour in this regard remarkably differentiated. Consequently, differentiated policies for different types of companies and, more specifically, targeted financial support measures for young, small, innovative/R&D-intensive firms were widely suggested. Facilitating access to finance (given the existence of significant credit constraints or in times of a crisis), supporting cooperation in terms of R&D and innovation, and — with regard to firms' absorptive capacity — stimulating firms' training activities and on-the-job education initiatives were other examples of measures aiming at supporting these young R&D-driven innovative SMEs. Moreover, there is ample rationale for supporting non-R&D innovators (especially SMEs) and also non-R&D business activities, such as marketing, design and hiring academically-skilled personnel.<sup>(29)</sup> (6)

## II. Industrial dynamics and the role of R&D and innovation in Europe's competitiveness

With regard to Europe's competitiveness and the role of R&D, evidence from studies analysing the productivity gap was reinforced: US firms are more able to leverage R&D into productivity growth.<sup>(26)</sup> As this holds for high-tech sectors too, it implies that the superior aggregate performance of the US is not only due to a different sectoral specialisation. In EU countries there are, however, both fewer growing and fewer shrinking firms than in the US, meaning that European firms tend to remain static. This holds true across all sectors and appears to be a relevant factor explaining the EU-US productivity gap.<sup>(7)</sup> Moreover, there seems to be a positive correlation between the share of high-growth and fast-shrinking firms — with some evidence of a revolving-door effect in this regard — and it is this 'creative destruction', rather than the share of high-growth firms *per se*, which is associated with faster productivity growth, particularly as countries come closer to the technology frontier. In fact, the presented evidence of less dynamic business growth distribution in Europe, with a much larger share of static firms, points to less experimentation and a slower reallocation of resources from less to more productive businesses. As these are important drivers of productivity growth, this evidence highlights the importance of allowing 'creative destruction' to take place, thus providing 'room' to grow for successful firms as others exit the market. This is something often ignored in policy discussions.

The evidence presented at CONCORD-2011 showed that the relationship between R&D and firm productivity appears to be clearly non-linear and that, depending on the level of initial productivity, the marginal impact of R&D varies considerably. Moreover, the relationship of R&D and productivity differs among high-, medium- and low-tech sectors with notable benefits from investments in R&D for high-tech firms, while for low-techs no significant effects of investments in R&D on productivity were found.<sup>(20)</sup> Note, however, that other studies<sup>vii</sup> did indeed find significant positive effects of R&D investment on firms' total factor productivity in low-tech industries, but with regard to individual technical in-efficiency rather than to companies' overall production possibilities (i.e. shape/slope of the production frontier; the applied technology). In any case, the empirical evidence calls out for differentiated policy support according to firms' R&D intensity complementing horizontal policy measures aiming at improving the general business environment, i.e. in particular supporting the access to finance and knowledge in the case of high-R&D intensive firms (SMEs in particular) and, in the case of low-R&D intensity industries, facilitating the firms' capital accumulation. And rethinking what kind of innovative activities should be targeted could be a promising undertaking. In fact, spending on marketing associated with innovation appears to yield a significant return (provided there is a marketable innovative product already). Evidence suggested that the returns on such marketing could be even higher than

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<sup>vii</sup> See e.g. Kumbhakar, S. C.; Ortega-Argilés, R.; Potters, L.; Vivarelli, M., Voigt, P. (2011): Corporate R&D and firm efficiency: Evidence from Europe's top R&D investors. *Journal of Productivity Analysis*, <[link](#)>, print forthcoming

spending additional money on the associated R&D, thus reminding us that the two types of expenditures are weak substitutes.<sup>(6)</sup> Hence, going well beyond supporting formal R&D and innovation activities — which implies a well concerted policy mix — is the approach that generates the largest returns.

### ***The role of competition and the overall institutional framework***

As with the relationship between R&D/innovation and firm productivity, the link with competition was also found to be non-linear. In fact, several empirical analyses presented at CONCORD-2011 point towards a robust inverse-U shape relationship between competition and corporate innovation efforts; i.e. a higher number of competitors increases the firm's innovation effort, but at a diminishing rate; furthermore, too much (and too little) competition is detrimental to innovation. Moreover, technology potential, demand growth, firm size, and exports were found to have a positive effect, and foreign ownership a negative impact, on innovation. This inverse-U shape seems to be steeper for creative than for adaptive entrepreneurial regimes.<sup>(27)</sup> These findings provide a rationale for industrial policies to propel the system out of a high competition/low-innovation trap in order to foster industries with high innovation and intermediate competition intensities.

Moreover, considered in the light of a study on industrial diversification,<sup>(10)</sup> the presented results have potential implications for competition policy. To the extent that industrial diversification is initially mainly pursued through Mergers and Acquisition [M&A], and that increased industrial diversification reduces the dynamic efficiency of the merged entities, consumers might be harmed. Competition authorities may fail to take such dynamic efficiency effects into account when evaluating a proposed M&A since these effects may take some time to appear. Hence, neglecting dynamic efficiency effects in competition policy implementation has the potential to create a severe bottleneck in the improvement of the EU's innovative and growth performance.

Examining the role of R&D and innovation for Europe's competitiveness conceptually, innovative firms have to be seen as operating within a broad institutional framework that defines the innovation system [IS], whether national, regional or sectoral. The role of the IS was investigated by several studies and highlighted explicitly with regard to the acquisition of external knowledge and 'realised absorptive capacity', both evidently driven by human capital and identified as crucial for firm and industry performance (see above). However, according to empirical evidence from CONCORD-2011, research organisations (which are seen as a pillar of the IS) work well as 'innovation hubs' for a certain firm only if they interact in the same national setting. Hence, coordination of the IS seems more appropriate at the national rather than the regional or European levels. However, there is still room for territorially differentiated policies aiming not only at more public support for R&D but also at facilitating the diffusion of technology (B2B cooperative efforts and cooperation between firms and public research). In this context, the use of EU structural funds was suggested.

Further with regard to Innovation Systems, protecting intellectual property rights and the prevailing patent regime was seen as a key point. Indeed, it is widely accepted that the (intellectual) quality rather than quantity of patents is a fundamental factor for enhancing innovativeness in the knowledge-based economy. Therefore, the ability of a patent system to ensure quality patents is a paramount issue. Evidence from CONCORD-2011 suggests that the quality of patent systems affects the behaviour of patent applicants, i.e., the better the patent system, the lower the numbers of complaints that patent applicants tend to file.<sup>(13)</sup> This leads to a call for improving the quality of patent systems across Europe. In fact, evidence suggests differences in terms of patent system quality across Europe, which could signal a risk of lowering the quality standards of the best performers to an undesirable low common denominator. Hence, there is a strong need to harmonise the systems (by converging towards the top) and the envisaged 'European patent' will likely be a significant step forward in this regard. However, in the course of the discussion a warning came up against "simple metrics", meaning policy-makers looking at the number of patent applications and patents granted, as this is too simplistic an indicator of innovative activities. As mentioned above, quality rather than quantity is a crucial issue here and good policy-making should rely on more accurate/less biased metrics.

Further and more exemplary evidence from CONCORD-2011 concerning the role of the IS and the institutional framework suggested that a combination of 'niche market conditions' with human agency is fundamental for transforming inventions into innovations.<sup>(8)</sup> The crucial factor, however, seems to be the diffusion of technology (wind energy in the example given), as it is the mechanism that enables reaching a critical mass. It has been suggested to support all of the above-mentioned points more actively through targeted policy measures.

### ***Internationalised corporate R&D activities***

Going beyond the national dimension of IS, several contributions to CONCORD-2011 studied the internationalisation of corporate R&D and innovation. In fact, the impact of globalisation processes on Europe's competitiveness and the dynamics of its industrial structure — and on this topic, the question of how corporate R&D and innovation activities are affected and perhaps even the source of emerging trends — has been a prominent field of research for years. According to contributions to CONCORD-2011, globalisation of EU's Multi-National Enterprises [MNE] is associated with higher productivity for R&D capital, while industrial diversification appears to hinder R&D productivity. The corresponding analysis also revealed that having a higher share of subsidiaries in Europe decreases R&D output elasticity, although it affects it positively in North America. In the Asia Pacific region, in contrast, the share of subsidiaries seems to increase elasticity (but only in-low tech industries).<sup>(10)</sup> Such differences need to be taken into account, for instance, when considering antitrust issues and potential impacts of M&A (on this subject, see above the comment on competition policies).

In addition, based on a social network analysis studying the locations of R&D centres and the relationships between 'origin' and 'hosting' countries,<sup>(12)</sup> it was demonstrated that the US is currently leading in terms of corporate networking, with China emerging rapidly. Moreover, an empirical analysis of determinants of R&D internationalisation suggested that — beyond cultural proximity to other countries — geographical proximity is less important, although a country's network position (technological relatedness) has a significant and seemingly even more important impact on the formation and intensity of R&D linkages.

Another study investigated the relative effects of spillovers on innovative activity within several narrowly-defined technological fields.<sup>(23)</sup> Both intra-sectoral and international knowledge spillovers appeared more relevant than was commonly assumed, and empirical evidence suggests that the importance of international spillovers may even increase over time (while past evidence showed spillovers as being mainly localised and occurring within defined geographical boundaries). These findings point towards policies designed to help firms' better internalising these two types of codified externalities (e.g. EU S&T collaborations). Hence, papers advocate increasing support for international S&T collaborations and partnerships since this is seen as a mechanism that can improve both the accessibility of the internationally-available pool of know-how and the absorption of such knowledge at the firm level. However, evidence has also shown that such international linkages cannot replace internal R&D activities. It was argued that in order for these international linkages to be fruitful, it is important that EU firms hold a central position in international networks. The latter is typically obtained from leading expertise in a given technological area, which calls for intensifying S&T policy efforts with an emphasis on thematic areas in close proximity to the technological frontiers (i.e. toehold for supporting the technological leaders rather than the laggards).

In summary, evidence from CONCORD-2011 suggests that innovation policy needs to be designed in a way that acknowledges, analyses and tackles the bottlenecks and sub-optimal aspects of the institutional, legal and organisational context in which innovation takes place. The quality of that context is crucial to the innovative performance of firms and industries. Crucial aspects include organisational issues such as well-staffed/managed patent offices; easier, cheaper, and quicker definition of standards; facilitating access to infrastructure and distribution networks; flexibility and professional skills of technology transfer offices, etc.

Further improvement to the EU's general framework conditions seems to be needed, first and foremost, to facilitate EU firms' access to large integrated markets and secondly, to stimulate engagement in corporate R&D activities. As a policy goal, merely increasing R&D is necessary but not sufficient if



an overall increase in productivity and competitiveness is the target. Efforts should be backed up by policies aiming at translating R&D results into productivity performance, as well as stimulating innovation and supporting firms' physical capital formation. Moreover, achieving a business environment that rewards experimentation, penalises inertia, and reduces the costs of failure (creative destruction) should be the goal, and this would indicate horizontal policies targeting the corresponding framework conditions.

### **III. New avenues for policy and for management practices**

Across the board, contributions to (all) CONCORD emphasised the importance of a permanently repeated policy evaluation, and therefore the role and sensitivity of appropriate measuring and benchmarking, in order to improve and fine-tune both general and targeted policy measures. Feedback is important in this area, but it is not always straightforward. A strong call for improving the data on firm level R&D and innovation activities and for using sophisticated analytical approaches was heard. Moreover, Conference participants pointed towards a series of blank spots on the research agenda and thus paved the way towards new or extended research activities.

Some studies — based on individual evidence and/or general considerations — highlighted strategic issues in terms of R&D and innovation policies. In fact, during the past few years the need for innovation policy to be strategic has been emphasised; 'strategic' in this context means that some specific aspects or areas might be in need of more public action and attention than others. This is largely based on the understanding that public budgetary resources are limited, and that a selection of the most crucial (strategic) public actions is therefore needed in order to maximise the potential effect of public action. The current economic crisis, with its enormous pressure on public budgets, renders these remarks most relevant.

In general, rather than targeting firms that are growing fast already, a more fruitful approach would be to create the conditions enabling the emergence of all firms that have both the ambition and the potential to grow. Some largely non-targeted measures, especially those aimed at removing barriers for firms' innovative ambitions (thus indirectly targeting the firms with the most growth potential) — improving the climate for venture capital, and reducing market fragmentation, for example — may be more appropriate. On this topic, a central problem having to do with targeting firms and sectors is the issue of what exactly must be targeted. How do we identify the right firms and sectors? Are the high growth firms in fact the appropriate targets? Do the source of growth and the type of firm matter? Might the growth of innovation-based young firms in high-tech sectors be a more appropriate target? There can be no doubt that a clearer case of market failure has been identified for innovation based/fast growing/young firms.

Some of the papers presented at the conference underline the importance of developing national and Europe-wide strategic policy initiatives concerning industrial policy and innovation. For instance, while the software industry is one of the most dynamic industries in Europe and employs approximately 2.8 million people, it lags behind the USA when it comes to global presence and competitiveness.<sup>(21)</sup> Analyses indicate that future potential is in the areas of cloud computing, mobile computing and open source software. Therefore, strategic initiatives must address the crucial innovation systemic aspects that might help or hinder these future prospects (stimulate knowledge, empower people, encourage players, create/amplify/provide access to markets, etc.). Strategic innovation policy must therefore combine horizontal (framework conditions) and vertical (sectoral) dimensions.

A similar implication is to be found when analysing the micro-electronics/nano-technologies and industrial biotechnology fields, also called Key Enabling Technologies [KET].<sup>(30)</sup> The two sectors mentioned above have been the subjects of a series of European-level initiatives. Perhaps more importantly, the legal requirements of "state aid control" under EU competition policy have been gradually transforming and softening the ceilings for aid intensity. This has paved the way for a more strategic industrial-innovation strategic policy approach at the national level (e.g. France/Germany), and for higher levels of public investments in this area. However, there continue to be problems associated with the lack of flexibility in the interpretation of state aid control rules, which are inadequate with regard to a modern and more strategic industrial-based innovation policy approach. Hence, strategic

innovation policy should not focus on key enabling technologies as such, but rather on the actual system-related problems that limit developing the potential of those technologies. This requires going beyond strictly research issues and more into innovation-related aspects.

Lastly, a number of instruments needed and/or helpful for policy making were discussed in the course of CONCORD-2011. For instance, since research funding programmes are the most fundamental types of policy instruments used in research and innovation policy, measuring the effects of R&D funding programs is a crucial dimension of innovation policy-making. One of the contributions confirmed the positive effect of such programmes on firms' innovativeness and on the levels of inter-firm collaboration and demonstrated how to measure the corresponding effect reliably.<sup>(16)</sup> In general, analyses evaluating the effects of policy instruments are necessary for careful consideration and revision of programmes and their eventual reformulation or elimination in case of inefficient/undesired effects and/or failure.

An additional valuable instrument for (fine tuning) innovation policy is measuring the development process of New Technology-Based Firms [NTBFs] and thus approximating the ability to mobilise innovative and risk-taking entrepreneurs. One CONCORD-2011 contribution demonstrated that NTBFs follow different paths in their development, and that policy instruments with more sophisticated analytical tools are needed to grasp this level of heterogeneity, so that policy initiatives are more suitable for the challenges these NTBFs face.<sup>(28)</sup>

Another remarkable policy tool used recently for both national and regional innovation policy is *benchmarking*. This tool facilitates the formulation of appropriate innovation policy strategy for a specific territory (country or region). The use of benchmarking as an instrument should ideally be based on three stages, namely, quantitative, qualitative and a more analytical causality stage. However, it is usually only developed in the first quantitative stage, and this is typically done in an un-nuanced way. For that reason, the first stage of benchmarking has to be based on a set of clear criteria, so that regions and countries are compared to suitable and relatively homogeneous cases. In the course of CONCORD-2011, a methodology was presented to solve that exact problem. When used appropriately, that instrument has the potential to enhance strategic innovation policy-making.<sup>(25)</sup>

From the above follows that fine tuning innovation policy instruments to suit the tasks at hand is a highly advisable undertaking that results in a clear, policy-relevant message: more sophisticated measurement mechanisms, smarter analytical tools and more intelligent combinations of policy instruments are the crucial components of a successful and highly effective innovation policy.

# CONFERENCE PAPERS

- (1) **Francesco Aiello, Paola Cardamone**  
Regional Economic divide and the role of technological spillovers in Italy: Evidence from micro-data
- (2) **René C.G. Arnold, Roman Bertenrath**  
Is there a role for European innovation policy in combating economic downturn?
- (3) **Dolores Añón Higón, Miguel Manjón, Juan A. Máñez, Juan A. Sanchis-Llopis**  
Intramural, contracted R&D and import of technology: Which innovation strategy pays off more?
- (4) **Ascensión Barajas, Elena Huergo, Lourdes Moreno**  
The impact of research joint ventures on SMEs performance: Empirical evidence for Spanish firms
- (5) **Pilar Beneito, Paz Coscollá-Girona, María Engracia Rochina-Barrachina, Amparo Sanchis-Llopis**  
Competitive pressure determinants and innovation at the firm level
- (6) **Mukesh Bhargava, Rabikar Chatterjee, Christoph Grimpe, Wolfgang Sofka**  
Marketing innovation and R&D capabilities – More than one way to innovation success?
- (7) **Albert Bravo-Biosca**  
Firm growth dynamics across countries: Evidence from a new database
- (8) **Juliet Carpenter, James Simmie, Elisa Conti, Fabiana Povinelli, Joschka Milan Kipshagen**  
Innovation and new path creation: Insights into the wind power industry for Europe's competitiveness
- (9) **Michele Cincera, David Dratwa**  
Determinants of scientific production: An empirical study of the world's top R&D companies
- (10) **Michele Cincera, Julien Ravet**  
Globalisation, industrial diversification, and productivity growth in large European R&D companies
- (11) **Claudio Cozza, Michele Cincera, Alexander Tuebke, Peter Voigt**  
Doing R&D or not (in a crisis), that is the question...
- (12) **Giuditta De Prato, Daniel Nepelski**  
Global R&D network: Network analysis of international R&D centres
- (13) **Matthis de Saint-Georges, Bruno van Pottelsberghe de la Potterie**  
A quality index for patent systems
- (14) **Chiara Franco, Alberto Marzucchi, Sandro Montresor**  
The "potential" face of absorptive capacity. An empirical investigation for an area of 3 European countries
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European Commission

**EUR 25244 EN – Joint Research Centre – Institute for Prospective Technological Studies**

Title: Concord 2011 Summary Report

Author(s): Fernando Hervás and Peter Voigt

Luxembourg: Publications Office of the European Union

2011

EUR 25244 EN – Scientific and Technical Research series – ISSN 1831-9424

ISBN 978-92-79-23195-7

doi:10.2791/74768

**Abstract**

The aim of CONCORD-2011 was to provide a forum for an academic discussion about recent findings on the role played by R&D and innovation in industrial dynamics and company growth. Of the 102 abstracts submitted in response to the initial call, 30 papers were selected for detailed presentation and discussion during the Conference. In addition, 20 posters were displayed.

The conference was structured along three thematic strands:

- IV. R&D and innovation: Sources and constraints at company level
- V. Industrial dynamics & the role of R&D and innovation for Europe's competitiveness
- VI. New avenues for policy and for management practices

The papers and the presentations during the conference examined very different topics and issues, ranging from evidence of certain sector specifics in terms of industrial innovation to broad systemic issues. At the same time, the papers shared a common methodology: they were all empirical, based on relatively unique (micro) datasets, and most of them used advanced econometric tools. This methodological consistency was very welcome and contributed positively to the scientific quality of the conference. Obviously, data limitations prevented some papers from going too far in terms of interpretations and policy implications. In fact, in some cases, the unavailability of longitudinal datasets hindered a better investigation into causal links rather than focusing on simple correlations. This was the case, for instance, in terms of several analyses on the EU innovation deficit.

The scientific findings reinforce the broad existing evidence on the subjects covered and, in a number of cases, present conclusions with clear policy implications, as illustrated in this report. This synthesis is structured along the logic of the three thematic strands of CONCORD-2011: (1) micro-level evidence and firm behaviour, (2) evidence at meso-level, i.e. sector and industry dynamics, and (3) evidence from the assessment of concrete policy tools and management practices. Throughout the text, we refer to the papers from which the corresponding evidence and conclusions were extracted. The list of papers is provided in Annex I.

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