Centre for European Policy Studies

CEPS Policy Brief

No. 56/July 2004

Thinking ahead for Europe

R&D in the EU

Can the Open Method of Coordination Succeed in Closing the Gap?

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Abstract

In March 2000 in Lisbon, EU heads of state and government set the strategic goal to become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion. These goals were confirmed at the Barcelona European Council, which added that investment in European R&D should be increased to 3% of GDP by 2010.

A recent CEPS Working Paper by Laura Bottazzi, initially prepared within a CEPS study of the Broad Economic Policy Guidelines undertaken for the European Parliament, argues that the weakness of R&D and the slow accumulation of knowledge in the EU is probably a major reason why Europe has failed to catch up with the US productivity performance during recent decades.[1] But the emphasis of the Barcelona Council on the spending target for R&D could be misplaced as the question is not so much one of increasing the level but rather of enhancing the efficiency of R&D in Europe.

After an examination of various potential constraints on innovative entrepreneurship, Bottazzi argues that the enforcement of competition policy, the introduction of a European patent, adaptations of the tax systems in favour of entrepreneurship, a reduction of red tape, the adaptation of bankruptcy rules and the easing of finance for new ventures are all welcome measures. She argues, however, that actively subsidising investment by venture capitalists may not necessarily deliver the desired results. In fact a large part of European venture capital finds it way to the American capital market and thus does not necessarily benefit innovation in Europe.

Consequently, policy measures aimed at enhancing the efficiency and productivity of R&D in Europe should focus on the level of knowledge of workers and the capacity of entrepreneurs to translate scientific excellence into viable technological innovation. We would add that the relative inefficiency of European R&D is to a considerable extent the result of the segmentation of public research efforts and overlapping of competing research programmes, and thus underutilisation of the available human resources. The time has now come to create an integrated EU market for research and researchers. (This was already attempted by the Commission in the early 1990s, but not accepted by member states.).

The Barcelona R&D targets

In March 2000 in Lisbon, EU heads of state and government set the strategic goal to become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion. The Lisbon conclusions also outlined what was presented as a new working method: the open method of coordination (OMC) designed to bring about a high degree of convergence of member states' policies in fields not covered by the traditional common policies such as, notably, fiscal policy and social policy but also a number of other policies

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[1] Laura Botazzi (2004), *R&D and the Financing of Ideas in Europe*, CEPS Working Paper No. 203, CEPS, Brussels, forthcoming.

normally reserved for national competences. Policies supporting and stimulating R&D constitute a prominent example of the latter.[2]

The Lisbon targets were confirmed at the Barcelona European Council in March 2002. Furthermore, the latter Council meeting agreed that investment in European research and development (R&D) must be increased to 3% of GDP by 2010, with at least two-thirds of the total investment coming from the private sector. This goal is intended to focus the attention of the Commission and member states on the reforms necessary to deliver not only higher but also more productive business investment. To achieve this objective, the Commission in its recommendation for the 2002 Broad Economic Policy Guidelines (BEPGs) for the economic policies of the member states and the Community called for better incentives for firms to invest in R&D while preserving sound fiscal policies.

In September 2002, the Commission adopted the Communication entitled *More Research for Europe: Towards 3% of GDP*[3] with recommendations for member states, industry and other stakeholders for achieving the 3% objective. The Brussels European Council in March 2003 reinforced the member states' commitment to the Barcelona objective and called for concrete action to attain the 3% target and for strengthening of the European Research and Innovation Area to the benefit of all in the enlarged EU. Finally, in a Communication on *Investing in Research: An Action Plan for Europe*[4] in June 2003 the Commission outlined a series of detailed steps to be taken at the level of the EU, member states or even regions in pursuit of the Barcelona target.

The weakness of R&D in the EU: A diagnosis

As stressed in a CEPS Working Paper by Laura Bottazzi, initially prepared within a CEPS study of the Broad Economic Policy Guidelines undertaken for the European Parliament, the weakness of R&D and the slow accumulation of knowledge in the EU is probably a major reason for the unsatisfactory productivity performance during recent decades.[5]

In fact, most or all available indicators on the level of R&D confirm that the EU as a whole is lagging seriously behind other OECD countries, notably the United States and Japan. Thus, on average for the period 1995-99, total R&D expenditure in the EU amounted to about 1.8% of GDP as against some 2.5% in the US and close to 3% in Japan. With respect to private R&D expenditure the relative difference was even larger, with the EU at around 1% of GDP compared with nearly 2% in Japan and the US.

The gap between Japan and the US on one side and the EU on the other was equally striking when measured by the number of researchers. In fact, over the same period the number of researchers amounted overall to some 0.5% of employment in the EU as against 0.8% in the US and close to 1% in Japan. The number of researchers in the business sector was only some 0.2% in the EU or about a third of the level in Japan and the US. As far as patent intensity (the number of patents during a year per thousand persons employed) is concerned, the EU is also seriously lagging behind when measured by the number of patents registered in the (most important) US Patent and Trademark Office.

While the European R&D intensity on average lags behind Japan and the US, the detailed country-by-country data show huge differences between the north and the south of Europe. Among the EU member states, Finland and Sweden appear to be in a class of their own, with a research intensity in the same range as in Japan and the US. The high level of the Scandinavian countries (also including Norway) contrasts sharply with the low level seen in Greece, Italy, Portugal and Spain. In this respect the new member state Poland is in the same category as the Mediterranean countries. Other EU member states (Belgium, Denmark, France, Germany and the UK) are in a more favourable situation that the latter group, but typically show research intensity at roughly half the level of Japan and the US.

According to Bottazzi, the low research intensity in the EU is not in the main owing to a high share of industries with a low intensity of research (composition effect) but essentially the result of a low level of R&D in all branches of the economy. Digging further into the analysis of the nature and effects of the low R&D intensity, she shows convincingly that the low intensity of research gradually translates into a low level of accumulated knowledge.

Using the cumulated number of patents (with each patent weighed with the average yearly number of citations that a patent posted with the US Patent Office receives in its first three years of existence) as a proxy for the production of innovation, she calculates an index for knowledge per worker accumulated during the 1973-96 period for a number of OECD countries. According to these estimates, the knowledge capital per worker more than trebled in the US and Japan from 1972 to 1995 while it rose much less in the EU countries. Although the US and Japan maintained their leadership, the dispersion of the indices fell moderately, indicating a certain catching-up by EU countries such as Spain and Finland, which initially had a very low level of knowledge capital.

Bottazzi then turns to decomposing the average creation of new ideas as measured by "patent productivity" into three

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[2] For an assessment of the potential of the OMC see Gràinne de Búrca and Jonathan Zeitlin (2003), *Constitutionalising the Open Method of Coordination: What Should the Convention Propose?*, CEPS Policy Brief No. 31, CEPS, Brussels, March.

[3] European Commission (2002), COM(2002) 499 final, Brussels, 11.9.2002.

[4] European Commission (2003), COM(2003) 226 final/2, Brussels, 4.6.2003.

[5] Laura Bottazzi (2004), *R&D and the Financing of Ideas in Europe*, CEPS Working Paper No. 203, CEPS, Brussels, forthcoming.

components: 1) expenditure on R&D per worker in R&D; 2) stock of patents per worker in R&D; and 3) a general productivity-enhancing factor in R&D creation. She concludes that within the EU, certain member states (notably Denmark and Finland) obtain more innovation than other member states from a given level of R&D. By including the stock of "world knowledge", she finds a strong impact on domestic innovation in a number of countries, an observation that confirms the findings of a number of other studies of the productivity of R&D expenditure (in terms of innovation). Consequently, the main problem for most (major) EU countries is not the *level* of R&D but the capacity to translate scientific excellence into viable technological innovation.

Bottazzi agrees that the scarcity of risk capital and of venture capital in particular may harm the innovative ability of start-ups. Venture capital has been shown to benefit start-ups beyond the supply of finance. In other words, there is a 'soft' side to venture capital that adds value to the 'hard' financial side: venture capitalists are often a 'coach' for entrepreneurial start-ups. At least in the US, venture capital adds to national innovative capabilities by affecting both the efficiency of the knowledge-production function (more and better patents per given inputs) and the overall total factor productivity. There is not such evidence, however, for Europe. In fact, in Europe venture capital investment in the early stages of ventures is only one-fifth of what is invested in the US. Furthermore, nearly half of the funds come from banks and established companies, while in the US venture firms are most often small independent partnerships working more closely with the management of the firms in which they invest. This seems to confirm that venture capital investment in Europe is much less 'adventurous' than in the US.

Concluding from an examination of various potential constraints on innovative entrepreneurship, Bottazzi argues that enforcing competition policy, introducing a European patent, adapting the tax systems in favour of entrepreneurship, reducing red tape, adapting bankruptcy rules and easing finance for new ventures are all welcome measures. She argues, however, that actively subsidising investment by *venture capitalists* may not necessarily deliver the desired results. In fact a large part of European venture capital finds its way to the American capital market and thus does not benefit innovation in Europe.

Consequently, policy measures aimed at enhancing the efficiency and productivity of R&D in Europe should therefore particularly focus on the level of knowledge of workers and the capacity of entrepreneurs to translate scientific excellence into viable technological innovation.

Assessing the action plan for investing in research

The action plan presented by the Commission in June 2003 included four main sets of actions, comprising a total of 46 new initiatives, including:

- steps to enhance the coordination of policies through active use of the *open method of coordination* and the creation of European 'technology platforms' (five new initiatives);
- strengthening the quantity and quality of the flow of human resources into research (23 new initiatives);
- redirecting public spending towards research and innovation (six new initiatives); and
- improving framework conditions for private investment in research through adaptation of intellectual property rules, regulation of products and standardisation, competition rules and adaptation of the financial and fiscal environment (12 new initiatives).

As stressed by Bottazzi, all or most of these measures would be welcome and useful steps to build up the momentum of innovation in the EU. Yet among the 46 new initiatives listed in the action plan, very few, if any, actually involve the proposal and implementation of common policies. Although it should be noted that a number of cases subject to the open method of coordination policies are mainly within the exclusive competence of member states and must be both decided and implemented within the framework of national competences. The Commission is thus on the whole restricted to efforts that "encourage those that are willing to improve the conditions to do more and better research in Europe".[6]

An issue to consider is whether the relative inefficiency of European R&D is not to a considerable extent the result of the segmentation of public research efforts and overlapping of competing research programmes, and thus underutilisation of the available human resources. Beyond doubt the 6th Framework Programme constitutes a powerful tool in the endeavour to streamline research and promote cross-frontier collaboration and a certain degree of integration of research projects. Nevertheless, the total resources of the 6th Framework Programme only amount to some 5% of the total public spending on research in the EU and thus can only exert marginal influence on the structure and direction of research.

Therefore the time has now come to create an integrated EU market for research and researchers as already proposed by the Commission a decade ago.

[6] Extract from the conclusions of European Commission (2003), COM(2003) 226 final.

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