Knowledge Economists Policy Brief n° 2
October 2007

This is the second in a series of Policy Briefs based on the reports delivered by the "Knowledge for Growth" Expert Group. The full report on which it is based can be downloaded at:
http://ec.europa.eu/invest-in-research/monitoring/knowledge_en.htm

Universities need to find their place in Europe's innovation system

Paul A David[1] and Stan Metcalfe[2]

European universities vary widely, in their financing, governance, research/teaching balance and interaction with businesses. While greater inter-connections between universities and businesses are to be encouraged, there are nevertheless many different factors that must be taken into account. The main connection between the two remains the supply of graduates and qualified staff. The range of possible interactions is vast, and the appropriate mix of these must be carefully considered in each case. Experience in the US shows that over-emphasis on exercising intellectual property rights can hamper efforts to work with the business sector. Finally, universities and policy-makers must not confuse *invention* with *innovation*. Innovation certainly needs invention, but many other factors come into play, most of which are not in the hands of universities.

There are approximately 4000 higher education organisations across the EU and at least 600 other public research laboratories. Their activities are divided between applied and basic research and dissemination of that knowledge. Even though one term is generally used – "universities"[3] – the

[1] Stanford University & The Oxford Internet Institute paul.david@all-souls.ox.ac.uk
[2] Manchester Institute of Innovation Research, the University of Manchester, stan.metcalfe@manchester.ac.uk
[3] It is convenient -- and now conventional usage (at least in European Commission documents) -- to take "universities" as a collective descriptor for tertiary educational organizations. We do so here without suggesting that in specific policy contexts one may safely disregard the important differences that exist between universities and other HEIs -- such as the *grandes ecoles*, *fachhochschulen*, *politechnicos*, and other, emerging technical research and training institutes, including the prospective European Institute of Technology (ETI).

differences within the category can be vast, from their size, to the balance of research and teaching, to the disciplines that are taught, or the extent to which they act in a cross-discipline way.

Naturally, research universities are the focus of a lot of attention when considering the EU's approach to knowledge generation and innovation. Several concerns are raised in this context:

- Are there enough EU Universities at the forefront of international research to be able to provide EU firms with the best research available?
- Are EU firms in a position to grasp the research output of universities and so work with them in developing innovation?
- Should there be specific organisations to connect universities and commercial firms?

This briefing will focus on the question of **what contribution do, or can, universities make to the innovative performance of European firms** and their ability to compete in the global marketplace? The general view is that the European university system is found wanting here. Reasons often cited include lack of funding, outmoded governance systems, barriers to interaction between institutions across Europe, incentive systems that distort interaction with the business community, and an excessive concern for disciplinary-based activity at the expense of more relevant cross-discipline approaches.

In short there is a danger that the University systems of the Community are out of date and urgently need modernising if they are to play their part in Europe's drive for more growth and jobs. Easy to say, much less easy to do.

Challenges exist in many fields, well identified in the European Commission's Green Paper on the European Research Area[4]. Primary among these are: finding competent researchers willing to move across institutional, disciplinary, sector and national boundaries; excellent and properly resourced research institutions that are able to develop and maintain partnerships with other entities, either through direct partnerships, clusters or virtual networking; and effective knowledge-sharing between public research and industry. To this should be added that the heterogeneity that prevails in the university sector is matched in the business sector.

There has been remarkable change and innovation within the European university sector over the last 40 years. Developments of prime importance here are:

[4] See IP/07/ or COM/07/

- the general demise of centralized corporate R&D laboratories in manufacturing industry and the reorganisation of corporate R&D around divisional, near-to-market activities;
- the increased internationalization of R&D activity (see Policy Brief 1), as large firms become more willing to engage with universities and technology research institutes on a world wide scale;
- the increase in "knowledge-based service" activities, with very different meanings attached to R&D activities in the service economy;
- the decline of defence R&D, as a result of the ending of the Cold War;
- the changed status, through privatization or other new forms of governance, of many public research laboratories, in areas such as defence or metrology, that removes them from government, and leads them to search for other sources of funding.

Even bearing these changes in mind, can universities contribute to the innovation process? It is clear that in terms of knowledge, the principle connection between firms and universities comes from the employment of graduates, qualified scientists and technologists with the scientific and technical knowledge to contribute to the solution of innovation problems. When faced with problems linked to innovation, firms are more likely to use their links with customers and suppliers ("*market-mediated*") then their links with universities. Finally, the connections between businesses and universities are many and varied and used in different ways at different times. They range from informal contacts, attendance at conferences and access to published literature, to recruitment of graduates, staff exchanges and joint research programmes or specific contracts.

It is hard to find a policy document from government, business or university sources that does not call for greater, wider or deeper "interactions" between private business firms and the universities. The key question is, **what is meant by interactions**? Two very different, sometimes conflicting notions are often lumped together.

The first concerns a better connection of universities with innovative activity in firms, through stronger networking arrangements, collaborative funding of research programmes and foresight activities in which scientific and technical experts participate.

The second is about stimulating universities to exploit the ideas developed within them, through better management of intellectual property, opening technology transfer offices and creating university-based start-up companies.

While the first notion respects the division of labour between academia and commerce, the second seeks to change it. Both have a role: the question in one of balance, and an understanding not only of the benefits, but also of the costs of each approach. By pursuing in the commercial objectives of the second approach, it is quite possible to lose the gains of the first, in terms of personal contacts, for example. Can universities always play companies at their own game, and win?

Recent events in the US may show that the right balance of these two elements has not been found there either. Since 1980[5], there has been much focus on universities acting to commercialise their research results. The recently announced Open Collaborative Research Program, under which I.B.M., Hewlett-Packard, Intel, and Cisco Systems and seven U.S. universities have agreed to embark on a series of collaborative software research undertakings in areas such as privacy, security and medical decision-making, sees the parties committing to making their research results freely and publicly available. This development reflects a growing sense in some corporate and university circles that US legislation had allowed, even encouraged, too great a swing of the pendulum towards taking economic benefit from public investment in research, and an over-vigorous application of IPR. The result was actually reduced interaction between the university sectors and businesses.

An important point to bear in mind is that innovation is more than invention. There is much more to the innovation process than R&D, wherever it is performed. University-business linkages form only part of this process, albeit an important part, and their influence on innovation cannot be independent of the many other factors at play.

The longer term consequence of the university reform is likely to be a more refined division of labour within the research system, with a clear recognition that different models of a modern university are possible, interaction with the business sector won't be on a "one-size-fits-all" model and all this with different modes of funding and governance.

[5] The Bayh-Dole Act of 1980 permits a university, small business, or non-profit institution to elect to pursue ownership of an invention before the government.