European Expert Network on Economics of Education (EENEE)

EENEE POLICY BRIEF 2/2014 APRIL 2014

How to Activate Universities as Engines of Growth in Europe?

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As universities increasingly open up to the marketplace for knowledge and ideas, debates over university missions have been common. Are European universities able to match societies' expectations as engines of innovative growth without jeopardizing their main missions of education and basic research? This will require a change in policy attention from targeting faculty spin-offs and university patenting to taking a broader view on universities' contribution to economic development, including the research-based training and mobility of human capital.

ENTREPRENEURIAL UNIVERSITY: A THIRD MISSION

As European economies worry about their recovery and future prospects in a rapidly changing world economy, their attention naturally turns to universities, sources of two most valuable assets: skilled people and new ideas. But increasingly, governments are looking for a more direct and large-scale involvement of universities in knowledge transfer. The concept of "entrepreneurial" universities adds market-based innovations and entrepreneurial objectives as a third university mission, next to its core missions of teaching and curiosity-driven research.

Success stories from the US, such as Silicon Valley and Stanford's blockbuster license on recombinant DNA, have helped to promote a standard view of the entrepreneurial university and its economic role, centering on technology transfer through licensing patented academic inventions and faculty spin-offs.

DIFFICULT PATH FROM SCIENCE TO INNOVATION

But economic research shows that the link between science and industry is neither direct nor obvious. Universities must find a strong corporate innovation system as complement for impacting on economic growth. The evidence also emphasizes the large time lags required, the differential effects depending on distance to the technological frontier and on subsets of technological fields and the importance of geographic proximity.

When looking for ways to improve the transfer from science to innovation, academic and policy attention focuses on critical success factors on the science side from best US practices. These include proper intellecttual property right regimes, where Bayh-Dole type of reforms which allocate property rights to the university are considered to have cleared the path towards tech transfer. Other best practices include incentive schemes for tech transfers with a fair share for researchers in royalties and spin-offs and a dedicated technology transfer office with critical scale, expertise and experience. But perhaps the most important success factor for tech transfer identified is the quality of the research faculty and their created ideas. This is a strong reminder of the importance of universities' core mission of fundamental curiosity-driven research for their third tech-transfer mission.

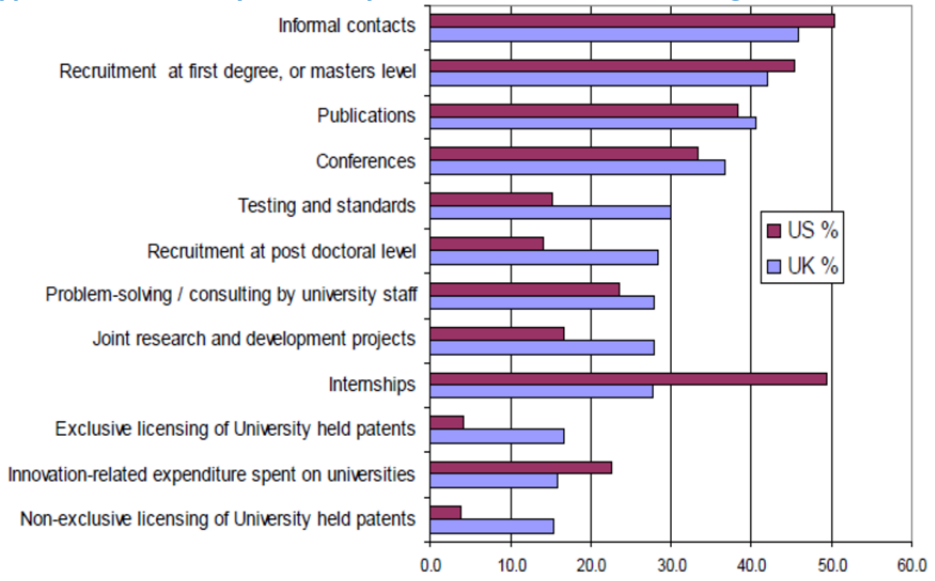
Following best practice analysis, the most frequently used policy instruments for improving universities' third stream activities are (i) regulation of intellectual property rights, (ii) supporting the establishment of technology transfer offices, (iii) supporting "science parks", (iv) funding industry science collaboration and (v) stimulating university-based clusters.

Economic research evaluating these instruments is still far from able to assess their effectiveness. The policy initiatives all suffer from the lack of a proper evaluation strategy prohibiting systematic evidence collection on the causal effects of the policies.

Tech transfer in Europe

Third mission activities of universities in Europe generally lag behind the US, particularly on academic patenting and spin-offs. The following stylized facts arise: (i) Income from third stream is on the rise. (ii) The largest component of university income is contract research. (iii) Licensing income and income from spin-offs is of minor importance. (iv) Few university patents generate substantial licensing income. (v) A few successes account for the majority of income from spin-offs and licensing. (vi) Student spin-offs are less often looked at, but are more numerous than faculty spin-offs.

Types of university-industry interactions contributing to innovation



Percentage of firms rating mode. Source: Cosh et al. (2006).

Moving beyond patenting and spin-offs

Overall, this evidence puts in perspective the classic view on tech transfer. Patenting and licensing is only one of a number of pathways for the transfer of knowledge from universities to industry, and perhaps not even the best form. The best form of technology transfer, at least as rated by industry, may be the moving van that transports the graduate or PhD from his or her university to a new job in industry, as evidence from the US and UK indicates (see Figure).

This implies that the university's most important contribution runs through its first two missions of research-based education and training. Student and researcher mobility is a critical mechanism to transfer hard-to-codify scientific knowledge from university to industry. Research has only recently started to trace labour mobility in the innovation process. First studies confirm that (i) mobility is indeed associated with knowledge transfer. (ii) University-trained researchers are not only important for firms' own R&D activities but also for absorbing external R&D. (iii) Mobility works positively on both old and new employees. (iv) There are strong local effects in labour mobility.

Taking the policy agenda further

Overall, the most salient policy recommendation that stems from the analysis is that policy makers looking for ways to improve the contribution of universities to innovation-based growth should take a long-term perspective for developing an industry-science eco-system, avoiding the temptation of quick "success stories". A particularly dangerous policy practice is a target focusing only on commercializing university technologies through licensing and spin-offs, ignoring universities' broader contribution to economic development with other pathways, most notably the research-based training and mobility of human capital.

Policy makers should be more "innovative" in their search for effective policy interventions, venturing beyond the classic spin-off and incubator programs. At the same time, they should be more serious about evaluating their new and existing instruments. To progress, they should support more systematic data collection and analysis on the various pathways for universities' contribution to economic prosperity.

More details: Reinhilde Veugelers, Elena Del Rey, *The Contribution of Universities to Innovation, (Regional) Growth and Employment*. EENEE Analytical Report 18, Jan. 2014, http://www.eenee.de/dms/EENEE/Analytical_Reports/EENEE_AR18.pdf.

European Expert Network on Economics of Education (EENEE)
Funded by the European Commission, DG Education and Culture

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