

## Chapter 5

### Looking ahead: National policy implications

*Government policies and institutional practices have an important impact on the commercialisation of public research. This concluding chapter on policy implications finds that there is a strong policy bias in favour of codified flows in the form of patents and licenses. Drawing on new survey findings, case studies, statistical analysis and an inventory of cutting-edge initiatives pursued by governments and public research organisations, it makes the case for a more holistic approach to policy making that recognises the importance of people-based channels such as student entrepreneurship and the mobility of staff for the transfer, exploitation and commercialisation of public research results. It also calls for policies to support two-way flows of knowledge between industry and academia.*

This report on new strategies and policies for the transfer, exploitation and commercialisation of public research results gathered a wealth of material and showed that this area has undergone much change and experimentation in recent years. The evidence presented shows a levelling off in academic patenting and licensing activity as new channels, notably student-led entrepreneurial ventures and the commercialisation of public research outputs via open science and data initiatives, gain in importance. At the same time, commercialisation activities have become more sophisticated and complex in response to technological complexity and convergence, but also in response to the integration of public research organisations (PROs) in both regional clusters and global innovation networks. Governments and respective ministries and agencies are developing policy strategies and instruments that can boost these institutes' effectiveness in providing better services to fulfil their missions, one of which is engagement in commercial activities.

The institutions and infrastructures that support the networks and markets for transferring and commercialising public research results are being reviewed across many OECD countries, as traditional approaches and models are facing considerable limitations and may be restraining further scientific advance and broader innovation. For example, the narrow focus on faculty inventors, natural/physical sciences and patenting/licensing; the apparent mismatch between the supply and demand of public sector knowledge; less easy financing for new ventures; limited evidence and metrics for assessing changes, benchmarking institutions, or making international comparisons all inhibit a good interplay among relevant actors and initiatives at different levels. Given these barriers and ongoing changes in organisational structures, orientations, linkages and more, it is important to regularly take stock of these and to understand them in depth.

Tailoring national policies or strategies for the transfer and commercialisation of public research is inherently complex, a fact highlighted by previous OECD work. A 2002 report, *Benchmarking Industry-Science Relationships*, generally regarded governments' role as setting the basic rules and institutional frameworks that reflect the public interest and providing the right incentives to firms, public researchers and PROs (OECD, 2002). Policy goals will differ according to countries' public research environments, as these vary greatly in their ability to turn funding into commercial outcomes. Studies show that academic excellence and commercial success are not incompatible but in fact can be mutually reinforcing. In this respect, countries on the research frontier may be most interested to increase firms' absorptive capacity, while those further behind the research frontier may seek to reduce undesirable duplication of investment and improve the responsiveness of public research to industry needs.

In addition to providing sound framework conditions, policy makers will need to further differentiate the types of commercialisation paths used by various types of PROs. This will require taking into account evidence on the extent to which different activities and channels complement each other.

Management at universities, professional organisations, governments and the private sector should co-ordinate efforts to develop a more balanced set of policies to improve understanding of the process and its performance, as multiple national policy strategies and instruments can result in conflicting goals and incentives. Government initiatives, including the funding of networks and forums or supporting programmes to increase awareness, could help improve the implementation of national and institutional policies.

To be effective, awareness strategies must go beyond addressing information asymmetries; they should help promote the active engagement of PROs and encourage institutional experimentation, in particular in ways PROs organise their relationships with industry. For example, few universities give a clear policy mandate to innovation and commercialisation strategies that recognise different pathways to commercialisation, although university policies and rules have pronounced effects on how TTOs, researchers and students engage in these practices.

However, governments and institutions should design and implement support systems that meet their own needs, resources, and objectives in a realistic manner. Considering the heterogeneity of PRIs and universities and the different local and regional contexts, there is a need to ensure that national and institutional policies are consistent with the local and global research environment. To start, the differences between (and within) countries, national innovation systems (NIS) and PROs mean that successful policy and institutional approaches from one environment may not work in another. History, social and political factors do matter. The system in the United States, for example, would be difficult to duplicate elsewhere as it has a long history of informal interactions (especially consulting and contract research) and of universities serving local needs and orienting towards industry (Gray, 2011). These issues stem from the general complexity of national innovation systems and their linkages. This can lead to national policies having unexpected effects – Howells and Edler (2011), for instance, suggested that policies to introduce “structural innovations” (such as new governance models) can go wrong if the interactions of actors in the system are not well understood. Therefore, governmental and institutional support to new models of commercialisation will have to demonstrate – possibly through pilot experiences – their ability to ensure quality, participation and adequate rewards to those who contribute to the research, peer review and dissemination effort.

Incentive mechanisms play a fundamental role in the effectiveness of knowledge transfer and commercialisation strategies. The overall challenge for policy makers in this respect is to allow for the potential of commercialisation while retaining the fundamental integrity of research institutions, in particular for universities, and to find useful arrangements to link teaching, research and commercialisation. Top-performing institutions are already learning how to operate broad commercial activities without undermining the integrity of core commitments such as research and education. Research funding agencies and respective ministries do have a major role to play in defining key policies concerning access to research results, data and instruments, as well as policies regarding awareness raising, training and creating links between PROs and firms. It is of particular importance to ensure that those who generate ideas and inventions, from professors to students, have relevant incentives and assistance to share and disclose their findings, so that a relevant validation, development and exploitation strategy can be identified and implemented. Clear assignments of government oversight of academic incentives could help here to remedy imbalances and conflicts.

A relatively unexplored domain of analysis is the role of current and former students as key actors in the exploitation and possible commercialisation of knowledge generated, in universities in particular. Acknowledging this role and understanding what drives it and what the main barriers are could prove a particularly fruitful area of future analysis, comparing the level of support and training that PROs provide to promote research-based entrepreneurship among students. In the same vein, evidence of the effectiveness and impact of financial instruments dedicated to the support of academic entrepreneurs, such

as university seed funds, could help improve the identification of solutions and approaches for addressing the funding gap.

The question of how researchers are influenced to participate in knowledge transfer and commercialisation by their institutional environment, as suggested by Ponomariov and Boardman (2012), could be another interesting avenue for future work. The authors suggested it would be instructive to further analyse informal contacts, consulting and collaborative research, as these channels are important to industry. Understanding researchers' involvement in these activities requires knowing more about their mindset/motivations and competences, and the institutional culture and leadership in their workplace. Some evidence on these factors is available, but future research at the individual and institutional level could improve policy making.

Given the growing interest from policy makers in the impact of commercialisation activities, there are greater efforts to evaluate policies at a variety of levels (e.g. individual/firm/institutional/system level). There is no standard approach or solution. Indicators of impact at the level of individuals and institutions are likely to grow in importance. This will create a significant challenge for policy makers, as the impacts of policies can take a long time to materialise and the mechanisms can be several and diverse, and not necessarily captured by available metrics and data infrastructures.

Our current understanding of the pattern of scientific knowledge flows and their impact relies rather heavily on traditional bibliometric sources. Future developments in indicators are bound to draw attention to economically and socially important uses of research outputs, recognising that the information and knowledge they produce can be used by actors beyond the traditional research community. Users include business large and small, entrepreneurs, and the general public. Beyond traditional qualitative and quantitative evaluation methods, emerging Internet-based indicators of use and reuse of publications and data may provide additional insight into the scope and intensity of the impact and effects of scientific knowledge on innovation and the broader economy.

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