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Thematic Issue 54

Research for Environmental Policymaking

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Source: Jacobsson, S., Vico, E. & Hellsmark, H. (2014). The many ways of academic researchers: How is science made useful? *Science and Public Policy*, 41(5), pp.641-657. DOI: 10.1093/scipol/sct088

Contact: eugenia.perezvico@sp.se

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Science for Environment Policy

Broader impacts are important when measuring the utility of science

Governments and funding bodies are increasingly evaluating the 'impact' of academic research. There are growing discussions about impact – what it means, and how it can be demonstrated – and it is a challenge to evaluate impact on society. This study investigated the broader benefits of scientific research, beyond technology development, to support more comprehensive evaluations of science.

Scientists are increasingly being asked to demonstrate the 'impact' of their research, particularly to gain funding. Indeed, recent efforts by several European governments to introduce 'performance-based funding' place a greater emphasis on 'impact' than ever before. In the UK for example, impact makes up 20% of the Research Excellence Framework (the way in which research in UK higher education institutions is assessed).

However, what constitutes 'impact' is evolving. A growing belief, in Europe and elsewhere, is that impact can be measured by the number of new patents or spin-off companies generated by a research project, while others propose that research generates benefits far beyond commercialisation.

There is a risk that by focusing on the former, the criteria used to assess research may neglect vital aspects of science's value. Research generates many outcomes that are not directly measurable: ideas, opportunities and knowledge, for example.

To assess this risk, this study assessed the outputs of the Chalmers Energy Initiative (CEI), a large research programme that received Strategic Research Funding from the Swedish Government in 2010. The researchers wanted to investigate how science is made 'useful' at the CEI, and to use these insights to improve research assessment.

The authors began to investigate the impact of research at the CEI by considering seven key activities performed by academic researchers: conducting research, scientific publishing, commercialisation (e.g. creating new firms, patents and products), educating, networking, providing infrastructure (the tools that facilitate research, such as instruments and methods), and providing explicit guidance (e.g. policy advice).

To assess the value of these activities, the authors analysed how they relate to seven 'functions': influence on the direction of search (attracting organisations to enter a technological field, or guidance within a field), legitimation (social acceptance and compliance with institutions), market formation, entrepreneurial experimentation (e.g. testing new technologies), resource mobilisation (including human and financial capital), knowledge development and diffusion, and social capital development (development of social cohesion and common understanding).

The authors assessed the relationship between the activities and functions through case studies underpinned by interviews with CEI professors, and case studies' beneficiaries, prior evaluations and a patent analysis. This enabled them to capture the ways in which science creates value for society.

The results showed that all functions were influenced by academic activities. For example, conducting research had a direct impact on knowledge development and diffusion, resource mobilisation, entrepreneurial experimentation and influence of the direction of research. However, other traditionally less prominent activities such as networking also generated significant impacts.

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The authors say that the focus on the direct impacts of publishing and commercialisation are inadequate for evaluating the benefits of science. To fully understand how science is made useful, it is important to map all activities and their impacts. The researchers also say assessments should reflect a wider range of impacts, going beyond simply counting the number of patents and spin-off companies.

They recommend that four key activities – networking, providing infrastructure, providing explicit guidance and educating – be considered by future assessments. They say **networking** is critical to making science useful by maintaining dialogue with external stakeholders. To measure this, the researchers suggest recording the number of 'dialogue partners'. **Providing infrastructure** could be measured by contributions to standards or the provision of methods; while **providing explicit guidance** can be evaluated by involvement in non-academic boards, presentations and media appearances. Finally, **educating** could be measured via numbers of graduated PhD and MSc students and engagement in professional education. Together, these indicators provide a more comprehensive reflection of the value of academic research.

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