
Editorial

Effie Amanatidou*

Alliance Manchester Business School,
Manchester Institute of Innovation Research,
Oxford Road, Manchester M13 9PL, UK
Email: effie.amanatidou@manchester.ac.uk
*Corresponding editor

Mika Nieminen

VTT Technical Research Centre of Finland,
Tekniikankatu 1, P.O. Box 1300,
Tampere FI-33101, Finland,
Email: mika.nieminen@vtt.fi

Stephanie Daimer and Miriam Hufnagl

Fraunhofer Institute for Systems and Innovation Research ISI,
Policy and Regions,
Breslauer Straße 48, Karlsruhe 76139,
Germany
Email: stephanie.daimer@isi.fraunhofer.de
Email: miriam.hufnagl@isi.fraunhofer.de

Biographical notes: Effie Amanatidou is a Research Fellow with the Manchester Institute of Innovation Research/AMBS/University of Manchester. She received MSc in Technical Change and Industrial Strategy (1996) and PhD in foresight evaluation (2011) from the University of Manchester/MIoIR. Effie enjoys around 20 years of her research experience, and her expertise mainly lies in the fields of research and innovation policy analysis, research evaluation and impact assessment, social innovation and foresight.

Mika Nieminen works in VTT, Technical Research Centre of Finland as a Principal Scientist. He holds PhD in Sociology from the University of Tampere. He has studied, e.g., transformation of research and research organisations, intermediaries, spin-off companies and impacts of STI policy. His current research interests cover especially systemic innovations and transformations as well as development of impact assessment methods.

Stephanie Daimer is a Senior Researcher in the Competence Centre Policy - Industry - Innovation at the Fraunhofer Institute of Systems and Innovation Research ISI Karlsruhe since 2008. She holds PhD in political science from the University of Mannheim. Her work covers the analysis and evaluation of national and European research and innovation (R&I) policies, the governance of R&I, in particular in the European Research Area and policy instruments.

Miriam Hufnagl studied Political Science with a focus on comparative systems science and policy studies as well as history and constitutional/international law

at the University of Augsburg. Miriam has internships in the field of political education and development aid and in an industrial association. She has been employed since February 2009 as a Researcher in the Competence Center Policy - Industry - Innovation in the Fraunhofer Institute for Systems and Innovation Research ISI in Karlsruhe. Since October 2011, she is a PhD student at the Leuphana University Lüneburg writing a thesis on strategic policymaking in research and innovation policy.

The notion that research and innovation (R&I) can contribute to the resolution of major (grand, global) societal challenges has become pervasive in contemporary R&I policy at international, European and national levels. This brings forth a number of challenges in R&I policymaking that call for a better understanding of

- 1 the emergence of the concept in the policy discourse and the underlying rationale(s) and also of
- 2 the implications for policymaking
- 3 associated policy instruments that need to apply a problem-oriented, multi-disciplinary research approach addressing multiple social, technological and industrial areas.

Efforts are being made by R&I policy analysts and researchers to identify the ‘differentia specifica’ of emergent challenge-driven R&I policies. So far some took their point of departure from the observation that entrenched analytical frameworks for R&I policy to stimulate overall economic growth that does not fit R&I policies, which are focussed on specific objectives (Foray, Mowery and Nelson, 2012, p.1697). Hence, it may be necessary to rediscover public R&D in support of particular sectors and objectives like national defence, public health or agriculture (Foray, Mowery and Nelson, 2012, p.1697).

Comparisons with earlier exemplars of mission-oriented policy have also been made, such as the Apollo and Manhattan projects, concluding, however, that this category does not fit the today’s challenge-driven policies. The challenges addressed today, (such as global warming or the clean energy challenge) apart from being geographically global, have uncertain as well as far-reaching implications if not dealt with. Furthermore, the role of R&I in resolving certain challenges is significant (Mowery, Nelson and Martin, 2010). Nevertheless, to some extent, challenge-driven R&I policies are similar to mission-oriented policies of the past to be categorised by some as “a new mission-led approach” (Gassler, Polt and Rammer, 2008), noting that this approach calls for revisiting incumbent ‘systems of innovation’ approaches.

Although this may, for some, indicate the advent of an imminent analytical paradigm shift making ‘systems of innovation-’ based policy analyses inadequate or obsolete, others find opportunities to make necessary amendments to the innovation system frameworks adding new forms of ‘systemic failures’ (a. o. Wieczorek and Hekkert, 2012) to the framework, such as ‘directional failure’ (Weber and Rohracher, 2012). Similarly, Daimer, Hufnagl and Warnke (2012, 170ff) speak of an ‘orientation failure’ and discuss some ideas how to operationalise this into policy practice, for instance, how systemic policy instruments, which are designed to address the capability of innovation systems, might also be suited to address new requirements of R&I activities implied by the normative turn of innovation policy.

In another contribution (Kallerud et al., 2013), an attempt was made to identify key issues, dimensions, and tensions that may have an essential bearing on the issue of the novelty of challenge-driven R&I policies. The emphasis is in particular in

- 1 Their purported level of stakes of challenge-driven initiatives (grand challenges, with stakes of high, ‘existential’ magnitude with far reaching, yet unknown and interconnected impacts, which makes them be considered as ‘wicked problems’).
- 2 Their supranational scope (e.g., ‘global’ challenges, affecting many or all countries/regions) challenging the up to date almost all dominant role of the national basis of R&I policymaking, and requiring international collaboration and coordination at a yet unknown scale and within organisational settings that need to be developed.
- 3 Their multiobjective nature calling for a multistakeholder and multidisciplinary approach which in turn brings to the fore issues of reconciling diverse interests, foci and objectives in the public and private spheres or in the technological and social realms (addressing societal objectives, while at the same time involving private actors, creating business opportunities and shading into demand-side innovation policy).

These issues have to be addressed under conditions which require a reflexive approach, acknowledging that while the notion of societal, grand and global challenges now drive, inspire and justify a large number of policy instruments, initiatives and priorities, neither the concept nor the organisational models of challenge-driven R&I policy are nowhere near a crystallised and stabilised state. Hence, the rhetoric and practice of challenge-driven R&I policies, on the one hand, and the analytical frameworks to understand and sustain them, on the other, are in a process of coevolution, obfuscating any simple distinction between theory and practice and between descriptive adequacy and normative intervention.

Taking up these thoughts, we are delighted to hopefully contribute to this process of coevolution and the ongoing deliberation on grand challenges with this special issue.

To further complement the debate on the provenance and meaning of the ‘grand challenges’ concept, we included two conceptual papers by Ulicane and Hicks, both consider the historical development of the concept on the global scale as a starting point. While the former continues its analyses with a focus on the European and OECD level, the latter looks at the situation in USA.

As stated earlier, exemplary cases of truly grand and global challenges are for instance global warming and clean energy or the energy turnaround. Therefore, three papers are included that focus on these topics: Dreher et al. (in this issue) interpret the grand challenges approach as a competition between different but dependent technological innovation systems (TIS). Out of this perspective, they present an analysis of the current German energy revolution (Energiewende) and explore the significance of interacting and competing TIS for goal-oriented policies.

Another specific aspect of energy transition is considered by Upham et al. (in this issue) with their paper on Swedish, Norwegian and UK biofuel policy. They argue that transition management functions well as a means of highlighting not only policy shortcomings in a sector but also policy directions appropriate to the scale of grand challenges.

In addition, Klitkou (in this issue) considers transition processes and the impact on these of demonstration projects in Denmark, Norway and Sweden by asking: How successful are Scandinavian demonstration projects in contributing to the development of knowledge networks for sustainable energy and transport transitions?

After looking at specific case studies from Germany (Dreher et al.), Sweden, Norway, UK and Denmark (Upham et al.; Klitkou), the paper by Karo and Lember (in this issue) takes up the situation in Estonia to point out the challenges the new mission orientation brings about for a rather young market-based innovation system. They argue that in addition to the development of new policy mixes and coordination instruments, such policy shift may also require the rethinking of core STI policy rationales and legitimisation practices.

Finally, Loveridge (in this issue) provides food for thought when challenging us with his paper on the interrelation between the digital and natural worlds, which may be the major challenge of them all. He suggests that all research to be underlined by the notion of a crisis in preference to that of a challenge based on well-defined problem-solving opportunities.

Whatever perspective one chooses to take on R&I policies, we can surely all agree on the current and (quite possibly) future relevance of the ‘grand challenges’ concept. Hopefully the authors of this issue and we, as the editors, can add to the quality of the debate by shedding some light on discussed concepts, practices and policies.

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