# Editorial

# Innovation Policy: How can it best make a difference?

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**The role of innovation policy**

Research has documented the impact of innovation on industrial and wider economic development (Fagerberg et al. 2010) and today innovation policy is invariably linked to economic growth in general (OECD 2007) and long-term, sustainable growth in particular (OECD 2010; European Commission 2015). Innovation policy is now discussed as a separate policy and academic field (Christensen and Fagerberg 2016) but it is important to bear in mind that the discussion on a pro-active or re-active innovation policy is also part of a current, broader discussion on the role of the state; to what extent the state should intervene; and if it should have an initiating or a supporting role.

The development towards understanding how the innovation process unfolds and which factors influence innovation has had an impact on innovation policy. This regards not only the often discussed implications of moving from an understanding of innovation as a linear process towards a more systemic and interactive model (Lundvall 2007; Edquist 2011; 2014), but also that innovation is now embedded in a different context than it was previously. Nevertheless, holistic innovation policies have relatively low status and legitimization compared to other, more established policies (Edquist 2014). Moreover, the scope and scale of problems that innovation is expected to address has expanded. Societal challenges like climate change have e.g. been seen as something that will come closer to a solution by way of introducing more innovation into the energy production and consumption (Criscuolo and Menon 2015). The papers included in this issue contribute various answers to the question of how innovation policy can best make a difference.

**Towards an answer to how innovation policy can best make a difference**

We propose that the answer to the above-mentioned question is highly dependent on four dimensions: *objectives*, *instruments*, *implementation* as well as *evaluation/impact assessment* of innovation policy.

*Objectives.* In order to assess the extent to which innovation policy can make a difference, the objectives of the policy should be clear. This may sound trivial, but public policy often pursue a broad and ever changing range of more or less explicit and implicit, final and intermediate objectives, and it reacts to urgent and often unforeseen problems (Flanagan and Uyarra 2016, this issue). Different actors may also have different objectives and incentives, which are not necessarily explicit (Brown 2016, this issue). Furthermore, the scale and scope of objectives may range from a relatively narrow objective, such as influencing the behavior of specific actors in relation to R&D activities (Engel et al. 2016, this issue) to broad objectives, such as creating and shaping markets that may influence the future emergence of new technological paradigms (Mazzocato 2016, this issue). The answer to the question of how innovation policy can best make a difference is highly dependent on which types of objectives are pursued.

*Instruments*. Policy instruments should be adequately matched to the problems and challenges they address, both in the number of instruments, in their resources relative to the problems, and the timing of the ‘cure’. Again, this may sound trivial, but an agenda for further development of innovation policy should include addressing what the most relevant instruments are (Smits and Kuhlmann 2004; Edler and Georghiou 2007) and how these are most appropriately designed and mixed (Flanagan et al. 2011). There is no one-to-one fit between ‘a problem’ and ‘the solution’ in terms of an instrument that works as a generic tool. Policy instruments are *not* tools that carry the same meaning in different contexts; on the contrary, instruments are influenced by the agents that implement them, by the actors they are targeting, and by time and space (Flanagan and Uyarra 2016, this issue). Unfortunately, policy instruments are often studied individually, with few systematic analyses and comparisons of different policy instruments or of the interactions between different types of policy instruments (‘policy-mixes’) (Martin 2016, this issue). Innovation policies also interact with other types of policies. Specifically, there may be a direct relation between the ambitions in terms of radicalness of changes and the interplay between different types of policies that is required to achieve the objectives. In order to address contemporary societal challenges it is most often necessary to combine several policies to achieve pervasive effects on economic structures (Mazzucato 2016, this issue) – a policy combination, which may in turn broaden our understanding of what constitutes innovation policy.

*Implementation.* When implementing a policy, the context and actors should be aligned with expectations to the extent of which innovation policy can alleviate problems. The role that actors play in the implementation and the impact of innovation policy is complicated by the fact that the policy actors are part of the system they are trying to influence (Flanagan and Uyarra 2016, this issue). According to Brown (2016, this issue) this situation may lead to a risk of policy capture by vested interests, revealing a need for further research on how power asymmetries may influence innovation policy. Related to the discussion of the role of policy actors is a discussion of the role of innovation scholars’ contributions towards moving innovation policy forward. Although there may be signs of innovation policy research becoming more ‘academic’ and detached from practice, science is not carried out in isolation. Science, including innovation studies, is influenced by external forces – political, economic and social – and scientific findings are often used, in manners more or less loyal to their intentions, to legitimize specific policies (Fagerberg et al. 2012) that may (or may not) be decided independently of scientific findings. Hence, innovation policy is not the result of a simple translation of theoretical rationales into policy action, rather it is influenced by many factors, not least by policy path dependencies (Flanagan and Uyarra 2016, this issue). Moreover, the policy process is not ‘linear’ in the sense that it proceeds in a process from policy ‘discovery’ or theory to policy formulation, implementation, and evaluation. Rather it often unfolds with feedback mechanisms between each of these stages. Therefore, there may be untapped potentials in further collaboration between innovation researchers and policy makers and closer interaction between policy makers and ‘users’ of innovation policy (Lerner 2002).

*Evaluation.* Innovation policy needs to draw upon lessons from evaluations of previous policy interventions in order to increase our understanding of how innovation policy fails, succeeds and changes (Borrás 2011; Lenihan 2011) as well as of what the impacts on innovation stemming from policy are. However, the types of objectives of the innovation policy are crucial for the choice of evaluation method. If the objective of a policy is to influence the behavior of specific actors in relation to a narrowly defined set of activities, then the principal task of an evaluation is to assess the outcome through estimating the counterfactual state (Engel et al. 2016, this issue). Just like innovation policies are often subject to path dependencies (Flanagan and Uyarra 2016, this issue), so may the behavioral responses of targeted actors (e.g. firms) be path dependent. Engel et al. (2016, this issue) provide an illustration of such path dependent behavioral responses by showing how firms that have been subject to a specific instrument over a long time period have a stronger reaction to the instrument than firms that have no prior experience with the instrument. This is something that should be taken into account when assessing the impact of a specific instrument. Periodic evaluations of existing policy instruments may provide important inputs on how to modify or outface instruments as well as on how to coordinate different instruments (Martin 2016, this issue), but complex interactions between different types of interventions make evaluation of innovation policy a difficult task (Flanagan and Uyarra 2016, this issue). This may suggest redirecting the attention from retrospective, summative evaluations (Edler et al. 2012) towards a greater emphasis on understanding learning processes in relation to innovation policy interventions (Brown 2016, this issue; Flanagan and Uyarra 2016, this issue). Especially when the objectives of innovation policy are broad in scale and scope, there is a need for the development of new tools and indicators that are able to capture transformations of technological landscapes in addition to behavioral changes within existing boundaries (Mazzucato 2016, this issue). Such new tools must also be able to capture – and assess the value of – learning from failure (Brown et al. 2015; Flanagan and Uyarra 2016, this issue; Mazzucato 2016, this issue).

**This special issue**

The papers in this special issue discuss the above-mentioned dimensions of innovation policy in further detail. We do not end up with an unambiguous answer to how innovation policy can best make a difference, but the papers contribute important building blocks for the answering of the question in a specific context, and not least for how to design and implement innovation policy that has a good chance of making a difference.

Mariana Mazzucato, in her paper ”From Market Fixing to Market-Creating: A new framework for innovation policy”, presents an alternative to the market failure approach to innovation policy which has the potential to contribute towards solving grand societal challenges. This alternative approach, inspired by the work of Polanyi (2001 [1944]), sets the stage for government policies that provide directions of change.

Ben Martin’s paper ”R&D Policy Instruments – a Critical Review of What We Do and Don’t Know” provides an extensive overview of the literature on R&D policy as a sub-set of innovation policy instruments. Martin situates R&D policy within a broader context of public policy design in search of a more coherent conceptual framework for analyzing R&D policy instruments.

Kieron Flanagan and Elvira Uyarra’s contribution on “Four dangers in innovation policy studies – and how to avoid them” addresses the community of innovation policy researchers with a ‘warning’ about four possible dangers in current approaches to innovation policy studies. Flanagan and Uyarra argue that adopting a genuinely evolutionary approach to innovation policy can make innovation policy studies more useful in the policy making process.

The two final papers by respectively Ross Brown on “Mission Impossible? Entrepreneurial Universities and Peripheral Regional Innovation Systems” and by Dirk Engel, Michael Rothgang and Verena Eckl on “Systemic Aspects of R&D Policy Subsidies for R&D Collaboration and Their Effects on Private R&D” both deal with assessing the effects of specific innovation policy instruments. Ross Brown challenges the role of universities as regional entrepreneurial actors, and sets out to understand why universities have a dominant role in Scottish innovation policy despite apparently marginal economic contributions. Dirk Engel, Michael Rothgang and Verena Eckl estimate the effect of one important innovation policy instrument in Germany, which is R&D subsidies to firms. The rigorous analysis provides insights to the influence of the public research system in business sector R&D activities.

The five papers in this special issue open an interesting research agenda on the position of innovation policy in the policy landscape, policy objectives, implementation challenges, and possible impacts innovation policies. It is our hope that we, by bringing these five papers together, have spurred an increased interest among the community of innovation scholars to develop this agenda further.

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