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## Responsible innovation: its institutionalisation and a critique

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### ABSTRACT

There is a growing body of literature on responsible innovation (RI). RI is prominent in debates and policies regarding the governance of research and innovation, particularly in the EU and USA. The paper brings together sociologically-informed institutional analysis and critical discourse analysis into a discourse-institutional perspective, which is applied to review the emergence of and scholarly contributions to literature on RI. It generates insights into the role of language use in the institutionalisation of RI from detailed analysis of a foundational text. The paper identifies evidence for the institutionalisation of RI, how this has been accomplished and by whom. The paper considers opportunities for and limitations of RI research and policy in connection with its potential to foster effective anticipatory governance of science and innovation while facilitating inclusive deliberation in society. The conclusion suggests that RI is a developing area of research and practice in which there are dominant perspectives, practices and actors, which combine to inhibit the building of a truly responsive, inclusive and reflexive approach to governing innovation.

### 1. Introduction

Responsible innovation (RI)<sup>1</sup> has become increasingly salient in policy circles. RI in the European Union, for example, is seen as an approach capable – albeit with some institutional development – of addressing ‘grand challenges’ in areas such as climate change and health (European Commission, 2014; c.f. Kuhlmann and Rip, 2014 on the ‘insufficiency’ of pre-existing policies and practices). As a cross-cutting theme underpinning Horizon 2020 (the EU Framework Programme for Research and Innovation) and its challenge to widen participation in ‘Science with and for Society’, RI is presented as ‘an inclusive approach to research and innovation’. Thus RI aims to better align research and innovation with societal values, needs and expectations.<sup>2</sup> It is typically represented as a novel approach to governance of science and innovation, characterising a move from ‘risk governance’ to ‘innovation governance’ (Von Schomberg, 2014). This shift entails governing innovation through early ‘upstream’ interventions rather than ‘downstream’ monitoring and ‘correction’ of interventions ex post. It means moving away from approaches geared towards ex ante calculations of the risks and benefits associated with inherently uncertain decisions about technology, to one more concerned with broadening processes of decision-making to realise ethically acceptable and societally desirable innovation (Von Schomberg, 2013).

RI is identified with a shift of emphasis from ‘shaping technology’ on

the supply side and through better design, to ‘shaping innovation’ (Grunwald, 2011), with greater attention to the interaction of technology development, societal needs and the rules and processes governing this relation. A frequently cited definition states that: “[r]esponsible research and innovation is a transparent, interactive process by which societal actors and innovators become mutually responsive to each other with a view on the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products (in order to allow a proper embedding of scientific and technological advances in our society).” (Von Schomberg, 2012: 50).

Owen et al. (2013) articulate four dimensions of RI: (i) anticipation; (ii) inclusive deliberation; (iii) reflexivity; and (iv) responsiveness. Although closely interlinked with future-oriented concepts of foresight, horizon-scanning and scenario-building, the idea of anticipatory governance in RI is often presented as a step forward in governance of technology and innovation, which should not be confused with much-criticised approaches to forecasting or prediction of impacts of technology (Guston, 2013). It includes governing activities that are more broadly distributed across numerous actors, extended through society through inclusive deliberation. Reflexivity is another prerequisite for responsible, responsive and accountable research and innovation. It means ‘holding a mirror up to one’s own activities, commitments and assumptions’, being aware of the limits of knowledge and the potential existence of other framings of an issue (Stilgoe et al., 2013).

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<sup>1</sup> Here, ‘RI’ refers both to ‘responsible innovation’ and ‘responsible research and innovation’.

<sup>2</sup> <https://ec.europa.eu/programmes/horizon2020/en/h2020-section/science-and-society>

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Responsiveness ‘requires a capacity to change shape or direction in response to stakeholder and public values and changing circumstances’ (Stilgoe et al., 2013), explicitly linking innovation to societal challenges and public interest. These dimensions must be integrated, mutually reinforcing and applied in an iterative manner for the proposed RI framework to be realised in practice. Thus understood the dimensions provide criteria with which to assess the institutionalisation of RI.

RI-related ideas date back at least to the 1930s, based on concerns about the relationship between science and society and the responsibility of science and scientists (Bernal, 1939; Rose and Rose, 1969). Such concerns were reflected in, but not confined to, anxiety about the development and use of nuclear technology for generating electricity and for military application. Moreover, contemporary researchers draw on well-known concepts and activities concerned with potential consequences of research and innovation (e.g. Grunwald, 2011; Stilgoe et al., 2013; Von Schomberg, 2014), informed by a variety of disciplinary perspectives, such as science and technology studies (STS), philosophy and political science. Relevant concepts and practices include technology assessment (TA), science governance, risk governance, (engineering) ethics, public and stakeholder engagement, anticipation, foresight and future studies, each having their own rationale, strengths and limitations. Von Schomberg (2014) points to governance principles, e.g. the precautionary principle firmly embodied in European policy, as inherited by RI from previous cases on innovation and technology governance.

The argument has been made that previously known approaches cannot satisfy all of the expectations connected with the governance of science and technology although they variously provide knowledge, expertise and a methodological toolbox for RI research and policy communities (Grunwald, 2011). The major novelty and practical relevance of RI is in integrating existing approaches and in making an explicit link between innovation and responsibility (Grinbaum and Groves, 2013; Grunwald, 2011; Owen et al., 2012, 2013). This means that existing responsibilities need to be addressed as a whole, framing RI as a responsibility for society at large, with closer attention to societal context and a broader spectrum of actors capable of reflecting on their own values and research and innovation-related responsibilities (Grunwald, 2011; Wynne, 2011).

The paper critically reviews existing literature on RI. The paper argues an approach informed by a discourse-institutional perspective can insightfully contribute to building an understanding of the institutionalisation of RI research and practice. In doing so such an approach may help to probe the ‘carriers’ and practices of RI and the implications of these for anticipatory governance of science and innovation for embracing diverse but relevant perspectives and actors which might render such governance effective and fair. Accordingly, the paper addresses the following research questions:

1. To what extent, why and how has responsible innovation achieved greater institutionalisation?
2. What are the dominant conceptions and concerns of responsible innovation research and practice?
3. What perspectives or actors are marginalised in RI discourse, and why?

The paper has the following structure. Section 2 outlines the discourse-institutional methodology and the more specific methods employed to critique and to review RI. Section 3 specifies how this approach is applied to critically review the emergence of RI research and policy. Section 4 closely analyses the text of a foundational contribution on RI to generate insights into its institutionalisation, identifying some matters of concern arising from this for anticipatory, inclusively deliberative, responsive and reflexive governance of science and innovation. Section 5 situates these concerns in a critique of pervasive social structures, which are implicated with conventional practices for exerting control over the future and regulating science and innovation.

Section 6 is a conclusion summarising the work of the paper and pointing to implications thereof for the institutionalisation of RI.

## 2. A methodology and methods for critically reviewing RI

The paper suggests that debates about the institutionalisation of RI may be helpfully informed by drawing on literature on ‘discursive-institutionalism’, some of which has been invoked by researchers of innovation, environmental policy, and science and technology studies (Hajer, 1993; Hajer and Versteeg, 2005; see also: Genus, 2016; Schmidt, 2010). Schmidt (2010) considers ‘discursive institutionalism’ to be an umbrella term encompassing a range of views on the exchange, communication and legitimation of ideas in the political sphere, one which represents a fourth type of neoinstitutional approach. However, a fundamental distinction may be made between (e.g. Schmidt’s, 2010) discursive institutional approach and the discourse – institutional perspective adopted here, which explicitly brings together a critical view of discourse with sociologically informed institutional analysis. The critical orientation of the approach puts centre stage the domination or marginalisation of certain actors or ideas, highlighting how this is institutionalised. More than a merely discursive approach, a discourse-institutional perspective addresses how institutional phenomena come to be objectivised and experienced as ‘real’. More than a merely institutional approach, a discourse-institutional perspective recognises the importance of language and subjectivity to prevailing institutions and institutional change.

Central to the discourse-institutional approach is the idea that discourse constitutes thought and other phenomena which frame the possibilities for social action. The approach focuses on the language and related structural arrangements which constitute and institutionalise social relations. The paper argues that it is necessary to examine *critically* language-related phenomena which partly create and reproduce social relations (and possibly transforms them). However, it addresses broader and unequal relations within its analysis of ‘language and power’, than might be the case with a narrower conception of language based on minute linguistic analysis (Fairclough, 2001). This critical approach is associated with the work of Fairclough (2003, 2010), who attempts to unravel the workings of contemporary capitalism. The argument is that such a view can help to understand patterns of dominance, inertia and change in contemporary societies. It is thus an approach which fits well with an aspiration to understand more clearly the nature and effects of institutionalisation and sources of possible institutional change.

In relation to ‘institutions’ it should be made clear that one is not employing this term to refer merely to political organizations, as is often the case in literature advocating the need for ‘institutional change’ or new policy arrangements, in relation to improving the governance of science and innovation (c.f. Genus, 2014). Rather, the reference is to institutions as ‘rules’ (Scott, 2008). Thus institutions are understood to be regularities in social life which are held in place by complexes of formal or regulative, normative and cultural-cognitive rules, and the compliance mechanisms which underpin them, but which are subject to change. These rules are inter-related so that, for example, legislation and legal sanctions enforcing them are only effective if they are accorded an assumption of credibility among those who are intended to be disciplined by them. Legitimacy is ‘carried’ by interacting artefacts, relational networks, routines, language and symbols. Whereas previous work emphasised institutions as having inertial properties and stability in social life, later contributions focus on what allows new institutions to become embedded and ‘old’ ones to be disrupted (Greenwood and Suddaby, 2006). Understanding institutions in this way, the paper considers the potential insight that might be gained from developing a complementary approach which bridges a critical approach to discourse analysis of responsible innovation (c.f. Li et al., 2015; Stahl et al., 2014 on the role of fiction and narratives in prompting thinking about the ethics and desirability of new technologies) with a concern to fill the

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