Monitoring the Evolution and Benefits of Responsible Research and Innovation (MoRRI)

Analytical report on the dimension of citizen engagement and participation of societal actors in research and innovation

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Sub-task 2.5, analytical report, Deliverable D2.1

Executive Summary

This report is one out of a series of six reports, each targeting a separate dimension of Responsible Research and Innovation (RRI). The six reports collectively form the main output of Task 2 of the 'Monitoring the Evolution and Benefits of Responsible Research and Innovation' (MoRRI) project.

The report at hand specifically focuses on the dimension of 'Citizen engagement and participation of societal actors in research and innovation', or in short 'Public Engagement' (PE). The main objective of this report is to take stock and assess existing empirical material within the dimension of PE, thus providing a platform for subsequent definition of metrics and indicators for RRI dimensions in Task 3. More specifically, the report will provide a functional PE vocabulary, review existing EC studies and other empirical information, assess availability of qualitative/quantitative data within this dimension, assess data gaps, and provide reflections on the need for primary data collection in subsequent project tasks.

To reach an operational understanding of PE while recognizing the complexity of objectives for PE and the variation in mechanisms for engagement, the report distinguishes five main categories of PE, namely 'public communication', 'public activism', 'public consultation', 'public deliberation', and 'public participation'. This classification of PE mechanisms and initiatives primarily takes into account 1) their aim / objective and 2) the direction of the flow of information. Furthermore, the categories tap into the distinction between horizontal engagement (activities oriented towards cultivating a broader scientific culture in society) and vertical (policy-oriented) engagement, and the classification is furthermore indicative of the interrelatedness of PE and other dimensions of RRI, in particular the dimensions of science literacy and governance. This operational understanding is considered a useful platform for organising the monitoring of PE and as a background for developing indicators that are able to capture (some of) the complexity of the field.

The review of EC studies and other empirical studies on the PE dimension shows that a significant share of these studies are useful for identifying relevant content for indicators and ensuring that core issues are not disregarded, but less relevant for populating indicators with actual data since many target a 'global' analytical level in the sense that they explore cross-cutting trends and patterns within the field without actually presenting transferable data. Some studies do however provide specific indicators at national, institutional, and individual level, respectively. With a view to harvesting secondary data, the Eurobarometer surveys constitute a particularly useful source. The availability of existing data can be summarized in the following way:

Data availability across PE categories

It is the overall assessment that the empirical studies reviewed are able to offer information across the operational categorisation presented. Several studies explicitly target questions related to variation in PE formats, and a number of studies aim to develop typologies of PE activities and populate these with empirical cases. The category of 'public activism' is however not extensively covered by the studies reviewed below.

Availability of quantitative and qualitative data

The vast majority of empirical studies on PE provide qualitative data. In this regard, the Eurobarometer data constitute a notable exception. For the purposes of MoRRI, it will be necessary to translate qualitative material into 'quantitative' indicators and measures. A number of the existing and promising indicators presented in the report are based on such procedures.

Availability of data across analytical levels included in the intervention logic model

The empirical information that emerges from the studies reviewed disproportionately concern the 'input' level, but with examples also across the other three levels; in particular studies that address the 'context' level.

Availability of data at different levels of aggregation

A significant share of the empirical studies provides empirical information about PE at the global level, and several studies target the national level. Only a limited number of studies provide empirical information relevant to sub-national analytical levels. Some of these are, however, explicitly presenting operational indicators relevant to MoRRI.

Feasible existing indicators for monitoring purposes

As a platform for the subsequent design of RRI indicators, the report presents 33 existing PE indicators and provides the associated data to the extent that these have been accessible. These are harvested from the small subset of empirical studies that actually provides feasible indicators and data which can be used for MoRRI monitoring purposes. There is a clear difference between the overall emphasis in empirical studies of PE on the 'global' level, the 'input' phase of the intervention logic model, and qualitative data on the one hand, and the characteristics of the indicators that can be extracted on the other hand. The 33 identified indicators are, by nature, quantitative, though some are derived from qualitative primary data. These indicators tend to be oriented towards the 'input' but also the 'output' level. In terms of level of aggregation, they spread across the 'national', 'institutional', and 'individual' level fairly balanced.

This implicitly points to a gap of both 'context' and 'outcome' measures. Furthermore, none of the existing indicators identified in this report address the 'regional' or 'programme/project' level. Not surprisingly, the emphasis in the reviewed literature and studies on the 'global' level, often in the shape of general policy reflections or development of generic models for characterising / typologising PE, does not manifest itself in actual indicators populated with data.

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1. Introduction - analytical and empirical aspects of Responsible Research and Innovation

This report is one out of a series of six reports, each targeting a separate dimension of Responsible Research and Innovation (RRI). The six dimensions include 'Citizen engagement and participation of societal actors in research and innovation', 'science literacy and scientific education', gender equality', 'open access to scientific knowledge, research results, and data', 'research and innovation governance' and research and innovation ethics'. The six reports collectively form the main output of Task 2 of the 'Monitoring the Evolution and Benefits of Responsible Research and Innovation' (MoRRI) project, and they are informed by the results of the literature review on RRI and its conceptual components which was performed as Task 1 of the project.

The six reports emerging from Task 2 specifically address analytical and empirical issues relating to each of the RRI dimensions. Each report aims to:

- Provide an operational understanding of the RRI dimension it targets
- Present existing empirical information about the RRI dimension
- Assess data availability and specify analytical levels and degrees of aggregation of available material

The reports will provide a platform for subsequent definition of metrics and indicators for the RRI dimensions in Task 3.

The report at hand specifically focuses on the dimension of 'Citizen engagement and participation of societal actors in research and innovation'. For purposes of brevity and readability, the report will use the shorter notion of 'Public Engagement' (PE) to capture the contents of this dimension.

The report is structured in accordance with the main aims of Task 2 and also provides an outlet for the results of Task 1. In chapter 2, results from the literature review are presented. These provide a background for the following chapters. Chapter 3 is concerned with the development of an operational understanding of PE. The objective is to provide a functional vocabulary of PE by clarifying important analytical components and definitions of PE. This chapter includes specification of the relationship and borderlines between the PE dimension and the other five dimensions of RRI. Chapter 4 accounts for existing empirical information on PE. It is based on a review of selected studies funded by the European Commission, along with review of evidence from other empirically oriented studies which are considered particularly relevant for the PE dimension.

In chapter 5, availability of existing data on PE is assessed. Following the scheme outlined in the MoRRI proposal, this chapter specifically considers the availability of data on PE relating first to its characteristics in terms of the intervention logic model, i.e. data describing the context, input, output, and outcome of ethics. More specifically, **context** relates to the environment and overall situation in a country; **input** to the activities carried out, measures taken, structures created or resources provided to address what is done in order to address issues of RRI and whether it is done in a systematic manner; **outputs** to the immediate or direct results of activities and **outcomes** relate to the achievements (MoRRI Proposal 2014:64). Second, availability of data are described according to the level of aggregation of these data, distinguishing data that describe the global level, the national level, the regional level, the institutional level, the programme/project level and the individual level.

Reflecting the findings in chapter 5, chapter 6 considers issues relating to data gaps and assesses the overall need for primary data collection to fill gaps. Finally chapter 7 provides early thoughts on the development of indicators and metrics for PE, which will be the objective of Task 3.

2. Results of the literature review on PE

This chapter includes a list of the core literature on PE selected for review (approximately 10-15 papers have been reviewed for each RRI dimension), as well as a synthesis of the literature review on this dimension. The literature review was performed in Task 1 of this project. The synthesis will summarize the main conceptual elements of the targeted dimension, and form the background for the succeeding chapter about the 'functional vocabulary' for the dimension.

2.1 Review of core literature relating to PE

The objectives of the literature review (Task 1) is to:

- review of the state of knowledge regarding RRI
- define the policy context of RRI in Europe and elsewhere
- give a comparative assessment of RRI dimensions, weighing-up advantages, disadvantages and available options
- conduct a preliminary assessment of the availability of empirical evidence on the dimensions
- finalise the definitions and properties of the RRI key dimensions
- finalise the definition and properties of additional factors that may be relevant for the monitoring tasks.

In order to meet these objectives and provide useful input to the thematically and methodologically strongly related aims of Task 2 and other ensuing project tasks, the approach to the literature review was designed in close cooperation with the dimension and task leaders. In a first step, the five dimension leaders were asked – based on their long-standing experience in their respective fields – to select 10 to 15 key publications in each key RRI-dimension for detailed review. Second, a review template was designed in order a) to ensure a systematic analysis of the selected literature and b) to cover all relevant aspects and information required in Tasks 1 and 2. Before it was rolled out to the individual reviewers, the template was subject to a pretest.

For PE, the following key publications were selected and reviewed:

- Arnstein, Sherry R. (1969): A Ladder of Citizen Participation. *AIP*, 35, 216-224.
- Bauer, Martin W., Nick Allum and Steve Miller (2007): What can we learn from 25 years of PUS survey research? Liberating and expanding the agenda. *Public Understand. Sci.* 16, 79–95.
- Bucchi, Massimiano and Frederico Neresini (2008): 'Science and Public Participation' in, Edward et al (eds.): Handbook of Science and Technology Studies (3rd edition). Cambridge: Mit Press.
- Delgado, Ana, Kamilla Lein Kjølberg and Fern Wickson (2011): Public engagement coming of age: From theory to practice in STS encounters with nanotechnology. *Public Understanding of Science.* 20: 826.
- Mejlgaard, Niels and Sally Stares (2013): Performed and preferred participation in science and technology across Europe: Exploring an alternative idea of ''democratic deficit''. *Public Understanding of Science*. 22, 660–673.

- Neresini, Federico and Massimiano Bucchi (2011): Which indicators for the new public engagement activities? An exploratory study of European research institutions. Public Understand. Sci. 20, 64–79.
- Newton, Kenneth and Brigitte Geissel (2012): Evaluating Democratic Innovations: Curing the Democratic Malaise? New York: Routledge
- Rask, Mikko, Saule Maciukaite-Zviniene and Jurgita Petrauskiene (2012): Innovations in public engagement and participatory performance of the nations. *Science and Public Policy* 39, 710–721.
- Rowe Gene and Lynn J. Frewer (2005): A Typology of Public Engagement Mechanisms. *Science Technology & Human Values*. 30: 251.
- Rowe, Gene and Lynn J. Frewer (2000): Public Participation Methods: A Framework for Evaluation. *Science Technology & Human Values*. 25, 251-90.
- Smith, Graham (2005): *Beyond the ballot. 57 Democratic Innovations from Around the World*. The POWER Inquiry.
- Stilgoe, Jack et al. (2014): Why should we promote public engagement with science? *Public Understanding of Science* .23: 4-15.
- Stirling, Andy (2008:) "Opening Up" and "Closing Down". Power, Participation, and Pluralism in the Social Appraisal of Technology. *Science, Technology, & Human Values.* 33, 262-294.
- Vargiu, Andrea (2014): Indicators for the evaluation of public engagement of higher education institutions. *Journal of the Knowledge Economy.* 5: 562–584.
- Wilsdon, James and Rebecca Willis (2004): See-through Science Why public engagement needs to move upstream. London: Demos.

The guidelines for the review process and the findings of the individual reviews are documented in the Appendix to this report.

2.2 Synthesis of literature review on PE

The synthesis of the reviewed literature has been conducted in order to provide a concise overview of the key dimension, its policy context, main definitional elements and functional vocabulary, most important claims about impacts, and relationships to other key dimensions of RRI.

Cross-reading of the review reports on selected core literature shows that 'citizen engagement and participation of societal actors in research and innovation', or PE, is today a rich and diversified field of practice and academic studies, and the concept of PE is multifaceted. The PE field has been reframed and transformed within the last decades and despite variation across countries and contexts, a general turn from one-way and top-down models of communication towards increased focus on 'new' dialogue-based approaches characterizes the development of the field (Bauer et al 2007).

During the 1960s and 70s, public concern with developments in science and technology rose. Activist groups and social movements with a critical stand towards environmental depletion, consumerism, nuclear power, the dominance of multinational corporations, the risk of war etc. challenged the prevailing positive understanding of science and technology, and emphasized a need to discuss science and technology not only as instruments for solving military, economic, and social problems, but also as a source of social and environmental problems. In the following decades, important

academic contributions tried to explain the apparent 'legitimacy crisis' of science, indicated by the lack of public appropriation of new technologies, distrust in scientists, and citizen mobilization in science-sceptical social movements. One of these academic diagnoses is encapsulated in the 'risk society' thesis (Beck 1992), which recognizes the responsibility of modern science and technology in creating a comprehensive risk situation, yet with little capability to manage its consequences.

In parallel with the academic reconceptualization of science as a social activity with significant societal implications, the 1980s and 90s saw early, and scattered, policy responses to public concerns and scientific risks. Systematic technology assessment procedures and the establishment of dedicated organisations, ethical committees, as well as increased science communication efforts were introduced heterogeneously across countries, and in some cases, specific institutional arrangements were developed to facilitate public and stakeholder involvement in issues related to science and technology. Public engagement activities were, however, to a large extent tailored to bridge the gap between the highly specialized activities of research and the non-expert general public (Kallerud 1997).

In 1985, The Royal Society in London issued a report on 'The Public Understanding of Science', which has been an influential document in the modern history of public engagement with science. The report, was, in the words of Josephine Anne Stein a product of the 'Thatcherite Britain' (Stein 2003), in which all public expenditure had to be justified in terms of its contribution to national prosperity. Given considerable public investments in science and technology, science should be transparent and scientists should account for the societal consequences of their work.

The report highlighted the intimate connection between national prosperity, science, and technological progress, and the pervasiveness of science and technology in the everyday life of citizens. It identified a need to strengthen science communication efforts for two purposes: first, because it basically is not possible to navigate successfully in modern societies without an overall understanding of science. Ignorance of science, the report argued, leads to alienation and renders individuals vulnerable to superstition and 'pseudo-scientific information', thus seriously challenging the constitutive idea of a democratic society, in which every citizen has equal opportunities. Second, science and technology are fundamental forces in the broader innovation system, which generates progress and prosperity. There is a need, the report emphasised, to tell this story to the public in order to generate a broader appreciation of science and technology (Wynne 1995). In this respect, 'understanding' science is not merely a question of being interested and knowledgeable, but rather a question of appreciating and acknowledging the importance of science and technology as main drivers of economic and societal progress.

In the literature, the assumption that lack of public appreciation of science and technology is due to lack of understanding of science and technology has come to be known as the 'deficit-model' (Layton et al. 1993). Since the turn of the Century, the deficit model is, however, increasingly considered insufficient in describing the complex processes of public attitude formation regarding science and technology, let alone the inability of such a model to help sustain democratic decision-making processes. Increasingly, the agenda has shifted away from enhancing public scientific literacy by disseminating science, towards enhancing public participation in science and technology. The science dissemination activities remain important in national strategies concerning the relationship between science and society, yet, increasingly efforts are put into creating mechanisms, or 'technologies of humility' (Jasanoff 2003) or 'technologies of community' (Irwin 2001), which could offer an adequate framework for active public participation in negotiating and assessing science and technology

developments, rather than merely public consumption of (information about) science and technology. Particular attention has been given to the idea of 'upstream engagement', which means that PE takes place 'upstream', at very early stages of the scientific and technological development process, and not 'downstream', after decisions have been made, and exercises run the risk of being tokenistic (Wilsdon and Willis 2004).

The emerging attentiveness to active public participation in science and technology has since become an important feature of the field. Scholars and practitioners increasingly recognize that science is not a disinterested endeavour; neither is technology a mere resolution and application of scientific knowledge. On the contrary, the tale of science and technology developments is one of conflict, controversies and social contingencies (Bijker, Hughes & Pinch 1987) and it requires a focus on the various actors, who articulate interests and exercise power towards science and technology and on the networks and mediating practices between these actors. New technologies navigate their way through competing social claims, and the translation processes or mediating practices are ultimately important for the actual success of these technologies. Hence, 'sound science', probabilistic approaches in technology assessment and science and technology policy making are insufficient. Rather, lay citizens and societal actors should be considered relevant and necessary participants in the broader societal negotiations about how to assess and prioritise research and innovation.

Political ideas about participation have been broadened over time, from a rather narrow focus on voting behaviour and party membership to a more open concept, which includes grass-root activities, voluntary associations, campaigning, local group memberships, individual contacts with authorities, and political consumption among the ways citizens can participate politically (Goul Andersen & Hoff 2001). Recent years have witnessed an increasing interest in the relationship between participation and deliberative democracy (Eriksen 1995; 1999), sometimes referred to as discursive democracy (Dryzek 1990; cf. Dryzek 2000), which is essentially a discourse on democracy, which emphasises public debate, collective reasoning, and reflection as imperative elements in a legitimate political community. In policies and activities concerned with public participation in science and technology, the normative ideals of deliberative democracy and of undistorted interaction have also become highly influential. There are numerous examples of participatory exercises on issues of science and technology based on principles adapted from theories of deliberative democracy, such as consensus conferences, deliberative polling, citizen juries, town meetings, and other public deliberation programmes. Local as well as national and international networks of 'deliberation practitioner' have emerged, and good practices in deliberation exercises are systematically being identified and collected in 'practitioners' handbooks' on strategies for civic engagement (Gastil & Levine 2005) and public participation (Creighton 2005) within this field.

Besides the obvious potential of public engagement to open up debates and discussion about scientific and technological issues (Stirling 2008) and positive examples where such ideals have been put into practice, PE is also at risk of being abused as an instrument to enforce particular institutional interests (Stilgoe et al. 2014). By scanning through the academic literature it becomes obvious, that an increasingly critical agenda of PE research is emerging. Looking back at decades of PE research, assessments and evaluations, the tendency to focus on procedural demands rather than also taking into account the broader political context and broader questions of science and technology, seems to exist (Stilgoe et al. 2014). This does not mean that procedural aspects are negligible; it is rather the opposite, as it is crucial in order to

legitimise engagement activities. Nevertheless, besides procedural questions such as 'When is the right time for PE, upstream, midstream or downstream?', 'Who should be included in PE, who is a "relevant" participant?', 'How should PE be initiated and by whom?' it is of great importance to also elaborate on the rationale, i.e. 'why should PE be done?' and the context, i.e. 'where should PE be grounded, universal or context specific?' (Delgado et al. 2011).

Further indications for some kind of disconnect between normative ideals and empirical realities can be found by having a look at the PE performance of research institutions. Neresini and Bucchi (2011) carried out an exploratory study of 40 European research institutions and investigated to which extent the diffusion of PE activities has led to an incorporation of PE into organisational routines. Results of their study show that the performance is highly unequal among the different research institutions and that there is a remarkable distance between few organisations that are very active in terms of PE and many organisation which are scarcely active. In terms of organisational change originating from the PE activities, the authors conclude that it is more incremental than systemic (Neresini/Bucchi 2011).

3. Functional vocabulary of PE – definitions and terminology

Building on the results of the literature review, the purpose of this chapter is to arrive at a functional vocabulary of PE. The intention of the chapter is to present the definitions and terminology related to PE that will allow an empirical and practical approach to the concept of PE. The functional vocabulary will be the basis for the subsequent exploration of empirical studies and data on PE. Importantly, this chapter will consider the borderlines and relationship between the PE dimension and the remaining five dimensions of RRI.

On the backdrop of the broad developments in the field of PE, and reflecting the synthesis of the literature review, a number of issues stand out as important elements of an operational understanding of the PE dimension of RRI.

First, there is no singular conception of 'engagement' and no single model of its implementation. A number of important contributions have, however, provided useful typologies of PE that are instrumental in organising the vast, and expanding, universe of engagement activities within the context of research and innovation.

Rowe and Frewer (2005) develop a typology of PE mechanisms based on the direction of the flow of information between representatives of the public on the one hand and the sponsors of engagement initiatives (defined as the party commissioning the engagement initiative) on the other hand, resulting in a differentiation between 'public communication', 'public consultation', and 'public participation'. Bucchi and Neresini (2007) further develop the typology into a two-dimensional scheme. One dimension concerns the intensity with which citizens participate in knowledge construction processes, while the other distinguishes 'sponsored' engagement activities from those that are spontaneous or, in other words, instigated by citizens themselves.

An alternative approach to systemise the huge variety of different mechanisms is offered by Smith (2005), who speaks of 'democratic innovations' in general and divides these into electoral innovations (e.g. electronic voting, positive abstention, reducing voting age), consultative innovations (e.g. public meeting, community visioning, standing citizen' panel), deliberative innovations (e.g. citizens' juries, consensus conferences, deliberative opinions polling), co-governance (e.g. youth councils, participatory appraisal, participatory budgeting), direct democracy (e.g. referendum, initiative, recall) and e-democracy innovations (e.g. e-referendum, online deliberative polling, e-consultation). He defines democratic innovations in general as "formal methods for involving citizens in the political decision-making process" (Smith 2005).

Building on these prior insights, but mainly informed by an inventorying of 250 specific engagement initiatives across Europe and beyond, Ravn, Mejlgaard and Rask (2014) classify PE mechanisms and initiatives by 1) their aim / objective and 2) the direction of the flow of information. The five categories below are identified:

Public communication – *the aim is to inform and/or educate citizens*. The flow of information constitutes one-way communication from sponsors to public representatives, and no specific mechanisms exist to handle public feedback (examples include public hearings, public meetings and awareness raising activities).

Public activism – *the aim is to inform decision-makers and create awareness in order to influence decision-making processes.* The information flow is conveyed in one-way communication from citizens to sponsors but not on the initiative of the

sponsors, which characterized the 'public consultation' category (examples include demonstrations and protests).

Public consultation – *the aim is to inform decision-makers about public opinions on certain topics.* These opinions are sought from the sponsors of the PE initiative and no dialogue is implemented. Thus, in this case, the one-way communication is conveyed from citizens to sponsors on the initiative of sponsors (examples include citizens' panels, planning for real, focus groups and science shops).

Public deliberation – *the aim is to facilitate group deliberation on policy issues where the outcome may impact decision-making.* Information is exchanged between sponsors and public representatives and a dialogue is facilitated. The flow of information constitutes two-way communication (examples include 'mini publics' such as consensus conferences, citizen juries, deliberative opinion polling).

Public participation – *the aim is to assign partly or full decision-making-power to citizens on policy issues.* Information is exchanged between sponsors and public representatives and a dialogue is facilitated. The flow of information constitutes two-way communication (examples include co-governance and direct democracy mechanisms such as participatory budgeting, youth councils and binding referendums).

Even if engagement formats regularly combine elements from across the typology, it is a useful platform for organising the monitoring of PE and as a background for developing indicators that are able to capture (some of) the complexity of the field. It taps into a distinction between what might be called 'vertical' or policy-oriented engagement activities, which aim at contributing to the making of policies in the field of research and innovation on the one hand, and 'horizontal' or culture-oriented engagement activities, which aim at sharing knowledge or cultivating the broader scientific culture on the other hand. It also taps into the important issue of power sharing and citizen control when PE activities are 'vertically' oriented towards policy making, recognizing a continuum from no to full citizen decision power.

The typology is indicative of the interrelatedness of PE and other dimensions of RRI, particularly the dimensions of 'science literacy and scientific education' and 'governance and ethics'. PE activities that adhere to the 'public communication' category of the typology often have objectives and features which are similar to those of the 'science literacy and scientific education' dimension, i.e. educational objectives implemented through mechanisms that support the transmission of knowledge from scientists to representatives of the public. The remaining categories of the typology all have an orientation towards policy making, and particularly PE activities that can be characterized as 'public participation', 'public deliberation', and 'public activism' are aspects of participatory governance of research and innovation.

Second, it is important to recognize that there is no singular or unequivocal 'public' for research and innovation. The Eurobarometers have continuously revealed that while the interest in science and technology is generally high compared to other societal issues, significant parts of the general public do not engage regularly in 'horizontal' activities such as attending public lectures on science and technology or visiting science museums, and only a small minority of citizens engage 'vertically' by signing petitions, participating in demonstrations, or engaging in public debates about issues related to research and innovation. Socio-demographics, values, efficacy, and attitudes to science and technology are important in explaining variation in engagement inclination and practice at the level of the individual citizens. Likewise, different engagement mechanisms target different publics, and the extent to which various formats are effective in mobilizing representative samples of citizens have

been an issue of some debate (Carson & Martin 2002). As Stilgoe et al. (2014) put it, "we need to know more about fatalism with respect to science governance and disenchantment about engagement, and question the constructed publics that are being invoked in the discourse and practice of engagement".

Hence, engagement of individual citizens is not a simple issue, and it seems relevant to think rather of clusters of citizens in terms of overall engagement patterns. Furthermore, PE is not limited to the level of the individual citizen, but also includes the engagement of societal actors, i.e. groups of citizens organized in civil society organisations such as consumer, patient, or environmental organisations etc.

We understand PE, in the context of the MoRRI project, as activities where there is a distinct role for citizens and/or societal actors in research and innovation processes. Recognizing the complexity of objectives for PE and the variation in mechanisms for engagement, we distinguish five main categories of PE, namely 'public communication', 'public activism', 'public consultation, 'public deliberation', and 'public participation'. PE has overlaps with other dimensions of RRI. Science communication elements closely relate to the 'literacy and education' dimension, and policy-oriented engagement categories relate to 'governance'. 'Open access' can be considered a mechanism supporting PE, and the issue of 'gender equality' clearly relates to the distinction between different publics for engagement in research and innovation.

4. Review of existing empirical information about PE

In this chapter, which constitutes the bulk of the report, focus is turned to empirical studies in the area of PE. It presents the results of Sub-task 2.2 and Sub-task 2.3, which reviews the state of knowledge regarding the RRI dimensions, including empirical knowledge emerging from EC funded studies on the RRI dimensions. Results specifically for the PE dimension are presented in this report.

The chapter is divided into two parts. First, a selection of EC studies with particularly rich empirical information on PE is reviewed. Second, a selection of other studies that equally hold rich information on PE is presented schematically. The aim of the review of EC studies is to 1) specify the questions concerning PE, to which the studies provide (partial) answers, 2) tentatively identify the indicators that may be harvested from the reviewed studies, 3) assess whether the information contained in the studies relate to the context, input, output, or outcome of PE following the intervention logic model, 4) specify the analytical level of the information, distinguishing between global, national, and sub-national (regional, institutional, and individual) levels, and 4) specify whether the studies provide quantitative or qualitative data. For the extensive list of other relevant empirical studies, the aim is to summarize the sources of information, the analytical level at which information is presented, and the key focus of the studies, in order to pave the road to subsequent qualified selection of existing indicators of PE in Task 3 of the MoRRI project.

These specifications of the studies holding empirical information about PE will be used as the background for assessing the overall availability of empirical information on PE in the succeeding chapter.

4.1 Commission studies and projects in the area of PE

The turn from 'understanding' to 'engagement' identified in the literature review and described as part of the development of a functional vocabulary in chapter 3, is also discursively represented by the changing notion of 'Science and Society' (FP6) to 'Science in Society' (FP7) and to the current 'Science with and for Society' (Horizon 2020). The current thinking on RRI in the EC explicitly aims for collaboration among 'all societal actors' throughout research and innovation processes "in order to better align both the process and its outcomes with the values, needs and expectations of European society". A part of this objective is to "engage society more broadly in its research and innovation activities" (ec.europa.eu). Whereas FP6 funded projects in particular included more traditional activities related to science communication, FP7 projects increasingly focused on dialogue-based approaches entailing deliberation processes, stakeholder and citizen engagement, among others (Castellani 2014; see also this source for a more specified overview of commission studies).

Furthermore, as the interim evaluation and assessment of future options for Science in Society Actions (Technopolis-Fraunhofer 2012) emphasised:

> *A very significant proportion of the projects supported by the SiS programme have involved innovative approaches to the engagement of different types of actors both within the project teams and through new methods of dissemination (Technopolis-Fraunhofer 2012:3)*

In this regard, the SIS programme has stimulated the access of 'non-researchers' to the research process, from project formulation to dissemination of results. Additionally, in terms of involving a broad range of different stakeholders, the Mobilisation and Mutual Learning (MML) Action Plans are especially seen as an effective model for enhancing 'interaction between scientists, policymakers and CSO's

in key policy areas'. Notwithstanding such advances, the interim evaluation recommended that future SIS/RRI programmes aim to strengthen societal actor involvement in terms of research priority definitions and dissemination/implementation plans (Technopolis-Fraunhofer 2012:3-4, 122). This objective echoes well the broad aim of inclusiveness within the EC RRI framework in the sense that 'researchers, industry, policymakers and civil society' should be involved throughout research and innovation processes (European Union, 2012). As the above-mentioned interim report as well as in MASIS synthesis report (Mejlgaard et al. a 2012) suggest, the FP7 SiS programme support structure constituted a main mechanism for advancing SiS projects. Thus, at a programme and project level, the EC framework programmes themselves can be considered sources for the development of indicators for PE, both in a quantitative perspective in terms of the scope of projects carried out with distinctive PE features as well as qualitatively in terms of the character of such PE activities. For instance, is funding of research and innovation projects made conditional on the inclusion of citizen engagement and participation project activities? Or are citizen engagement and participation taken into account for the evaluation of research and innovation projects? (Mejlgaard et al. a 2012).

Evaluations such as the above-mentioned sources have to some degree reviewed European SiS policy and research activities, but to date no meta-review exist of FP6 and FP7 funded projects. A current call for tender denoted 'Stock-taking and Meta-analysis of Science in Society projects throughout FP6 and FP7' (Framework Contract 2012/S 144-240132), aims to launch such a meta-review, with the purpose of evaluating 'which projects have shown outstanding or path breaking advancements with a view to new ways of undertaking or governing research activities (stakeholder involvement, participatory processes, impact on policy, indicator development, etc.)?' (p.15). Such information would be relevant to review within the framework of MoRRI as well.

For the purpose of this report, eight projects which are considered particularly relevant for the public engagement dimension are reviewed with the aim of identifying empirical data for further analysis. These projects are listed in Table 1, below. The eight projects represent central studies which broadly monitor the field of science in society (MASIS), identify, access and develops PE mechanisms and categories (PE2020, Engage2020) as well as more specifically target deliberation processes and PE methods (Voices, Perares and Pacita). Furthermore, the review includes two projects specifically targeting PE in the context of RRI (NERRI and PIER). The selection of EC studies is based on expert nominations, existing reviews and a survey of FP7 databases.

Table 1: Commission studies for review

Proposal Call	Project Acronym	Project Title	Project Start Date	Project End Date	Sources
FP7 'Capacities' service contract nr. 2010/S 16-020113	**MASIS**	Monitoring Policy and Research Activities on Science in Society in Europe	01-01-2010	01-01-2012	**Report:** European Commission. 2012. "Monitoring Policy and Research Activities on Science in Society in Europe (MASIS). Final synthesis report." http://ec.europa.eu/research/science-society/document_library/pdf_06/monitoring-policy-research-activities-on-sis_en.pdf
FP7-SCIENCE-IN-SOCIETY-2013-1	**PE2020**	Public Engage-ment Innova-tions For Horizon 2020	01-02-2014	31-01-2017	http://pe2020.eu/ **Reports:** Inventory of PE mechanisms and initiatives.D.1.1. Available at: http://pe2020.eu/wp-content/uploads/sites/15/2014/02/PE2020-FINAL-D.1.1-report.pdf A Refined Typology of PE Tools and instruments D2.1.Available at: http://pe2020.eu/wp-content/uploads/sites/15/2014/02/D2-1-_PE2020_submission-1.pdf
FP7-SCIENCE-IN-SOCIETY-2013-1	**ENGAGE 2020**	Engaging Society In Horizon 2020	01-09-2013	30-11-2015	http://engage2020.eu/ **Reports:** Engage2020 Policy Brief Issue2_final ,http://engage2020.eu/media/Engage2020-Policy-Brief-Issue2_final.pdf Engage2020 Policy Brief Issue 1_final, http://engage2020.eu/media/Engage2020-Policy-Brief-Issue-1_final.pdf D3.2 Public Engagement Methods and Tools, http://engage2020.eu/media/D3.2-Public-Engagement-Methods-and-Tools.pdf D3.1 Current Praxis of Policies and Activities, http://engage2020.eu/media/D3.1-Current-Praxis-of-Policies-and-Activities.pdf

Proposal Call	Project Acronym	Project Title	Project Start Date	Project End Date	Sources
					D2.1 – Public Engagement – Promises, demands and fields of practice, http://engage2020.eu/media/D2.1-Public-Engagement-Promises-demands-and-fields-of-practice.pdf
	VOICES	Voices for innovation (Views, Opinions and Ideas of Citizens in Europe on Science)	16-01-2013	15-07-2014	http://www.voicesforinnovation.eu/ Broerse, Jacqueline E.W. et al. (2014): Voices for responsible research and innovation: Engaging citizens to shape EU research policies on urban waste. Final report. Available at: http://www.voicesforinnovation.eu/files/VOICES%20FOR%20RESPONSIBLE%20RESEARCH%20AND%20INNOVATION_ENGAGING%20CITIZENS%20TO%20SHAPE%20EU%20RESEARCH%20POLICY%20ON%20URBAN%20WASTE.pdf
FP7-SCIENCE-IN-SOCIETY-2009-1	**PERARES**	Public Engage-ment with Research and Research Engage-ment with Society	01-05-2010	30-04-2014	http://www.livingknowledge.org/livingknowledge/perares **Reports:** Van der Windt et al. (2014): Evaluating Projects of Public Engagement with Research and Research Engagement with Society. Final report on PERARES Work Package 9: Monitoring and Evaluation. Available at: http://www.livingknowledge.org/livingknowledge/wp-content/uploads/2014/09/Final-report_Evaluating-Projects-of-PER_WP9-Monitoring-and-Evaluation.pdf Tehnopolis group (2012): Sis Case Studies, May 18, first version, pp. 109ff

Proposal Call	Project Acronym	Project Title	Project Start Date	Project End Date	Sources
FP7-SCIENCE-IN-SOCIETY-2010-1	**PACITA**	Parliaments And Civil Society In Technology Assessment	01-04-2011	31-03-2015	http://www.pacitaproject.eu/ **Reports:** Ganzevles, Jurgen and Rinie van Est (2012): Deliverable 2.2. TA Practices in Europe. Available at: http://www.pacitaproject.eu/wp-content/uploads/2013/01/TA-Practices-in-Europe-final.pdf Bütschi, Danielle (2014): Strengthening Technology Assessment for Policy-Making Report of the Second Parliamentary TA Debate, 7-8 April 2014, Lisbon. Available at: http://www.pacitaproject.eu/wp-content/uploads/2014/10/PACITA_ParDdbate.pdf
FP7-SCIENCE-IN-SOCIETY-2012-1	**NERRI**	Neuro-Enhancement: Responsible Research and Innovation	01-03-2013	29-02-2016	http://www.nerri.eu/eng/home.aspx; http://www.europeanbraincouncil.org/projects/NERRI.asp **Reports:** NERRI (2014): RECONNAISSANCE (WP2) D2.5 Briefing Paper. Available at: http://www.europeanbraincouncil.org/pdfs/NERRI_Briefing_Paper_D2%205.pdf
FP7-Adhoc-2007-13	**PIER**	Public Involvement with exhibition on Responsible research and innovation	01-01-2014	31-01-2015	http://www.pier-project.eu/ http://cordis.europa.eu/project/rcn/111478_en.html

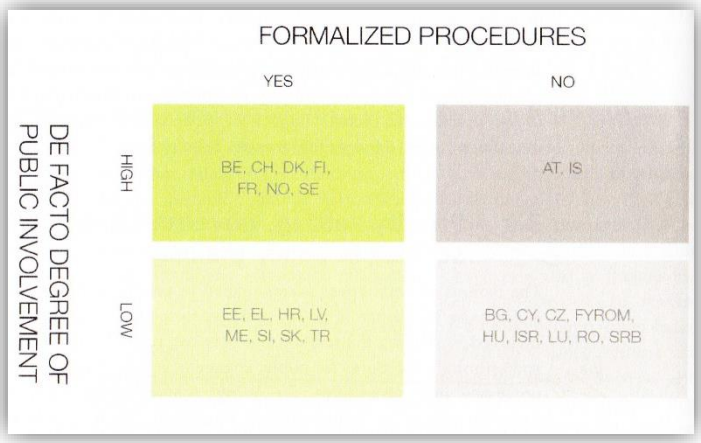
MASIS - Monitoring Policy and Research Activities on Science in Society in Europe

Based on 37 extensive national reports across EU and associated countries, the MASIS project aimed at monitoring and analyzing policy and research activities on science in society (SiS) across Europe. The final synthesis report presents a horizontal analysis of SiS trends, features and developments across Europe and provides findings within specific thematic areas such as national research efforts, science communication

activities, national SiS debates as well as priority setting, governance and use of science in policy making. The latter includes an analysis of national formal and informal procedures for citizen involvement in science and technology decision-making and assessments of the importance of upstream engagement. These particular cross-country analyses constitute relevant material for data review in terms of the PE dimension.

Notwithstanding increased attention towards the involvement of various stakeholders in research and innovation processes, especially within the European Commission's 'science in society' framework, one main observation emanates from the reports: "… the issue of public engagement has in no way become trivial, and there is no homogeneous European model of public engagement with science' (Mejlgaard et al. 2012:745). The extent to which formalized procedures are in place among the EU member states and associated countries differs significantly. Furthermore, the realization of PE opportunity structures does not necessarily imply a high de facto degree of public involvement either. For instance, 'nascent civil societies, lack of appropriate institutions, or a non-inclusive political culture tend to form the major barriers to a more democratic governance of science and technology' (Mejlgaard et al. 2012:746). Thus, accordance between the de jure and de facto processes in terms of public engagement is not a given. The typology constructed in this regard is relevant to consider for the subsequent development of indicators for the public engagement dimension (see Figure 1 below). The typology only includes two dimensions (formalized/non-formalized procedures and high/low degree of involvement) within which countries can be grouped into four categories. Despite its simplistic and general nature, the typology is to some extent able to capture and access the complex relation between input (formalized or non-formalized procedures) and outcomes in terms of PE achievements while also considering national contexts.

Figure 1: Models of public involvement in science and technology decision-making



Source: Mejlgaard et al. a 2012:40

On the basis of the MASIS reports, several independent analyses have subsequently been carried out with the purpose to establish cross-country models and measure PE 'performance levels', for instance the participatory performance model constructed in Rask, Maciukaite-Zviniene and Petrauskiene (2012), see section 4.2. below. Another

example is found in Tsipouri (2012) where quantitative indicators are constructed in order to compare innovation performance vis-à-vis 'science in society' performance.

The MASIS national reports as well as the synthesis report provide a rich knowledge repository for further analysis and indicator development. Table 2 below, summarises main guiding questions within the area of PE to which the MASIS report partly provide answers. Following these questions, the potential for indicator development as well as indicator characteristics are specified.

Table 2: Examples of public engagement indicators retrieved from MASIS

Guiding question	Indicator potential	Analytical level (intervention logic model)	Analytical level (aggregation)	Data classification and methods
What are the current debates on the role of citizen engagement and participation?	• Topic of debates • Number of EU member states in which debate took place	Context	National	Qualitative data Desk research
What are major policy initiatives, reforms, and developments of relevance to the overall place of science in society?	Policies according to • Policy area, • Objectives, • Impacts	Context	National	Qualitative data Desk research
Do formal procedures exist to allow for citizen engagement and participation in research and innovation decision-making?	1) Yes/No (Y/N) 2) Type of formal procedures 3) Procedure prevalence	Input	National	Qualitative data Desk research
Do non-formal procedures exist to allow for citizen engagement and participation in research and innovation decision-making?	• Y/N • Type of non-formal procedures • Procedure prevalence	Input	National level Sub-national level	Qualitative data Desk research
Is the public involved in research and innovation decision-making?	Y/N	Input	National level Programme level	Qualitative data Desk research
Have formats of citizen engagement been institutionalized?	Y/N	Outcome	National level	Qualitative data Desk research
Is funding of research and innovation projects made conditional on the inclusion of citizen engagement and participation project activities?	Y/N	Input	National level Programme level	Qualitative data Desk research
Are citizen engagement and participation taken into account for the evaluation of	Y/N	Input	National level Programme level	Qualitative data Desk research

Guiding question	Indicator potential	Analytical level (intervention logic model)	Analytical level (aggregation)	Data classification and methods
research and innovation projects?				
Are there any examples of activities initiated and led by citizens or civil society organisations with notable impact on decision making related to research and innovation?	Y/N	Input / output	National level, Sub-national level	Qualitative data Desk research
Which new formats of citizen engagement and participation have been developed in dedicated projects?	Formats of citizen engagement and participation	Output	National level, Sub-national level	Qualitative data Desk research
Are citizens/other stakeholders involved in early processes of decision-making? (Up-stream engagement)	Y/N	Input	National level, Sub-national level	Qualitative data Desk research

PE2020 - Public Engagement Innovations for Horizon 2020

A main ambition with the PE2020 project is to support a more dynamic governance of the science and society relation by identifying and exploring recent cutting edge PE innovations within this complex and multifaceted field. The aim is furthermore to "develop a tool for science policy actors that helps them identify, evaluate and successfully transfer innovative PE practices among European countries" (PE proposal B 2013:3). This objective will be accomplished by:

- Further development of a conceptual model that provides a systemic perspective of the dynamics of public and stakeholder engagement;
- Creating an updated inventory of current and prospective European PE innovations;
- Context-tailoring and piloting best practice PE processes related to the grand challenges of the Horizon 2020; and
- Developing an accessible web-based PE design toolkit that helps identify, evaluate and successfully transfer innovative PE practices among European countries (pe2020.eu).

PE2020 is still in its initial research phase; nonetheless, the data collection and conceptual work already carried out provide useful data for further exploration. The inventory constructed encompassing 76 mechanisms and 250 initiatives of current and prospective European public engagement innovations as well as the preliminary classification scheme of such democratic innovations provide material for clarifying and specifying the composite field of public engagement in terms of types of involvement and intensity of participation (cf. typology presented in Chapter 3). Additionally, the project aims to explore the notion of innovativeness in terms of

participation. How are we to understand innovative PE practises and what type of criteria defines such practises, for instance? In this respect, the elements of innovativeness can also relate to the effectiveness of mechanisms to 'increase and deepen citizen participation in the political decision-making process' (Smith 2005:7). Knowledge about type and degree of citizen involvement in terms of democratic innovations is needed for defining, evaluating and monitoring citizen and stakeholder inclusion in research and innovation processes.

Table 3 below, summarises main guiding questions within the area of public engagement activities, especially in terms of PE definitions, categorisation and innovations. Following these questions, the potential for indicator development as well as indicator characteristics are specified.

Table 3: Examples of public engagement indicators retrieved from PE2020

Guiding question	Indicator potential	Analytical level (intervention logic model)	Analytical level (aggregation)	Data classification and methods
How is the public involved in research and innovation decision-making?	Types of PE activities • Communication • Activism • Consultation • Deliberation • Public participation	Input	Global level European level National level, Sub-national level	Qualitative data Desk-research Literature-review Survey results Case descriptions
What is the character of democratic innovations?	Categorisation of innovativeness in PE activities • Hybrid combinations • Methodological novelty • Inclusive new ways of representation • Potential impact • Feasibility • (Bearing on societal challenges)	Output	Global level European level National level, Sub-national level	Qualitative data Desk-research Literature-review Survey results Case descriptions
Which new formats of citizen engagement and participation have been developed in dedicated projects?	• Formats of citizen engagement and participation	Output	Global level European level National level, Sub-national level	Qualitative data Desk-research Literature-review Survey results Case descriptions
What are the (potential) impacts of democratic innovations?	Categorisation: • Attainment of the objectives stated • Unintended	Outcome	Global level European level National level, Sub-national	Qualitative data Desk-research Literature-

Guiding question	Indicator potential	Analytical level (intervention logic model)	Analytical level (aggregation)	Data classification and methods
	impacts • Influence on political decision-making processes • Influence on political, media and learning outcomes • Impacts on public debate and impacts on participants • Potential impacts to come		level	review Survey results Case descriptions

Engage2020 - Engaging Society in Horizon 2020

The objective of Engage2020 is 'to give an overview on existing praxis' of societal engagement in research and innovation in Europe and potentially the rest of the world. Engage2020 aims at contributing to a wider inclusive praxis on all levels, in order to strengthen the collaborative governance and democratic elements of research and innovation. The project will provide an overview and increase the understanding of engagement to inspire many different actors in the scientific world to make use of engaging practices' (engage2020.eu). Engage2020 is an ongoing project; however extensive and significant reports, reviews and analyses have already been produced which provide relevant data for the purpose of the report at hand. The 'report on current praxis of policies and activities supporting societal engagement in research and innovation' (Kuhn et al. 2014) presents and reviews 124 PE policies and activities in the form of fact sheets. Different dimensions such as forms of policy and activity support, stakeholder characteristics and levels in research and innovation processes are included in the descriptions. These dimensions could potentially contribute to further indicator developments (see Table 4 below). Additionally, dimensions for citizen and stakeholder engagement in R&I processes as well as main motives for involving stakeholders in these processes, are outlined (Policy Brief 2, 2014, see Table 4). Furthermore, in the scope of this project, a database presenting engagement methods and tools based on an online survey among PE experts is constructed. The range of PE methods is described by means of facts sheets and these will later on fed into an online and searchable action catalogue.

Table 4: Examples of public engagement indicators retrieved from Engage2020

Guiding question	Indicator potential	Analytical level (intervention logic model)	Analytical level (aggregation)	Data classification and methods
What forms of policy and activity support already exist in Europe and beyond	Forms of policy and activity support: • Rules and regulation • Funding and other incentives • Infrastructure, institutions and networks • Training • Promotion • Projects and Studies	Input	Global level European level National level, Sub-national level	Qualitative data Desk research Interviews with key stakeholders/informants within the area of PE
Which kind of stakeholders are involved in research and innovation processes	• Civil Society Organizations (CSOs) • Citizens • Affected populations • Consumers • Employees • Users	Input	Global level European level National level, Sub-national level	Qualitative data Desk research Interviews with key stakeholders/informants within the area of PE
At which levels of research and innovation processes can citizens and stakeholders be involved?	• Policy formation • Programme development • Project definition • Research and innovation activity	Input	Global level European level National level, Sub-national level	Qualitative data Desk research Interviews with key stakeholders/informants within the area of PE
Which roles can the public play at the different R&I process levels?	• Setting R&I agenda • Supervising and assessing R&I • Actively initiating and funding research • Shaping the R&I process • Gather data • Dissemination of R&I outcomes	Input	Global level European level National level, Sub-national level	Qualitative data Desk research
What new methods of citizen engagement and participation have been developed in dedicated projects?	• Engagement methods	Output	Global level European level National level, Sub-national level	Quantitative data Online survey with international PE experts
What are the main motives for involving stakeholders in R&I processes	Functional motives: • R&I targeted towards societal needs • More effective R&I processes • Social acceptance of R&I	Outcomes (potential achieve-ments)	Global level European level National level, Sub-national level	Qualitative data Desk research

Guiding question	Indicator potential	Analytical level (intervention logic model)	Analytical level (aggregation)	Data classification and methods
	outcome Political motives: • Legitimation of R&I • Empowerment of Civil Society • Public accountability and responsiveness Cultural motives: • Science in society • A new mode of "public understanding of science" • Public appraisal and appreciation of R&I instead of public acceptance			

VOICES – Voices for innovation

The VOICES project carried out in 2013-14 and implemented by ECSITE, a European network of science centres and museums, comprises a unique citizen consultation process across Europe on urban waste and innovation. One thousand citizens participated in focus group interviews in 27 countries. This large-scale design represents novel ways of engaging citizens in defining the future agenda within the area of waste research. The project was also unique in the sense that citizens' deliberations for the first time directly provided input to the European research agenda. In this regard, the consultation results entailed 'the definition of 5 research topics under the Horizon 2020 2014-15 calls, for an EC contribution of 116 million Euro'. These results are in accordance with one of the main objectives of the VOICES project; 'to yield valuable insight on methods and procedure for engaging citizen participation to help set the research agenda for Europe's Responsible Research and Innovation (RRI) framework'. The projects provides a model for early inclusion of various stakeholders in research agenda-setting processes and may be transferred to other stakeholders, as well as to different system levels (Broerse et al. 2014; Castellani 2014:11).

The Voices project represents a particular methodology for citizen engagement in research agenda-setting and the particularity of such PE activities complicates the development of more general PE indicators. Still, the state of knowledge available with regard to VOICES can serve as input to a characterization of PE activity formats in general as well as to the particular public role citizens can play at this particular level in the R&I process (see Table 5 below and guiding question for in Table 4 above).

Table 5: Examples of public engagement indicators retrieved from VOICES

Guiding question	Indicator potential	Analytical level (intervention logic model)	Analytical level (aggregation)	Data classification and methods
How are citizens and stakeholders involved in European research agenda-setting?	Formats of citizen engagement	Input	European (programme) level	Qualitative data Focus groups across 27 European countries (public consultation)

PERARES - Public Engagement with Research and Research Engagement with Society

The PERARES project was a four year long European project which aimed 'to strengthen public engagement in research (PER) by involving researchers and Civil Society Organisations (CSOs) in the formulation of research agendas and the research process' (www.livingknowledge.org). Main activities undertaken within this project was the launch of a transnational web portal for dialogues' with the aim to foster research requests from the public; requests which were then submitted to research institutes though science shops facilities and used in subsequent phases of debate. In this regard different formats of debate such as science café's, science festivals, online-forums – with the Science Shop network – were linked. To strengthen and further facilitate 'the network of research bodies doing research for/with CSOs', thus also reinforcing the local co-operation with regard to the establishment of research agendas, 10 new science shops were set up throughout Europe. Furthermore, the different forms of dialogue between researchers and CSO's were piloted and assessed in order to increase researcher awareness towards civil society initiated research agendas (www.livingknowledge.org; Tehnopolis group 2012:110). Another objective with PERARES was to 'develop a set of indicators to evaluate influences of CSO and public participation in the development of scientific knowledge with reference to specific projects and actions' and to test these indicators as part of constructing a framework for such an evaluation (Van der Windt et al. 2014). Thus, with the aim to evaluate public engagement with science, a range of indicators were proposed, constructed and tested. For the purpose of this report and further indicator development, such indicators could serve as inspiration for charactering citizen engagement, especially for societal actor involvement at this particular level in the R&I process (see Table 6 below).

Table 6: Examples of public engagement indicators retrieved from PERARES

Guiding question	Indicator potential	Analytical level (intervention logic model)	Analytical level (aggregation)	Data classification and methods
How are researchers and CSO's involved in setting cooperative research agendas through the joint definition of research projects?	Formats of societal actor involvement in the initial research and innovation process	Input	National level (science shops) European level (transnational web portal for dialogues)	Quantitative / qualitative data Survey data interviews
How can public engagement with science be evaluating in terms of its influence on institutional research?	Indicator developments with regard to needs of CSOs, needs of community, organisation of teaching/learning, organisation of research, organisation of Science Shop, effects on teaching/learning, effects on research, effects on CSOs, effects on community	Output outcome	Institutional level	Quantitative / qualitative data Survey data interviews

PACITA - Parliaments And Civil Society In Technology Assessment

PACITA is funded under the Mobilisation and Mutual Learning (MML) programme and runs from 2011 to 2015. The project aims 'at increasing the capacity and enhancing the institutional foundation for knowledge-based policy-making on issues involving science, technology and innovation, mainly based upon the diversity of practices in Parliamentary Technology Assessment (PTA)'. The project brings together and engages a range of different societal actors, among others through the three main methodological approaches, expert based methods, stakeholder involvement and citizen consultation. Thematically, the approaches are exemplified within the areas of public health genomics, ageing society and sustainable consumption (www.pacitaproject.eu). Another related objective is to 'empower European member states and associated countries with an interest in PTA to make informed decisions about institutionalizing, organizing and performing Parliamentary TA'. In this regard, a new way of modelling parliamentary TA has been developed in 'addressing the dynamic interplay between parliament, government, science and society as well as 'a common framework for reflecting on an organisation's contribution to knowledge-based policymaking in the field of science, technology and innovation' is constructed. This framework considers such reflections at an institutional, organisational and project level as well as it helps explore which organisational models provide the most beneficial foundation for meeting local demands (Ganzevles and van Est 2012:216). Notwithstanding the particular PTA focus, the PTA model, the framework constructed as well as the range of results produced to date could provide further inspiration to indicator development with regard to stakeholder dialogue in early technology and innovation processes.

Table 7: Examples of public engagement indicators retrieved from PACITA

Guiding question	Indicator potential	Analytical level (intervention logic model)	Analytical level (aggregation)	Data classification and methods
How are citizens and stakeholders involved in early technology and innovation processes?	• Formats of citizen engagement, in particular with regard to PTA processes	Input	National level (Institutional) level	• Qualitative data • Interviews, desk research • workshops
Which kind of challenges and opportunities for establishing TA can be found across Europe?	• Extent of technological debates • R&D structures • Innovation • Political systems • Etc.	Context	National	• Qualitative data • Interviews with relevant national actors; • National workshops for policy-makers, stakeholders, representatives of science, public administration, media and civil society

NERRI - Neuro-Enhancement: Responsible Research and Innovation

The NERRI project was initiated in 2013 and will run to 2016. NERRI 'aims to contribute to the introduction of Responsible Research and Innovation (RRI) in neuro-enhancement (NE) in the European Area and to shape a normative framework underpinning the governance of neuro-enhancement technologies'. Through MML activities such as interviews and workshops, different stakeholders will be involved with the purpose to further a societal dialogue about neuro-enhancement. Furthermore, the project aims to bring together potential users, designers and legislators to promote dialogue in the early research and innovation process and to ensure an 'ethically acceptable and socially desirable' progression (www.nerri.eu). Due to the initial research phase of NERRI, only a limited number of results have so far been produced. The normative framework being produced as well as the development of an 'Analytic Classification of euro-enhancement technologies into currently available methods, experimental and hypothetical technologies' will presumably provide a suited inspirational framework for indicator developments within the area of public engagement vis-à-vis science and technology governance. Inspiration can also be found in the projects' contextualization of the societal anchors underpinning European societies as suggested by Von Schomberg (2013) (D.2.5 Briefing Paper, 2014, see Table 8 below).

Table 8: Examples of public engagement indicators retrieved from NERRI

Guiding question	Indicator potential	Analytical level (intervention logic model)	Analytical level (aggregation)	Data classification and methods
How are citizens and stakeholders involved in early R&I processes with regard to the area of neuro-enhancement?	Formats of citizen engagement	Input	National level	Qualitative data Stakeholder interviews (more than 120 responses)
In what way can normative anchors underpinning European societies be contextualized within a specific field such as that of neuro-enhancement?	• Respects for fundamental rights • Solidarity • Social justice • The protection of • human health and the promotion of well-being • Commitment to the advancement of scientific and technological innovation, • Development of a sustainable, competitive social market economy	Input	National level Institutional level Individual level	Qualitative / quantitative data Survey Stakeholder interviews

PIER - Public involvement with exhibition on responsible research and innovation

The Pier project was initiated in January 2014 and will end January 2015. One main goal of the project was the development of a grand exhibition on Ocean Research which 'aimed at explaining how research and innovation can be responsible towards societies by taking into account the needs of people and the environment, as well as by involving citizens in all stages of research'. Through workshops and focus groups, a range of different societal stakeholders such as researchers, CSO's, citizens and policymakers, among others, were included from the early stages of the project. The exhibition itself also includes communication formats such as hands-on exhibits, prototypes, multimedia products etc. as well as participation mechanisms in terms of dialogue formats to 'engage the public in the RRI dimensions of science and technology' (www.pier-project.eu). The hybrid combinations of combining more traditional science communication elements with participatory dialogue formats as well as the inclusion of various stakeholders early in the research and implementation process, could yield relevant experiences as to engaging societal actors in general, as well as to formats for promoting the dimensions of RRI. Such experiences and evaluations have not yet been produced due to the project progress, but they could potentially be informative in terms of the particular participation processes as well as in terms of attitudes towards RRI dimensions at an individual level.

Table 9: Examples of public engagement indicators retrieved from PIER

Guiding question	Indicator potential	Analytical level (intervention logic model)	Analytical level (aggregation)	Data classification and methods
How are citizens and stakeholders engaged in the RRI dimensions of science and technology'?	• Formats of citizen engagement	Input	Institutional	Qualitative / quantitative data Evaluations (surveys and interviews)
What are the public attitudes towards the dimensions of responsible research and innovation?	• Typology of public attitudes	Output	Institutional Individual	Qualitative / quantitative data Evaluations (surveys and interviews)

4.2 Other empirical studies on the dimension of PE

In addition to the EC funded studies identified and reviewed above, a number of other studies offer relevant empirical information on issues related to PE in research and innovation contexts. The selection and compilation of other empirical studies for the PE dimension is a) based on the literature review (and expert nominations in task 1) as well as b) based on prior knowledge of the field, including a performed systematic literature review of articles published from 2008 onwards in the academic journals 'Public Understanding of Science', 'Science Communication', 'Science, Technology, and Human Values', 'Science and Public Policy'. This defined search strategy was supplemented by a less systematic 'snowballing' strategy where relevant articles, books and commissioned reports have been gathered through internet searches, expert knowledge etc. These pieces exceeded the 2008-2014 timeframe.

In Table 10, 29 studies are presented. For each entry, the analytical level in terms of aggregation is specified, and a brief note on the key focus of the study is provided.

Table 10: Main empirical studies on the dimension of public engagement - for review

Source	Type of source	Analytical level (aggregation)	Key focus
Bauer, Martin W., Nick Allum and Steve Miller (2007): What can we learn from 25 years of PUS survey research? Liberating and expanding the agenda. *Public Understand. Sci.* 16, 79–95	Scientific article	Global	General introduction, framework of cultural indicators
Bucchi, Massimiano and Frederico Neresini (2007): 'Science and Public Participation' in, Edward et al (eds.): Handbook of Science and Technology Studies (3rd edition). Cambridge: Mit Press.	Book chapter	Global	General introduction – definitions and PE formats
Delgado, Ana, Kamilla Lein Kjølberg and Fern Wickson (2011): Public engagement coming of age: From theory to practice in STS encounters with nanotechnology. *Public Understanding of Science.* 20: 826.	Scientific article	Global	General introduction – definitions and PE formats
Stirling, Andy (2008:) "Opening Up" and "Closing Down". Power, Participation, and Pluralism in the	Scientific article	Global	Appraisal vis-à-vis governance

Source	Type of source	Analytical level (aggregation)	Key focus
Social Appraisal of Technology. *Science, Technology, & Human Values.* Volume 33 Number 2, 262-294.			commitments
Neresini, Federico and Massimiano Bucchi (2011): Which indicators for the new public engagement activities? An exploratory study of European research institutions. *Public Understand. Sci*. 20(1): 64–79.	Scientific article	Sub-national (institutions across Europe)	Framework for PE institutional indicators
Vargiu, Andrea (2014): Indicators for the evaluation of public engagement of higher education institutions. *J Knowl Econ* (2014) 5:562–584.	Scientific article	Sub-national (institutions across Europe)	Framework for PE institutional indicators
Rowe Gene and Lynn J. Frewer (2005): A Typology of Public Engagement Mechanisms. *Science Technology Human Values* 2005 30: 251.	Scientific article	Global	PE typology construction
Rowe, Gene and Lynn J. Frewer (2000): Public Participation Methods: A Framework for Evaluation. *Science Technology Human Values.* 25:3	Scientific article	Global	Evaluation and impact of public engagement
Rask, Mikko, Saule Maciukaite-Zviniene and Jurgita Petrauskiene (2012): Innovations in public engagement and participatory performance of the nations. *Science and Public Policy* 39, pp. 710–721.	Scientific article	National levels (cross-country analysis)	PE performance indicators
Smith, Graham (2005): *Beyond the ballot. 57 Democratic Innovations from Around the World*. The POWER Inquiry.	Report	Global	PE typology construction, review of existing and emerging 'democratic innovations'
Stilgoe, Jack et al. (2014): Why should we promote public engagement with science? *Public Understanding of Science* 2014 23:4.	Scientific article	Global	Introduction, continuities/discontinuities within the field of PE
Mejlgaard, Niels and Sally Stares (2013): Performed and preferred participation in science and technology across Europe: Exploring an alternative idea of ''democratic deficit''. *Public Understanding of Science*. 22(6) 660–673	Scientific article	European	indicators of citizen engagement practises vis-à-vis engagement preferences
Wilsdon, James and Rebecca Willis (2004): See-through Science Why public engagement needs to move upstream. London: Demos.	Report	National	Introduction, upstream public engagement
Newton, Kenneth and Brigitte Geissel (2012): Evaluating Democratic Innovations: Curing the Democratic Malaise? New York: Routledge	Book	Global	overview and review of democratic innovations
Biegelbauer, Peter and Janus Hansen (2011): Democratic theory and citizen participation: democracy models in the evaluation of public participation in science and technology. *Science and Public Policy*, 38(8): 589–597	Scientific article	Global	Evaluation and impact of public engagement
Burgess, Jacquelin and Jason Chilvers (2006): Upping the *ante*: a conceptual framework for designing and evaluating participatory	Scientific article	National	Evaluation and impact of public

Source	Type of source	Analytical level (aggregation)	Key focus
technology assessments. *Science and Public Policy*, volume 33, number 10, December, pages 713–728.			engagement
Chilvers, Jason (2008): Deliberating Competence. Theoretical and Practitioner Perspectives on Effective Participatory Appraisal Practice. Science, *Technology, & Human Values*, Volume 33 Number 2.	Scientific article	National	Evaluation and impact of public engagement
Powell, Maria C. and Mathilde Colin (2008): Meaningful Citizen Engagement in Science and Technology What Would it Really Take*? Science Communication*, vol.30:1, 126-136	Scientific article	Global	Evaluation and impact of public engagement
Rowe, Gene et al. (2008): Reliability, validity and limitations. Analysis of a normative framework for evaluating public engagement exercises. *Public Understanding of Science,* 17: 419	Scientific article	National	Evaluation and impact of public engagement
Stares, Sally (2009): Using Latent Class Models to Explore Cross-national Typologies of Public Engagement with Science and Technology in Europe. *Science, Technology & Society,* 14:2, 289–329	Scientific article	European	Evaluation and impact of public engagement
Stephens, Michael (2009): *Toward good practice in public engagement. A participatory evaluation guide for CSO's*. Canada: The Canadian Council for International Co-operation (CCIC).	Report	Global	Evaluation and impact of public engagement
Mohr A, Raman S (2012) Representing the Public in Public Engagement: The Case of the 2008 UK Stem Cell Dialogue. *PLoS Biol,* 10(11).	Scientific article	National	Evaluation and impact of public engagement
Burchell, Kevin, Sarah Franklin and Kerry Holden (2009): *Public culture as professional science: final report of the ScoPE project – Scientists on public engagement: from communication to deliberation?* September, BIOS, London School of Economics and Political Science	Project deliverable	National	Scientists and PE
Lewanski, Rodolfo (2013) "Institutionalizing Deliberative Democracy: the 'Tuscany laboratory'," *Journal of Public Deliberation*: Vol. 9: Iss. 1, Article 10.	Scientific article	National	Institutionalizing PE activities
Parry, Sarah et al. (2012): Heterogeneous Agendas around Public Engagement in Stem Cell Research: The Case for Maintaining Plasticity. *Science & Technology Studies*, Vol. 25, No. 2, 61-80.	Scientific article	National	PE typology construction
PytlikZillig, Lisa M. and Alan J. Tomkins (2011): Public Engagement for Informing Science and Technology Policy: What Do We Know, What Do We Need to Know, and How Will We Get There? *Review of Policy Research*, Volume 28, Number 2 se s. 203	Scientific article	Global	Evaluation and impact of public engagement
Rask, Mikko (2013): The tragedy of citizen deliberation – two cases of participatory technology assessment, *Technology Analysis & Strategic Management*, 25:1, 39-55	Scientific article	Global	Evaluation and impact of public engagement

Source	Type of source	Analytical level (aggregation)	Key focus
Mejlgaard, Niels et al. (2012): Locating science in society across Europe: Clusters and consequences, *Science and Public Policy*, 39: 741–750	Scientific article	European	Typologies concerning dimensions of science in society
European Commission (2009): Challenging Futures of Science in Society. Emerging Trends and cutting-edge issues. The MASIS report. https://europa.eu/sinapse/sinapse/index.cfm?&fuseaction=lib.detail&LIB_ID=216410DF-0754-3E38-FA0CABB78A41EDE4&backfuse=lib.last&page=8&bHighlight=false	Report	European	Introduction, SiS cutting-edge issues
Tsipouri, Lena (2012): Comparing innovation performance and science and society in the European member states. Science and Public Policy 39 (2012), pp. 732-740	Scientific article	European	PE and innovation performance indicators

In combination, the studies listed above provide a useful starting point for development of indicators, while examples of actual indicators are somewhat limited.

A significant share of the studies provides general overviews, or broad sweeps, of developments within the field of PE. They target a 'global' analytical level in the sense that they explore cross-cutting trends and patterns within the field. These studies are very important for identifying relevant content for indicators and ensuring that core issues are not disregarded, but less relevant for populating indicators with actual data.

A number of studies produce classification and typologies of engagement mechanisms based on 'global' monitoring of engagement activities. To various degrees, these studies also provide data such as PE case descriptions, often across several contexts and countries, thus offering empirical information that could potentially be useful for the monitoring activities in MoRRI.

A limited number of studies develop typologies and clustering of citizens based on survey data. These are often presented at the aggregated level (e.g. Europe as a whole), but may be possible to reproduce at disaggregated levels (e.g. in individual countries). We have access to raw data on all the relevant Eurobarometers due to prior involvement in the development and implementation of the barometers.

Finally, a limited number of studies provide specific indicators at institutional level, e.g. Vargiu (2014), Neresini & Bucchi (2011), or at the national level, e.g. Rask et al (2012), Mejlgaard et al (2012), which may be instrumentally applied in the monitoring activities of MoRRI, if they are considered relevant for the overall set of indicators for PE.

The studies by Vargiu (2014) and Neresini & Bucchi (2011) both identify a set of valid, robust and feasible set of indicators with the aim to assess public engagement performance at the level of research institutions. Based on a mix-method study, Neresini and Bucchi construct 'a synthetic index of PE activities through which the research institutes could be assessed, compared and potentially ranked' (2011:70). The explorative study covered a sample of 40 European research institutions. Given the anonymity of these institutions, no specific data presentation can be described, but a number of the indicators identified could potentially feature into a set of indicators relevant for the purpose of the report at hand (see chapter 6 and 7). In a similar vein, the study by Vargiu do not present specific institutional data across

Europe, but several of the indicators constructed on the basis of existing data material could potentially be of value in a composite model targeting the institutional model.

4.2.1 Survey studies on Public Understanding of Science and PE specifically

A particular source of data is surveys on citizens' perceptions of and engagement with research and innovation. In 1972, the American National Science Board decided to inaugurate a biennial report making status on American science and technology. This series of reports, known as *Science Indicators*, devotes one chapter to the public understanding of science, and is based on systematic data collection in national surveys. A bit later, in 1977 and 1978, two surveys were conducted in Europe under the auspices of the European Commission (European Commission 1977; 1979). These two surveys were limited in scope, but nonetheless the first attempts to make a pan-European assessment of the public understanding of science and technology. Citizens of the nine member states of the European Community constituted the population of these studies and around 1000 respondents from each country were interviewed face-to-face. The European Commission has continued doing public opinion surveys on a wide range of issues, the so-called Eurobarometers, including public understanding of science. Since the two initial surveys in the 70s, another five large-scale surveys on science, technology, and the public have been carried through in 1989, 1992, 2001, 2005, and 2010. In addition, seven special Eurobarometers have dealt with the Europeans' understanding and opinions about biotechnology specifically, starting in 1991, followed by another three in the course of the 90s, and finally most recently in 2002, 2005, and 2010. Finally, two barometers specifically addressing the emerging notion of RRI were implemented in 2013 and 2014.

Table 11: Relevant Eurobarometers on PUS

Year	EB wave and name of module
1989	Eurobarometer 31: Europeans, Science and Technology
1991	Eurobarometer 35.1: Opinions of Europeans on biotechnology in 1991
1992	Eurobarometer 38.1: Europeans, Science and Technology
1993	Eurobarometer 39.1: Biotechnology and Genetic Engineering: what Europeans think about it in 1993
1996	Eurobarometer 46.1: The Europeans and modern biotechnology
1999	Eurobarometer 52.1: Europeans and modern biotechnology
2001	Eurobarometer 55.2: Europeans, Science and Technology
2002	Eurobarometer 58.0: Europeans and biotechnology in 2002
2005	Eurobarometer 63.1: Europeans, Science and Technology
2005	Eurobarometer 64.3: Europeans and Biotechnology in 2005
2010	Eurobarometer 73.1: Europeans and Biotechnology in 2010
2010	Eurobarometer 73.1: Science and Technology 2010
2013	Eurobarometer 79.2: RRI, Science and Technology
2014	**Eurobarometer 81.5: Public perceptions of science, research and innovation**

The Eurobarometer series is an interesting source of empirical evidence for several reasons. First, in contrast with most of the empirical studies outlined in this chapter,

the Eurobarometers provide time-series data. Despite overall item discontinuity, a number of core items have been safeguarded, including issues such as interest in science, efficacy in matters of science, and knowledge of science (the latter up until 2005). With the participatory turn of the field in recent years, a number of items tapping into public engagement preferences and practices have also been implemented across recent waves. Second, the barometers stretch across a growing number of countries (reflecting the expansion of the EU) resulting in 30+ countries covered in the latest waves. Third, unlike the majority of studies providing empirical information about PE, Eurobarometers provide data at the level of the individual, which may also, due to representative sampling, be aggregated to the national and European level. Finally, Eurobarometer data may be relevant at different levels of the intervention logic model. Some items relate to PE input, while others may be considered indicators of output or outcome.

The specific items in the surveys are relevant towards both the PE and the 'science literacy and scientific education' dimensions of RRI. While several items are tailored to tap into attitudes, values, and perceptions, a growing number of items address behavior. Reported behavior in terms of 'talking with friends and family about science', 'visiting science museums', 'searching the internet to get information about science', and 'attending public lectures about scientific issues' relate to what was previously referred to as the horizontal dimension of PE, while 'attending public meetings or debates about science', 'sign petitions or join street demonstrations on matters of nuclear power, biotechnology or the environment', and participate in the activities of non-governmental organizations dealing with science and technology related issues' tap into the vertical, policy-oriented dimension of PE.

5. Assessment of data availability on PE

Based on the review and presentation of empirical studies on PE above, this chapter provides an overall assessment of data availability on PE for purposes of indicator development. The chapter discusses the issue of data availability in terms of 1) the extent to which the empirical studies provide relevant information across the categories of PE which were identified in the functional vocabulary, i.e. the extent to which the guiding questions that the studies address satisfactorily capture the contents of PE as defined in operational terms, 2) the balance and availability of quantitative and qualitative data respectively, 3) the extent to which available information address the four analytical levels specified in the intervention logic model, and 4) the availability of data at different levels of aggregation.

5.1 Data availability across PE categories

In the context of the MoRRI project, PE is understood as activities where there is a distinct role for citizens and/or societal actors in research and innovation processes. Recognizing the complexity of objectives for PE and the variation in mechanisms for engagement, five main categories of PE were distinguished, namely 'public communication', 'public activism', 'public consultation', 'public deliberation', and 'public participation'.

It is the overall assessment that the empirical studies presented in the previous chapter are able to offer information across these categories. Several studies explicitly target questions related to variation in PE formats, and a number of studies aim to develop typologies of PE activities and populate these with empirical cases. The category of 'public activism' is however not extensively covered by the studies reviewed above.

With regard to the distinction also mentioned in the functional vocabulary between individual citizens and societal actors, several studies are concerned with the mechanisms that facilitate participation of individual citizens in collective PE arrangements. However, a number of studies also explicitly deal with the participation of organised groups of citizens, i.e. societal actors, engage in issues related to research and innovation.

Hence, it is the overall impression that the available material is able to inform the main aspects that relate to PE. It is, however, important for the succeeding development of indicators in Task 3 to consider carefully the intersections and overlap between the PE dimension and other dimensions of RRI, not least 'governance and ethics' and 'science literacy and scientific education'.

5.2 Availability of quantitative and qualitative data

The vast majority of empirical studies on PE provide qualitative data and are based on methods such as desk research, interviews, focus groups, and case studies of various kinds. The Eurobarometers constitute a notable exception, and a number of other reviewed projects apply mixed methodologies, combining, e.g., interviews and focus groups with survey administration.

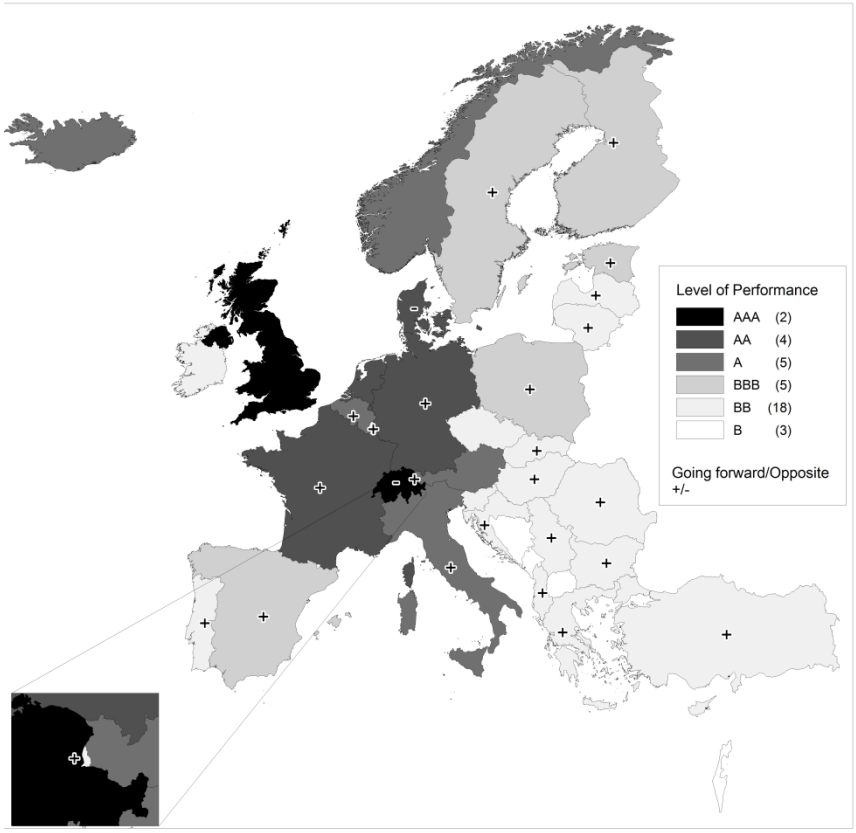
For the MoRRI project's objectives of developing metrics on the dimensions of RRI, including PE, the pervasiveness of qualitative data is a challenge. While qualitative methods are particularly important when opening up a complex and multifaceted issue, they rarely provide data that are straight-forwardly applicable in terms of benchmarking and comparisons across several countries or institutions. For the

purposes of MoRRI, it will be necessary to translate qualitative material into 'quantitative' indicators and measures.

A number of the reviewed studies apply such procedures. Projects such as MASIS, and the ongoing PE2020 and Res-AGorA projects, rely on qualitative approaches to data collection, uniformly implemented across EU member states and associated countries, which in turn was coded and classified, and thus 'translated' into quantitative indicators (see e.g. special issue of Science and Public Policy 39(6)).

An illustrative example is Rask et al. (2012) who coded all qualitative material in the 'public participation' chapter of the MASIS reports and classified countries according to identifiable parameters of participation. The coding resulted in a 6 class classification of countries' 'participatory performance' at ordinal level of measurement (from B to AAA, see illustration), combined with indicators of developmental pattern (+/-).

Figure 2: Countries by participatory performance



Source: Rask et al 2012

A similar 'grounded approach' to the qualitative data available in other studies should be considered as a main component of the development of indicators in MoRRI.

5.3 Availability of data across analytical levels included in the intervention logic model

Following the MoRRI proposal, indicators will be considered for different levels or phases of the 'logic model' of PE interventions. These levels include the 'Context', i.e. the overall environment for PE and character of civil society with regard to participatory practices, ' Input', i.e. the PE activities that are carried out, measures taken, structures created or resources provided to address engagement of citizens and societal actors, 'Outputs', i.e. the immediate or direct results of such activities, and the 'Outcomes' i.e. the mid- and long term achievements and consequences of engagement activities.

The empirical information that emerges from the studies presented above disproportionately concern the 'input' level, but with examples also across the other three levels. This observation resonates well with a general interest within PE as an academic and practitioners field in 'how PE can be done', i.e. studies related to the implementation of different formats of PE activities as well as studies trying to categorize across various formats. A fairly large share of the remaining studies address the 'context' level, particularly those that are interested in the historical development of the engagement movement within this area and the ways in which citizen engagement and participation of societal actors within the field of research and innovation is located in science policy in general. A number of studies relate to output and outcome. Not least the emergence of a demand for evaluative measures within the field provides part of the background for these studies.

For the continued work in MoRRI, it is useful to explore further the extent to which the latter cluster of studies might contribute to the development of indicators for the 'impact/benefit' side of the project, i.e. activities related to Tasks 6-8 of the project.

5.4 Availability of data at different levels of aggregation

With regard to the matter of different levels of aggregation of the available empirical data, a distinction was made between data at the global level, the national level, and the sub-national level, the latter including regional, institutional, and individual level data.

It is important to stress that these labels are not meant to capture the scope or coverage of available data, but rather the analytical level at which the available data is oriented. 'Global', thus, does not imply that we have access to data from all across the globe, but rather that the available data can inform us about PE issues at the cross-national level, often overall trends, focus points or developments within the field. Likewise, 'national' implies that the information concerns PE related, e.g., to national policies or procedures, but it does not indicate the actual number of countries that are covered in the study.

A significant share of the empirical studies presented above provides empirical information about PE at the global level, and several studies target the national level. Only a limited number of studies provide empirical information relevant to sub-national analytical levels. Some of these are, however, explicitly presenting operational indicators relevant to MoRRI. The overall assessment is that the portfolio of studies will be able to inform the development of indicators across the various levels of aggregation that MoRRI has an interest in.

6. Data selection for RRI monitoring – reflections of current data gaps and required data collection on PE

The purpose of this chapter is to assess data gaps and provide reflections on the need for primary data collection in order to mitigate data gaps based on the contents and results of the previous chapter as well as the list of promising existing indicators presented in chapter 7.

The assessment of existing empirical information in the area of PE demonstrated that it is possible to find information about and address central questions related to the five areas of PE which were specified in the functional vocabulary and also capture the distinction between individual citizens and organised societal actors. An imbalance between quantitative and qualitative studies was highlighted, and the possibility of transforming qualitative material into metrics was discussed. With regard to the intervention logic model, most information had relevance towards the 'input' level, while very few studies related to the 'outcome' level. Finally, a significant share of the studies related to 'global' (or general) PE issues, and several targeted the national level, while less were concerned with the institutional level or other sub-national levels.

These observations give an indication of the character of the available data and its ability to cover the contents of the PE dimension, and thus also indirectly an indication of the areas in which data is scarce. However, the exact coverage, e.g. in terms of number of countries, institutions, PE initiatives, but also in terms of freshness / date of available information and time series availability, is not sufficiently specified in chapter 5.

This chapter addresses such issues. It draws on the content of chapter 4 and synthesizes the contents of chapter 7, which provides a reservoir of potential indicators identified during the process of assessing data availability.

The summary Table 12 below, capturing the contents of chapter 7 serves as a basis for assessing the potential to use indicators based on existing empirical material for the monitoring of the PE dimension of RRI. The specific indicators on which the table is based are presented in detail in chapter 7.

Table 12: Summary table capturing the contents of chapter 7

INDICATOR	ANALYTICAL MODEL (Logic model) CONTEXT (1) INPUT (2) OUTPUT (3) OUTCOME (4)	ANALYTICAL LEVEL (aggregation) GLOBAL (1) NATIONAL (2) REGIONAL (3) INSTITUTIONAL (4) PROGRAMME/ PROJECT (5) INDIVIDUAL (6)	UNIT OF ANALYSIS COUNTRIES (1) INSTITUTIONS (2) INDIVIDUALS (3) PUBLICATIONS (4) OTHER (PLEASE SPECIFY) (5)	NUMBER OF OBSER-VATIONS	TIME SERIES Y (1) N (2)	YEAR OF DATA, MOST RECENT
Indicator 1	2	2	1	37	2	2011
Indicator 2	1	2	1	37	2	2011
Indicator 3	3	2	1	32	1	2010
Indicator 4	3	2	1	32	1	2010
Indicator 5	3	2	1	32	1	2010
Indicator 6	1	6	3	30000	1	2013
Indicator 7	3	6	3	30000	1	2005
Indicator 8	3	6	3	30000	1	2010
Indicator 9	3	6	3	30000	1	2010
Indicator 10	3	6	3	30000	2	2010
Indicator 11	3	6	3	30000	2	2010
Indicator 12	3	6	3	30000	2	2005
Indicator 13	3	6	3	30000	2	2005
Indicator 14	3	6	3	30000	2	2010
Indicator 15	2	2	1	37	2	2011
Indicator 16	2	2	1	26	2	2011
Indicator 17	2	2	1	26	2	2011
Indicator 18	2	2	1	26	2	2011
Indicator 19	2	4	2	40	2	2008
Indicator 20	2	4	2	40	2	2008
Indicator 21	2	4	2	40	2	2008
Indicator 22	2	4	2	40	2	2008
Indicator 23	2	4	2	40	2	2008
Indicator 24	2	4	2	40	2	2008
Indicator 25	2	4	2	40	2	2008
Indicator 26	2	4	2	40	2	2008
Indicator 27	2	4	2	40	2	2008
Indicator 28	2	4	2	40	2	2008
Indicator 29	2	4	2	?	2	2010
Indicator 30	2	4	2	?	2	2010
Indicator 31	2	4	2	?	2	2002

Indicator 32	2	4	2	?	2	2002
Indicator 33	2	2	1	30	1	2009

Table 12 illustrates the indicators from the studies reviewed in chapter 4 that can be harvested and fairly easily applied for monitoring purposes. The table demonstrates that there is a clear difference between the overall emphasis in empirical studies of PE on the 'global' level, the 'input' phase of the intervention logic model, and qualitative approaches on the one hand, and the characteristics of the indicators that can be extracted on the other hand (from the small subset of studies actually providing potentially feasible indicators and data).

The table summarizes 33 indicators identified in the empirical studies. These are, by nature, quantitative, though some are derived from qualitative primary data. These indicators tend to be oriented towards the 'input' but also the 'output' level. In terms of level of aggregation, they spread across the 'national', 'institutional', and 'individual' level fairly balanced.

This implicitly points to a gap of both 'context' and 'outcome' measures. Furthermore, none of the existing indicators identified in this report address the 'regional' or 'programme/project' level. Not surprisingly, the emphasis in the reviewed literature and studies on the 'global' level, often in the shape of general policy reflections or development of generic models for characterising / typologising PE, does not manifest itself in actual indicators populated with data.

7. Early thoughts on PE indicators

This chapter provides a space for compiling promising indicators based on existing empirical information identified throughout the report. The intention is to prepare for the ground for Task 3, in which the selection of existing indicators and the development of new ones will take place. The chapter will present potential indicators in a systematic and schematic way, and it will also present discussion points around indicator construction that emerge from the review of existing empirical information.

Table 13: Potential indicator for PE, no. 1

Information Item	PE1
Name of indicator	Models of public involvement in science and technology decision making
Brief description	Two-dimensional indicator that identifies existence of formal procedures for citizen involvement in national context on the one hand and the actual degree of citizen involvement in science and technology decision making on the other.
Analytical level (logic model)	Input-related
Analytical level (aggregation)	Country level
Qual / Quant	Quantitative (derived from qualitative primary data)
Source of data	Indicator presented in Mejlgaard et al 2012; primary data developed in the MASIS project
Date	Primary data from 2011
Time-series	No
Measurement level	Nominal
Unit of analysis	Countries
Coverage	37 European countries included
Attributes	• Formalized / high involvement • Formalized / low involvement • Not formalized / high involvement • Not formalized / low involvement

Table 14: Data presentation, PE1

Formalized / high involvement	Formalized / low involvement	Not formalized / high involvement	Not formalized / low involvement
Belgium	Albania	Austria	Bulgaria
Denmark	Croatia	Iceland	Cyprus
Finland	Estonia		Czech Republic
France	Greece		Hungary
Germany	Latvia		Ireland
Italy	Montenegro		Israel
Lithuania	Poland		Lichtenstein
Norway	Portugal		Luxembourg
Sweden	Slovakia		Macedonia
Switzerland	Slovenia		Romania
The Netherlands	Turkey		Serbia
United Kingdom			Spain

Table 15: Potential indicator for PE, no. 2

Information Item	PE2
Name of indicator	Science communication culture
Brief description	Indicator summarising overall national science communication culture. Builds on six parameters that collectively form a framework for describing the science communication culture of a specific country. These include the degree of institutionalization (e.g. the presence of popular science magazines, regularity of science section in newspapers, dedicated science communication in television etc.), political attention to the field, the scale and diversity of actor involvement, traditions for popularization within academia, public interest in science and technology, and finally the training and organizational characteristics of science journalism in the country.
Analytical level (logic model)	Context-related
Analytical level (aggregation)	Country level
Qual / Quant	Quantitative (derived from qualitative primary data)
Source of data	Indicator presented in Mejlgaard et al 2012; primary data developed in the MASIS project
Date	Primary data from 2011
Time-series	No
Measurement level	Ordinal
Unit of analysis	Countries
Coverage	37 European countries included
Attributes	• Fragile science communication culture • Developing science communication culture • Consolidated science communication culture

Table 16: Data presentation, PE2

Consolidated	Developing	Fragile
Belgium	Austria	Albania
Denmark	Cyprus	Bulgaria
Finland	Estonia	Croatia
France	Greece	Czech Republic
Germany	Hungary	Israel
Italy	Iceland	Lithuania
Lichtenstein	Ireland	Macedonia
Norway	Latvia	
Portugal	Luxembourg	
Spain	Montenegro	
Sweden	Poland	
The Netherlands	Romania	
United Kingdom	Serbia	
	Slovakia	
	Slovenia	
	Switzerland	
	Turkey	

Table 17: Potential indicator for PE3

Information Item	PE3
Name of indicator	Horizontal+vertical participation in science
Brief description	Captures Horizontal+vertical participation in science. Builds on four specific items from EB 63.1 on participatory practices. Two items (reading articles and talking with friends about science) indicate horizontal participation, while two others (attend meetings and sign petitions) indicate vertical participation (see below). **How often do you...?** *Responses recoded: Regularly/occasionally/hardly ever into 'Yes', and Never into 'No'* *% respondents* — Yes / No / Don't know Read articles on science in newspapers, magazines or on the Internet — 78.3 / 21.3 / 0.4 Talk with your friends about science and technology — 70.8 / 28.7 / 0.5 Attend public meetings or debates about science or technology — 28.4 / 71.0 / 0.6 Sign petitions or join street demonstrations about nuclear power, biotechnology or the environment — 24.3 / 74.8 / 0.9 The indicator expresses the share of the population involved both vertically and horizontally
Analytical level (logic model)	Outpu-related
Analytical level (aggregation)	Country level (aggregated from individual level)
Qual / Quant	Quantitative
Source of data	Indicator presented in Mejlgaard and Stares 2010; primary data collected as part of EB 63.1
Date	Primary data for the composite indicator from 2005
Time-series	2005 (could be reconstructed for 2010)
Measurement level	Interval
Unit of analysis	Countries (aggregated from individual level primary data)
Coverage	32 European countries included
Attributes	Share (%) of population involved in 'horizontal and vertical' participation

Table 18: Potential indicator for PE4

Information Item	PE4
Name of indicator	Horizontal only participation in science
Brief description	Captures horizontal participation in science. Builds on four specific items from EB 63.1 on participatory practices. Two items (reading articles and talking with friends about science) indicate horizontal participation, while two others (attend meetings and sign petitions) indicate vertical participation (see below). **How often do you...?** *Responses recoded: Regularly/occasionally/hardly ever into 'Yes', and Never into 'No'* *% respondents* — Yes / No / Don't know Read articles on science in newspapers, magazines or on the Internet — 78.3 / 21.3 / 0.4 Talk with your friends about science and technology — 70.8 / 28.7 / 0.5 Attend public meetings or debates about science or technology — 28.4 / 71.0 / 0.6 Sign petitions or join street demonstrations about nuclear power, biotechnology or the environment — 24.3 / 74.8 / 0.9 The indicator express share of population only involved horizontally in science and technology contexts.

Information Item	PE4
Analytical level (logic model)	Output-related
Analytical level (aggregation)	Country level (aggregated from individual level data)
Qual / Quant	Quantitative
Source of data	Indicator presented in Mejlgaard and Stares 2010; primary data collected as part of EB 63.1
Date	Primary data for the composite indicator from 2005
Time-series	2005 (could be reconstructed for 2010)
Measurement level	Interval
Unit of analysis	Countries (aggregated from individual level primary data)
Coverage	32 European countries included
Attributes	Share (%) of population involved in 'horizontal only' participation

Table 19: Potential indicator for PE5

Information Item	PE5
Name of indicator	Non-participation in science
Brief description	Captures degrees of non-participation at the national level. Builds on four specific items from EB 63.1 on participatory practices. Two items (reading articles and talking with friends about science) indicate horizontal participation, while two others (attend meetings and sign petitions) indicate vertical participation (see below). **How often do you...?** *Responses recoded: Regularly/occasionally/hardly ever into 'Yes', and Never into 'No'* *% respondents* — Yes / No / Don't know Read articles on science in newspapers, magazines or on the Internet — 78.3 / 21.3 / 0.4 Talk with your friends about science and technology — 70.8 / 28.7 / 0.5 Attend public meetings or debates about science or technology — 28.4 / 71.0 / 0.6 Sign petitions or join street demonstrations about nuclear power, biotechnology or the environment — 24.3 / 74.8 / 0.9 The indicator express share of population not participating in science and techhology contexts.
Analytical level (logic model)	Output-related
Analytical level (aggregation)	Country level (aggregated from individual level data)
Qual / Quant	Quantitative
Source of data	Indicator presented in Mejlgaard and Stares 2010; primary data collected as part of EB 63.1
Date	Primary data for the composite indicator from 2005
Time-series	2005 (could be reconstructed for 2010)
Measurement level	Interval
Unit of analysis	Countries (aggregated from individual level primary data)
Coverage	32 European countries included
Attributes	Share (%) of population not participating in science and technology

Table 20: Data presentation, PE3-PE5

Country	Horizontal & vertical	Horizontal Only	Non-participative
Sweden	46	49	4
Finland	52	43	5
Iceland	30	63	7
Slovenia	40	53	8
Norway	38	54	8
Netherlands	25	64	11
Switzerland	60	29	11
Luxembourg	38	50	11
Estonia	30	57	13
Germany	55	31	14
Denmark	46	40	14
Croatia	47	37	16
Slovakia	51	31	18
Latvia	34	48	19
Belgium	36	46	19
Austria	68	13	19
Czech Republic	44	35	21
Cyprus	41	38	21
France	31	47	22
Lithuania	35	43	22
UK	33	43	24
Greece	76	0	24
Hungary	50	24	26
Poland	26	47	27
Ireland	46	26	28
Italy	54	17	29
Romania	28	39	33
Spain	43	19	38
Bulgaria	45	17	38
Turkey	36	23	41
Malta	26	31	43
Portugal	21	33	46

Table 21: Potential indicator for PE6

Information Item	PE6
Name of indicator	Preferences for participation in decision making concerning science and technology
Brief description	The indicator taps into the desired degree of citizen inclusion in decision making concerning science and technology. It does not capture actual behaviour. At the individual level, it reveals individual preference for participation. At the aggregated level, it can be considered an indicator for the 'climate' for participation at the national level. The exact survey item reads: 'What is the level of involvement citizens should have when it comes to decisions made about science and technology'?
Analytical level (logic model)	Context
Analytical level (aggregation)	Individual level data, can be aggregated
Qual / Quant	Quantitative
Source of data	Eurobarometers, most recently Special EB 401
Date	2013
Time-series	Yes, 2013, 2010 (2010 slightly different in attributes)
Measurement level	Ordinal (strictly speaking nominal)
Unit of analysis	Individual European citizens
Coverage	Across Europe, around 32 countries, 30.000 respondents
Attributes	• Citizens do not need to be involved or informed • Citizens should only be informed • Citizens should be consulted and their opinion should be considered • Citizens should participate and have an active role • Citizens' opinions should be binding • Don't know

Table 22: Potential indicator for PE7

Information Item	PE7
Name of indicator	Visiting science museums
Brief description	Measures engagement through visits to science and technology museums. Questionnaire-based item has been somewhat modified through the time-series, but can still be used for dichotomous classification. Has the respondent visited or not visited a science museum over the last year. The most recent item formulation reads: 'Which of the following have you visited in the last 12 months: Science and technology museum'?
Analytical level (logic model)	Output
Analytical level (aggregation)	Individual level, can be aggregated
Qual / Quant	Quantitative
Source of data	Eurobarometers, most recently EB 63.1
Date	2005
Time-series	Yes, 2005, 2001, 1992
Measurement level	Nominal
Unit of analysis	Individual citizens
Coverage	Across Europe, around 32 countries, 30.000 respondents
Attributes	• Have visited • Have not visited • Don't know

Table 23: Potential indicator for PE8

Information Item	PE8
Name of indicator	Attending public meetings or debates about science
Brief description	Captures citizen engagement in terms of attendance at public meetings or debates about science and technology. Survey based, and the specific item reads: 'Do you attend public meetings or debates about science and technology'
Analytical level (logic model)	Output
Analytical level (aggregation)	Individual level, can be aggregated
Qual / Quant	Quantitative
Source of data	Eurobarometers, most recently EB73.1
Date	2010
Time-series	2005, 2010
Measurement level	Ordinal
Unit of analysis	Individual citizens
Coverage	Across Europe, around 32 countries, 30.000 respondents
Attributes	• Yes, regularly • Yes, occasionally • No, hardly ever • No, never • Don't know

Table 24: Potential indicator for PE9

Information Item	PE9
Name of indicator	Petitions and street demonstrations
Brief description	Captures vertical, policy-oriented citizen engagement in terms of signing petitions or joining street demonstrations on matters of nuclear power, biotechnology or the environment. Survey based, and the specific item reads: 'Do you sign petitions or join street demonstrations on matters of nuclear power, biotechnology or the environment'
Analytical level (logic model)	Output
Analytical level (aggregation)	Individual level, can be aggregated
Qual / Quant	Quantitative
Source of data	Eurobarometers, most recently EB73.1
Date	2010
Time-series	2005, 2010, slight change of wording between the two years
Measurement level	Ordinal
Unit of analysis	Individual citizens
Coverage	Across Europe, around 32 countries, 30.000 respondents
Attributes	• Yes, regularly • Yes, occasionally • No, hardly ever • No, never • Don't know

Table 25: Potential indicator for PE10

Information Item	PE10
Name of indicator	Donating money to science
Brief description	Captures citizen engagement in terms of donating money to medical research. Survey based, and the specific item reads: 'Do you donate money to fundraising campaigns for medical research into cancer'
Analytical level (logic model)	Output
Analytical level (aggregation)	Individual level, can be aggregated
Qual / Quant	Quantitative
Source of data	Eurobarometer EB73.1
Date	2010
Time-series	No
Measurement level	Ordinal
Unit of analysis	Individual citizens
Coverage	Across Europe, around 32 countries, 30.000 respondents
Attributes	• Yes, regularly • Yes, occasionally • No, hardly ever • No, never • Don't know

Table 26: Potential indicator for PE11

Information Item	PE11
Name of indicator	Participation in NGOs related to scientific issues
Brief description	Captures citizen engagement in terms of participation in NGOs dealing with science and technology. Survey based, and the specific item reads: 'Do you participate in the activities of a non-governmental organisation dealing with science and technology related issues'
Analytical level (logic model)	Output
Analytical level (aggregation)	Individual level, can be aggregated
Qual / Quant	Quantitative
Source of data	Eurobarometer EB73.1
Date	2010
Time-series	No
Measurement level	Ordinal
Unit of analysis	Individual citizens
Coverage	Across Europe, around 32 countries, 30.000 respondents
Attributes	• Yes, regularly • Yes, occasionally • No, hardly ever • No, never • Don't know

Table 27: Potential indicator for PE12

Information Item	PE12
Name of indicator	Talking about science
Brief description	Captures citizen engagement in terms of talking about science and technology. Survey based, and the specific item reads: 'How often do you talk with your friends about science and technology'
Analytical level (logic model)	Output
Analytical level (aggregation)	Individual level, can be aggregated
Qual / Quant	Quantitative
Source of data	Eurobarometer 63.1
Date	2005
Time-series	No
Measurement level	Ordinal
Unit of analysis	Individual citizens
Coverage	Across Europe, around 32 countries, 30.000 respondents
Attributes	• Regularly • Occasionally • Hardly ever • Never • Don't know

Table 28: Potential indicator for PE13

Information Item	PE13
Name of indicator	Reading about science
Brief description	Captures citizen engagement in terms of reading the news about science and technology. Survey based, and the specific item reads: 'How often do you read articles about science in newspapers, magazines or on the internet'
Analytical level (logic model)	Output
Analytical level (aggregation)	Individual level, can be aggregated
Qual / Quant	Quantitative
Source of data	Eurobarometer 63.1
Date	2005
Time-series	No
Measurement level	Ordinal
Unit of analysis	Individual citizens
Coverage	Across Europe, around 32 countries, 30.000 respondents
Attributes	• Regularly • Occasionally • Hardly ever • Never • Don't know

Table 29: Potential indicator for PE14

Information Item	PE14
Name of indicator	Heard, talked and searched for information about GM food (+ other controversial technologies)
Brief description	This is a composite measure based on three individual items from the 2010 eurbarometer on biotechnology. It divides respondents into three categories depending on their responses to background items concerning 'having heard about', 'having talked with friends and family about' and 'having searched for information about' GM food. The indicator taps into degrees of horizontal engagement with controversial technologies. It should be noted that the exact same measure is available for four other technologies, namely animanl cloning for food production, nanotechnology, biobanks, and synthetic biology.
Analytical level (logic model)	Output
Analytical level (aggregation)	Individual level, can be aggregated
Qual / Quant	Quantitative
Source of data	Composite indicators presented in Gaskell et al 2010, primary data collected as part of Eurobarometer wave 73.1
Date	2010
Time-series	No
Measurement level	Ordinal
Unit of analysis	Individual citizens
Coverage	Across Europe, around 32 countries, 30.000 respondents
Attributes	• Have heard and talked and/or searched for information • Have heard but not talked or searched for information • Have not heard

Table 30: Potential indicator for PE15

Information Item	PE15
Name of indicator	PE performance at national level
Brief description	A model of 'participatory performance is constructed to classify countries according to identifiable parameters/indicators of participation. The coding resulted in a 6 class classification of countries' 'participatory performance' at ordinal level of measurement (from B to AAA), combined with indicators of developmental pattern (+/-). The four main components in the model are: **1.Participatory resources:** regulations supporting PE activities, community of practitioners such as professional participatory agencies, institutional infrastructures supporting participation, e.g. e-governance portals, links to educational institutions and research programmes, upgrading of participatory skills and procedures, funding opportunities **2**. **Demand conditions:** national culture of public debate and criticism, level of public education, stage of a nation's institutional development saturation of a participatory market, level of techno-scientific controversy, social capital. **3 Related and supportive factors:** activity of non-governmental organizations (NGOs) and civil society movements, networking and coordination between participative actors, availability of examples of success **4** .**Governmental strategies and approaches:** strategies and ideas of PE, history of deliberative and participatory processes, competing national priorities, international pressure It should be noted that no explicit criteria for each level have been specified.
Analytical level (logic model)	Input-related
Analytical level (aggregation)	National level
Qual / Quant	Quantitative (derived from qualitative primary data)
Source of data	Rask, Mikko, Saule Maciukaite-Zviniene and Jurgita Petrauskiene (2012): Innovations in public engagement and participatory performance of the nations. *Science and Public Policy* 39, pp. 710–721. Primary data developed in the MASIS

Information Item	PE15
	project
Date	Primary data from 2011
Time-series	No
Measurement level	Ordinal
Unit of analysis	Countries
Coverage	37 European countries included
Attributes	• Level of performance: • AAA • AA • A • BBB • BB • B • Going forward/opposite • +/-

Table 31: Data presentation, PE15

AAA	AA	A	BBB	BB	B
Switzerland - United Kingdom	Denmark - Germany + France + The Netherlands	Austria + Italy + Norway Iceland Belgium +	Estonia + Finland + Sweden + Spain + Poland +	Bulgaria + Cyprus Czech Republic Hungary + Greece + Ireland Latvia + Lithuania + Lichtenstein + Luxembourg + Serbia + Romania + Albania + Croatia + Portugal + Slovakia + Slovenia Turkey +	Israel Macedonia Montenegro

Table 32: Potential indicator for PE16

Information Item	PE16
Name of indicator	Activity in 'Science in Society environment and debate'
Brief description	The indicator is constructed to measure performance in the EU member states with regard to 'Activity in SiS environment and debate'. Each member country is rated on a 1-3 scale.
Analytical level (logic model)	Input-related
Analytical level (aggregation)	Countries
Qual / Quant	Quantitative (derived from qualitative primary data)
Source of data	Tsipouri, Lena (2012): Comparing innovation performance and science and society in the European member states. Science and Public Policy 39 (2012), pp. 732-740. Primary data developed in the MASIS project
Date	Primary data from 2011
Time-series	No
Measurement level	Ordinal
Unit of analysis	Countries, EU 26 (no data from Malta)
Coverage	European member states
Attributes	• Sis top performers • Sis-average performers • Sis-developing capabilities

Table 33: Potential indicator for PE17

Information Item	PE17
Name of indicator	Citizen involvement in science
Brief description	The indicator is constructed to measure performance in the EU member states with regard to 'citizen involvement in science'. Each member country is rated on a 1-3 scale.
Analytical level (logic model)	Input-related
Analytical level (aggregation)	Countries
Qual / Quant	Quantitative (derived from qualitative primary data)
Source of data	Tsipouri, Lena (2012): Comparing innovation performance and science and society in the European member states. Science and Public Policy 39 (2012), pp. 732-740. Primary data developed in the MASIS project
Date	Primary data from 2011
Time-series	No
Measurement level	Ordinal
Unit of analysis	Countries, EU 26 (no data from Malta)
Coverage	European member states
Attributes	• Sis top performers • Sis-average performers • Sis-developing capabilities

Table 34: Potential indicator for PE18

Information Item	PE18
Name of indicator	Stimulating society's interest in science policy
Brief description	The indicator is constructed to measure performance in the EU member states with regard to performance levels concerning the stimulation of citizens' involvement in science policy and interest in its dissemination
Analytical level (logic model)	Input-related
Analytical level (aggregation)	Countries
Qual / Quant	Quantitative (derived from qualitative primary data)
Source of data	Tsipouri, Lena (2012): Comparing innovation performance and science and society in the European member states. Science and Public Policy 39 (2012), pp. 732-740. Primary data developed in the MASIS project
Date	Primary data from 2011
Time-series	No
Measurement level	Ordinal
Unit of analysis	Countries, EU 26 (no data from Malta)
Coverage	European member states
Attributes	• Sis top performers • Sis-average performers • Sis-developing capabilities

Table 35: Data presentation, PE16-PE18

Classification of EU member states	Activity in SiS environment and debate	Citizen involvement for the role of SiS	Stimulating society to become interested in science policy and its dissemination
Sis top performers	DK, FI, DE, SE, FR, UK, NL	DK, FI, DE, SE, FR, UK, NL	DK, FI, DE, SE, FR, UK, NL
Sis-average performers	AT, BE, EE, IT, PL, ES, RO, CZ SK	AT, BE, EE, IE, RO, CZ, SK, IT, PT	AT, BE, EE, IE, RO, CZ, SK, IT, PT
Sis-developing capabilities	CY, SI, IE, LU, GR, PT, BG, HU, LV, LT	CY, LU, SI, EL, BG, LT, LV, HU, PL, ES	CY, LU, SI, EL, BG, LT, LV, HU, PL, ES

Table 36: Potential indicator for PE19

Information Item	PE19
Name of indicator	Dedicated resources for PE at institutional level
Brief description	Indicator measuring the amount of resources allocated for PE activities in research institutions
Analytical level (logic model)	Input-related
Analytical level (aggregation)	Institutional
Qual / Quant	Quantitative (survey data)
Source of data	Neresini, F. and Bucchi, M. 2011: Which indicators for the new public engagement activities? An exploratory study of European research institutions. In: Public Understanding of Science, 20, 1, 64-79.
Date	Primary data from 2007-2008
Time-series	No
Measurement level	Interval
Unit of analysis	Research institutions (physics and biomedicine)
Coverage	40 European Research institutions
Attributes	€

Table 37: Potential indicator for PE20

Information Item	P20
Name of indicator	Information about research activities made publicly available
Brief description	Captures the practices of research institutions with regard to presenting information about research activities to the public online. It is not entirely clear from the paper, how this is operationalized.
Analytical level (logic model)	Input-related
Analytical level (aggregation)	Institutional
Qual / Quant	Quantitative (survey data)
Source of data	Neresini, F.. Bucchi, M. 2011: Which indicators for the new public engagement activities? An exploratory study of European research institutions. In: Public Understanding of Science, 20, 1, 64-79.
Date	Primary data from 2007-2008
Time-series	No
Measurement level	nominal
Unit of analysis	Research institutions (physics and biomedicine)
Coverage	40 European Research institutions
Attributes	• Yes • No Note: it is uncertain whether the indicator is dichotomous or stretches across several (ordinal) categories

Table 38: Potential indicator for PE21

Information Item	P21
Name of indicator	Availability of a press and/or PR office
Brief description	Indicator that identifies whether a research institution has a press and/or PR office
Analytical level (logic model)	Input-related
Analytical level (aggregation)	Institutional
Qual / Quant	Quantitative (survey data)
Source of data	Neresini, F.. Bucchi, M. 2011: Which indicators for the new public engagement activities? An exploratory study of European research institutions. In: Public Understanding of Science, 20, 1, 64-79.
Date	Primary data from 2007-2008
Time-series	No
Measurement level	Nominal
Unit of analysis	Research institutions (physics and biomedicine)
Coverage	40 European Research institutions
Attributes	Yes No

Table 39: Potential indicator for PE22

Information Item	P22
Name of indicator	Availability of publications addressed to the public
Brief description	Indicator that identifies to which extent a research institution provide publications that are specifically tailored for public audiences
Analytical level (logic model)	Input-related
Analytical level (aggregation)	Institutional
Qual / Quant	Quantitative (survey data)
Source of data	Neresini, F.. Bucchi, M. 2011: Which indicators for the new public engagement activities? An exploratory study of European research institutions. In: Public Understanding of Science, 20, 1, 64-79.
Date	Primary data from 2007-2008
Time-series	No
Measurement level	Interval
Unit of analysis	Research institutions (physics and biomedicine)
Coverage	40 European Research institutions
Attributes	Number of publications (numerical values)

Table 40: Potential indicator for PE23

Information Item	P23
Name of indicator	Participation in EU projects/networks about PE
Brief description	Indicator that identifies to which extent a research institution participates in EU-funded PE related projects/networks
Analytical level (logic model)	Input-related
Analytical level (aggregation)	Institutional
Qual / Quant	Quantitative (survey data)
Source of data	Neresini, F.. Bucchi, M. 2011: Which indicators for the new public engagement activities? An exploratory study of European research institutions. In: Public Understanding of Science, 20, 1, 64-79.
Date	Primary data from 2007-2008
Time-series	No
Measurement level	Interval
Unit of analysis	Research institutions (physics and biomedicine)
Coverage	40 European Research institutions
Attributes	Number of projects/networks (numerical values)

Table 41: Potential indicator for PE24

Information Item	P24
Name of indicator	Specific activities with schools at research institutions
Brief description	Indicator that identifies to which degree the research organisation organises specific activities with schools
Analytical level (logic model)	Input-related
Analytical level (aggregation)	Institutional
Qual / Quant	Quantitative (survey data)
Source of data	Neresini, F.& Bucchi, M. 2011: Which indicators for the new public engagement activities? An exploratory study of European research institutions. In: Public Understanding of Science, 20, 1, 64-79.
Date	Primary data from 2007-2008
Time-series	No
Measurement level	Interval
Unit of analysis	Research institutions (physics and biomedicine)
Coverage	40 European Research institutions
Attributes	Number of specific activities with schools (numerical values)

Table 42: Potential indicator for PE25

Information Item	P25
Name of indicator	Visits to laboratories aimed at the general public
Brief description	Indicator that identifies to which degree the research organisation organises visits to laboratories aimed at the general public
Analytical level (logic model)	Input-related
Analytical level (aggregation)	Institutional
Qual / Quant	Quantitative (survey data)
Source of data	Neresini, F.& Bucchi, M. 2011: Which indicators for the new public engagement activities? An exploratory study of European research institutions. In: Public Understanding of Science, 20, 1, 64-79.
Date	Primary data from 2007-2008
Time-series	No
Measurement level	Interval
Unit of analysis	Research institutions (physics and biomedicine)
Coverage	40 European Research institutions
Attributes	Number of visits (events, not visitors) to laboratories (numerical values)

Table 43: Potential indicator for PE26

Information Item	P26
Name of indicator	Open days aimed at the general public
Brief description	Indicator that identifies to which degree the research organisation organises open days aimed at the general public
Analytical level (logic model)	Input-related
Analytical level (aggregation)	Institutional
Qual / Quant	Quantitative (survey data)
Source of data	Neresini, F.. Bucchi, M. 2011: Which indicators for the new public engagement activities? An exploratory study of European research institutions. In: Public Understanding of Science, 20, 1, 64-79.
Date	Primary data from 2007-2008
Time-series	No
Measurement level	Interval
Unit of analysis	Research institutions (physics and biomedicine)
Coverage	40 European Research institutions
Attributes	Number of open days (numerical values)

Table 44: Potential indicator for PE27

Information Item	P27
Name of indicator	Collaboration with NGO's and local government bodies
Brief description	Indicator that identifies whether the research organisation collaborates with NGO's and local government bodies
Analytical level (logic model)	Input-related
Analytical level (aggregation)	Institutional
Qual / Quant	Quantitative (survey data)
Source of data	Neresini, F.. Bucchi, M. 2011: Which indicators for the new public engagement activities? An exploratory study of European research institutions. In: Public Understanding of Science, 20, 1, 64-79.
Date	Primary data from 2007-2008
Time-series	No
Measurement level	Nominal
Unit of analysis	Research institutions (physics and biomedicine)
Coverage	40 European Research institutions
Attributes	• Yes • No

Table 45: Potential indicator for PE28

Information Item	P28
Name of indicator	Organisation of meetings/conferences addressed to the public
Brief description	Indicator that identifies whether a research institution organises meetings/conferences addressed to the general public
Analytical level (logic model)	Input-related
Analytical level (aggregation)	Institutional
Qual / Quant	Quantitative (survey data)
Source of data	Neresini, F.. Bucchi, M. 2011: Which indicators for the new public engagement activities? An exploratory study of European research institutions. In: Public Understanding of Science, 20, 1, 64-79.
Date	Primary data from 2007-2008
Time-series	No
Measurement level	Nominal
Unit of analysis	Research institutions (physics and biomedicine)
Coverage	40 European Research institutions
Attributes	• Yes • No

Table 46: Potential indicator for PE29

Information Item	P29
Name of indicator	Action plan for PE
Brief description	This indicator measures the existence of an actual implementation plan for social engagement (SE) in the HEI (organizational and administrative arrangements as well as the allocation of financial/intellectual resources). It is a composite measure derived from background qualitative material. The operationalization is not entirely clear.
Analytical level (logic model)	Input- related
Analytical level (aggregation)	Institutional
Qual / Quant	Qualitative (Institutional documentation)
Source of data	• Vargiu, Andrea. 2014: Indicators for the Evaluation of Public Engagement of Higher Education Institutions. In: Journal of Knowledge Economy, 5, 3, 562-584. • This particular indicator is primary based on the source: • E3M (2011). Final report of Delphi Study. TheE3MProject—European Indicators and Ranking Methodology for University Third Mission, p. 28 (through the • Delphi technique a set of third mission indicators were analysed according to relevance, validity, reliability, feasibility and comparability)
Date	Primary data from 2010
Time-series	No
Measurement level	Ordinal
Unit of analysis	Higher education institutions
Coverage	?, not specified
Attributes	• Yes • No (not entirely clear from sources if an ordinal scale exists)

Table 47: Potential indicator for PE30

Information Item	P30
Name of indicator	Community representatives in boards or committees
Brief description	The indicator identifies the number of community representatives on the boards of HE boards or committees. If a community representative participates in more than one committee, the participation in each committee is counted.
Analytical level (logic model)	Input-related
Analytical level (aggregation)	Institutional
Qual / Quant	Qualitative (Institutional documentation)
Source of data	• Vargiu, Andrea. 2014: Indicators for the Evaluation of Public Engagement of Higher Education Institutions. In: Journal of Knowledge Economy, 5, 3, 562-584. • This particular indicator is primary based on the source: • E3M (2011). Final report of Delphi Study. TheE3MProject—European Indicators and Ranking Methodology for University Third Mission, p. 28 (through the • Delphi technique a set of third mission indicators were analysed according to relevance, validity, reliability, feasibility and comparability)
Date	Primary data from 2010
Time-series	No

Information Item	P30
Measurement level	Interval
Unit of analysis	Higher education institutions
Coverage	?, not specified
Attributes	Number of representatives (numerical values)

Table 48: Potential indicator for PE31

Information Item	P31
Name of indicator	Research projects in partnership with non-academic organisations
Brief description	The indicator identifies to which extent higher education institutions collaborate in research projects with non-academic organisations.
Analytical level (logic model)	Input-related
Analytical level (aggregation)	Institutional
Qual / Quant	Quantitative
Source of data	Vargiu, Andrea. 2014: Indicators for the Evaluation of Public Engagement of Higher Education Institutions. In: Journal of Knowledge Economy, 5, 3, 562-584. This particular indicator is primary based on the sources: 1. Hart A., Northmore S., & Gerhardt C. (2009). Briefing paper: auditing, benchmarking and evaluating public engagement. Bristol, UK: National Co-ordinating Centre for Public Engagement Research Synthesis n° 1. 2. Molas-Gallart J., Salter A., Patel P., Scott A., & Duran X. (2002). Measuring third stream activities. Final report to the Russell Group of University, Brighton: UK, SPRU—Science and Technology Policy Research, University of Sussex.
Date	Primary data from 2000 (Hart el al. 2009, literature review), primary data from 2002 (Molas-Gallart et al, 2002)
Time-series	No
Measurement level	Interval
Unit of analysis	Higher education institutions
Coverage	?, not specified
Attributes	Number of research projects in collaboration with non-academic partners (numerical values))

Table 49: Potential indicator for PE32

Information Item	P32
Name of indicator	Academics' participation in non-academic conferences

Brief description	The indicator identifies the number of times academics have participated in professional, non-academic conferences (where the majority were non-academics)
Analytical level (logic model)	Input-activities
Analytical level (aggregation)	Institutional
Qual / Quant	Quantitative
Source of data	Vargiu, Andrea. 2014: Indicators for the Evaluation of Public Engagement of Higher Education Institutions. In: Journal of Knowledge Economy, 5, 3, 562-584. This particular indicator is primary based on the source: • Molas-Gallart J., Salter A., Patel P., Scott A., & Duran X. (2002). Measuring third stream activities. Final report to the Russell Group of University, Brighton: UK, SPRU—Science and Technology Policy Research, University of Sussex.
Date	Primary data from 2002 (Molas-Gallart et al, 2002)
Time-series	No
Measurement level	Interval
Unit of analysis	Higher education institutions
Coverage	?, not specified
Attributes	Number of participation in non-academic conferences (numerical values)

Table 50: Potential indicator for PE33

Information Item	P33
Name of indicator	Mobilizing public support
Brief description	The indicator taps into the extent to which government consults with trade unions, employers' associations, leading business associations, religious communities, and social and environmental interest groups to support its policy. The indicator assesses how successful the government is in consulting economic and social actors in preparing its policies. Successful consultation is conceived here as an exchange of views and information that increases the acceptance of government policies in society and induces economic and social actors to support them.
Analytical level (logic model)	Input-related
Analytical level (aggregation)	National
Qual / Quant	Quantitative
Source of data	PASSO, Participatory Assessment of Sustainable Development indicators on good Governance from the Civil Society perspective (2009): Deliverable 3.2 Report on the outcomes of the CSO consultation, p.12. + D2.2 + D2.3 Report on the protocol for the selection of indicators / Report on the development of a new list of indicators, p.22. Available at: http://www.passo-project.org/index.php?option=com_docman&Itemid=3 The indicator was developed through Delphi and national CSO workshops. Thus, this particular indicator primarily has its origin in data from the Bertelsmann Foundation and the 2009 Sustainable Governance Indicators. In the report, Bertelsmann Stiftung (2009): SGISteering Capabilility Societal

Information Item	P33
	consultation Sustainable Governance Indicators 2009, 30 OECD countries are ranked according to performance (see attributes)
Date	Primary data – sustainable governance indicators from 2009
Time-series	Yes (data from 2011 and 2014 – slightly changed indicator, see http://www.sgi-network.org/2014/Governance/Executive_Capacity/Societal_Consultation)
Measurement level	Ordinal
Unit of analysis	countries
Coverage	30 OECD countries
Attributes	10-9 = The government successfully motivates economic and social actors to support its policy. 8-6 = The government facilitates acceptance of its policy among economic and social actors. 5-3= The government consults with economic and social actors. 2-1 = The government rarely consults with economic and social actors.

Table 51: Data presentation, PE33

The government successfully motivates economic and social actors to support its policy. (10-9)	The government facilitates acceptance of its policy among economic and social actors. (8-6)	The government consults with economic and social actors. (5-3)	The government rarely consults with economic and social actors. (2-1)
Finland (10)	New Zealand (8)	Greece (5)	
Switzerland (10)	Spain (8)	Hungary (5)	
Denmark (9)	Austria (7)	Mexico (5)	
Iceland (9)	Belgium (7)	Portugal (5)	
Ireland (9)	Canada (7)	South Korea (5)	
Luxembourg (9)	Germany (7)	Turkey (5)	
Netherlands (9)	Italy (7)	France (4)	
Norway (9)	Japan (7)	Poland (3)	
Sweden (9)	Australia (6)		
United States (9)	Czech Republic (6)		
	Slovakia (6)		
	United Kingdom (6)		

8. References

Abelson et al. (2003): Deliberations about deliberative methods: issues in the design and evaluation of public participation processes. *Social Science & Medicine* 57, 239–251.

Bauer, Martin W., Nick Allum and Steve Miller (2007): What can we learn from 25 years of PUS survey research? Liberating and expanding the agenda. *Public Understand. Sci.* 16, 79–95

Beck, U. 1992. *Risk Society - Towards another Modernity*. Sage Publications, London.

Bertelsmann Stiftung (2009): SGISteering Capabilility Societal consultation Sustainable Governance Indicators 2009

Bijker, W. E., Hughes, T. P. & Pinch, T. J. (eds.) (1987). *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*. MIT Press, Cambridge.

Broerse, Jacqueline E.W. et al. (2014): Voices for responsible research and innovation: Engaging citizens to shape EU research policies on urban waste. Final report.

Burchell, Kevin, Sarah Franklin and Kerry Holden (2009): *Public culture as professional science: final report of the ScoPE project – Scientists on public engagement: from communication to deliberation?* September, BIOS, London School of Economics and Political Science.

Carson, L. & Martin, B. (2002). Citizen participation – Random selection of citizens for technological decision making. In *Science and Public Policy*, Vol. 29, No. 2.

Creighton, J. L. (2005). *The Public Participation Handbook: Making Better Decisions Through Citizen Involvement*. Jossey-Bass, San Fransisco.

Delgado, Ana, Kamilla Lein Kjølberg and Fern Wickson (2011): Public engagement coming of age: From theory to practice in STS encounters with nanotechnology. *Public Understanding of Science.* 20: 826.

Dryzek, J. S. (1990). Discursive democracy: politics, policy, and political science. Cambridge University Press, Cambridge.

Dryzek, J. S. (2000). Deliberative democracy and beyond: Liberals, critics, contestations. Oxford University Press, Oxford.

Engage2020 (2014): Policy Brief Issue2 final. Public Engagement in R&I processes –

Promises and Demands. Available at: http://engage2020.eu/media/Engage2020-Policy-Brief-Issue2_final.pdf

Eriksen, E. O. (ed.) (1995). *Deliberativ Politikk*. Tano, Oslo.

Eriksen, E. O. (1999). *Is democracy possible today?*. Magtudredningen, Aarhus.

European Commission. (1977). *Science and European Public Opinion*. European Commission, Brussels.

European Commission. (1979). *The European Public's Attitudes to Scientific and Technological Developments*. European Commission, Brussels.

European Commission (2012): "Monitoring Policy and Research Activities on Science in Society in Europe (MASIS). Final synthesis report."

European Union (2012): Responsible Research and Innovation. Europe's ability to respond to societal challenges.

Ganzevles, Jurgen and Rinie van Est (2012): Deliverable 2.2. TA Practices in Europe. Available at: http://www.pacitaproject.eu/wp-content/uploads/2013/01/TA-Practices-in-Europe-final.pdf

Castellani, Tommaso (2014): "Public engagement". Conference Science, Innovation and Society: Achieving Responsible Research and Innovation Rome, November 19-21 2014. The Contribution of Science and Society (FP6) and Science in Society (FP7) to a Responsible Research and Innovation. A Review

Gastil, J. & Levine, P. (eds.) (2005). *The Deliberative Democracy Handbook: Strategies for Effective Civic Engagement*. Jossey-Bass, San Fransisco.

Goul Andersen, J. & Hoff, J. (2001). *Democracy and Citizenship in Scandinavia*. Palgrave Macmillan, Houndsmills.

Goodin, Robert E. & Dryzek, John S. (2006): Deliberative Impacts: The Macro-Political Uptake of Mini-Publics. *Politics Society*, 34:219.

Irwin, A. (2001). Constructing the scientific citizen: science and democracy in the biosciences. In *Public Understanding of Science*, vol. 10, no. 1.

Jasanoff, S. (2003). Technologies of humility: Citizen participation in governing science. In *Minerva*, 41: 223-244.

Kallerud, E. (1997). Public Understanding of Science and Technology in Research Policy. In Sjøberg, S. & Kallerud, E. (eds.) *Science, Technology and Citizenship – The Public Understanding of Science and Technology in Science Education and Research Policy*. NIFU, Oslo.

Kuhn et al. (2014): Deliverable 3.1 - Report on Current Praxis of Policies and Activities Supporting Societal Engagement in Research and Innovation. Available at: http://engage2020.eu/media/D3.1-Current-Praxis-of-Policies-and-Activities.pdf

Layton, D. *et al*. (1993). *Inarticulate Science? Perspectives on the Public Understanding of Science and Some Implications for Science Education*. Studies in Education, Driffield.

Mejlgaard et al. (2012): 'Locating science in society across Europe: Clusters and consequences', *Science and Public Policy*, 39(6), pp. 741–750.

Mejlgaard et al. a (2012) – Monitoring Policy and Research Activities on Science in Society in Europe (MASIS): Final synthesis report. Luxembourg: European Commission DG Research and Innovation, 2012. 85 p. (E U R; No. 25251).

Neresini, Federico and Massimiano Bucchi (2011): Which indicators for the new public engagement

NERRI (2014): RECONNAISSANCE (WP2) D2.5 Briefing Paper. Available at: http://www.europeanbraincouncil.org/pdfs/NERRI_Briefing_Paper_D2%205.pdf

Rowe Gene and Lynn J. Frewer (2005): A Typology of Public Engagement Mechanisms. *Science Technology Human Values* 2005 30: 251.

PASSO, Participatory Assessment of Sustainable Development indicators on good

Governance from the Civil Society perspective (2009): Deliverable 3.2 Report on the outcomes of the CSO consultation, p.12. Available at: http://www.passo-project.org/index.php?option=com_docman&Itemid=3

PASSO, Participatory Assessment of Sustainable Development indicators on good

Governance from the Civil Society perspective (2009): D2.2 + D2.3 Report on the protocol for the selection of indicators / Report on the development of a new list of

indicators. Available at: http://www.passo-project.org/index.php?option=com_docman&Itemid=3

PE proposal (Public Engagement Innovations for Horizon 2020). (2013) Part B. Seventh Framework Programme.

Rask, Mikko, Saule Maciukaite-Zviniene and Jurgita Petrauskiene (2012): Innovations in public engagement and participatory performance of the nations. *Science and Public Policy* 39, pp. 710–721.

Ravn, Mejlgaard and Rask (2014): Inventory of PE mechanisms and initiatives D.1.1. Available at: http://pe2020.eu/wp-content/uploads/sites/15/2014/02/PE2020-FINAL-D.1.1-report.pdf

Smith, Graham (2005): Beyond the ballot. 57 Democratic Innovations from Around the World. The POWER Inquiry.

Stein, J. A. (2003). Public Understanding of Science in the United Kingdom: A leading country, but to what destination?. In Felt, U. (ed.). *O.P.U.S. – Optimising public understanding of science and technology*. European Commission, Brussels.

Stilgoe, Jack et al. (2014): Why should we promote public engagement with science? *Public Understanding of Science* 2014 23:4.

Stirling, Andy (2008:) "Opening Up" and "Closing Down". Power, Participation, and Pluralism in the Social Appraisal of Technology. *Science, Technology, & Human Values.* Volume 33 Number 2, 262-294.

Tehnopolis group (2012): Sis Case Studies, May 18, first version.

Technopolis-Fraunhofer (2012): "Interim evaluation & assessment of future options for Science in Society Actions. Final Report." http://ec.europa.eu/research/science-society/document_library/pdf_06/phase01-122012_en.pdf

Tsipouri, Lena (2012): Comparing innovation performance and science in society in the European member states. *Science and Public Policy,* 3, pp. 732–740.

Van der Windt et al. (2014): Evaluating Projects of Public Engagement with Research and Research Engagement with Society. Final report on PERARES Work Package 9: Monitoring and Evaluation. Available at: http://www.livingknowledge.org/livingknowledge/wp-content/uploads/2014/09/Final-report_Evaluating-Projects-of-PER_WP9-Monitoring-and-Evaluation.pdf

Vargiu, Andrea (2014): Indicators for the evaluation of public engagement of higher education institutions. *J Knowl Econ* (2014) 5:562–584.

Von Schomberg, R. (2013). "A vision of responsible innovation". In: Owen, R., Bessant, J., Heintz, M. (eds.) *Responsible Innovation*. London: John Wiley

Wilsdon, James and Rebecca Willis (2004): See-through Science Why public engagement needs to move upstream. London: Demos.

Wynne, B. (1995). Public Understanding of Science. In Jasanoff, S. *et al*. (eds.). *Handbook of Science and Technology Studies*. Sage Publications, London.

Internet sources:

www.engage2020.eu

www.ec.europe.eu

www.livingknowledge.org/livingknowledge/perares

www.nerri.eu

www.sgi-network.org

www.pacitaproject.eu

www.pe2020.eu.

www.pier-project.eu

www.voicesforinnovation.eu

Appendix – literature review

The appendix contains the guidelines for the literature review and subsequently the individual review reports. Approximately 15 reports are prepared for each RRI dimension.

Review guidelines

MoRRI

Final version / 17.11.14 (rl)

Task 1: Literature review | Review template

Background and objectives

The purpose of this template is to provide each member of the review team with a common framework and reference point to conduct the literature review and, one the reviews are conducted, to facilitate a systematic and structured analysis of the literature.

According to the TOR, the main objective of this first task in the MoRRI project is to

- review of the state of knowledge regarding RRI
- define the policy context of RRI in Europe and elsewhere
- give a comparative assessment of RRI dimensions, weighing-up advantages, disadvantages and available options
- conduct a preliminary assessment of the availability of empirical evidence on the dimensions
- finalise the definitions and properties of the RRI key dimensions
- finalise the definition and properties of additional factors that may be relevant for the monitoring tasks.

How to use this document

- Due to the standardized nature of this template, you may feel that the content of the literature cannot be adequately represented. In these cases, please use the comment spaces provided for most questions.
- The literature review takes into account a selection of relevant publications in the 5 key dimensions of RRI (as defined by the EC: citizen engagement, science literacy, gender equality, open access, governance and ethics) and a selection of key publications dealing explicitly with RRI. Some of the questions in this template only relate to the 5 key dimensions, others only to the explicit RRI literature. Please make sure to fill in the template accordingly.

- Try to briefly summarise the relevant statements of the review document in your own words, perhaps using bullet points; please always refer to the page number of the document.
- If a question in the template does not apply to the publication at hand, please leave the entry blank.
- Important definitions or other central statements may be copied into the template; please always make reference to the page number of the review document
- Given the diversity of literature covered in this review, it is difficult to provide guidance on how extensive each review should be. For a "normal" journal article we expect the filled-in template to count roughly about 8-10 pages.

If you have any questions, please get in touch:

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ralf.lindner@isi.fraunhofer.de

Review reports

Basic information								**Document no.:** (citavi #)	**#1079**
Reviewer's name	Kerstin Goos								
1. Bibliographical information (author/s, year, title, editor/s, journal/book, volume, publisher, place of publication, pages, DOI)	Bucchi, Massimiano and Frederico Neresini (2007): 'Science and Public Participation' in, Edward et al (eds.): Handbook of Science and Technology Studies (3rd edition). Cambridge: Mit Press.								
2. Abstract (copy and paste)	This chapter seeks to 1. Provide an overview of the emergence of the phenomenon and theme of public participation in science 2. Define a general interpretative framework with which to map its various manifestations, and 3. Outline possible driving forces behind it as well as its potential impact in terms of changes in the production of scientific knowledge								
3. Main focus (key dimensions according to MoRRI) Comment on 3:	RRI / RI	☐	Citizen participation	x	Science literacy	☐	Gender equality	☐	
	Open access	☐	R&I governance and ethics	☐	Other	☐			
4. Main perspective (multiple entries possible)	Theoretical, conceptual	x	Methodological	☐	Policy oriented	☐	Evaluative	☐	
	Other	☐	Comment on 4:						
5. Type of document Comment on 5:	Scientific article	☐	Book chapter	x	Book	☐	Report	☐	
	Project deliverable	☐	Policy/ strategy document	☐	Other	☐			
6. System level (if applicable) Comment on 6:	Global	☐	European	☐	National	☐	Sub-national	☐	

Basic information				**Document no.:** (citavi #)	**#1079**
7.1 Country focus (if applicable, please specify)					
7.2 Country/ies of origin indicated by institutional affiliation of editor(s)/ author(s) (if applicable, please specify)	Italy			Comments on 7:	
Data and indicator availability					
8.1 Data, indicators, measurements	Document contains data	☐	If yes, please specify (including page numbers in document)		
Comment on 8.1					
8.2 Reference made to data, indicators measurements in other sources	Document refers to relevant sources	x	If yes, please list source(s): (URLs, data banks, reports, statistics, etc.)	- Michael (1992): Case study about a group of electricians working at the Sellafield nuclear power reprocessing plant in the UK: electricians gave the researchers various reasons for their lack of interest in acquiring scientific information about the risks of irradiation (p.451) - Wynne (1995): study of the "radioactive sheep" crisis, Cumberland, UK (p.451 ff) - Segall & Roberts (1980): study on communication between doctors and patients in a large Canadian hospital - AIDS research as an example for co-production (Epstein 1995), p. 453 - AFM (French Muscular Dystrophy Association) as another configuration of knowledge co-production (p.453) - Daubert decision by the US Supreme Court (p.456) - P.459: table with some of the most widespread from of public participation in science elicited by a sponsor - P.461: Woburn residents	

Basic information					**Document no.:** (citavi #)	**#1079**
					gathered epidemiological data and information on a suspiciously high number of childhood leukemia cases in their area that persuaded MIT to initiate a research program	
Comment on 8.2:						

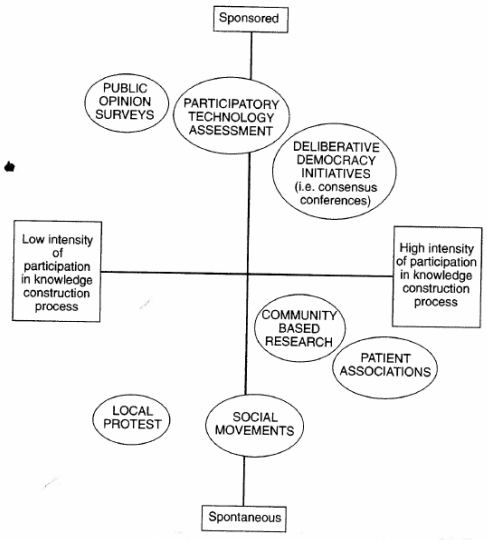
Guiding questions for review

- please add page numbers where appropriate -

9. How is RRI characterized? (For literature dealing explicitly with responsible (research) and innovation. If the publication deals with one of the 5 key dimensions, please proceed to 11.)	
9.1 Which definition of RRI is being used? (author's definition or reference to other source)	-
9.2 Which aspects of RRI receive special emphasis? (e.g., certain normative goals, procedural approaches, reference to one or more of the 5 key dimensions, …)	-

Basic information	**Document no.:** (citavi #)	**#1079**
9.2 Which arguments are presented in support or rejection/criticism of RRI?	-	
9.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to? (e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy, …)	-	
Comments on 9.		
10. Policy context of RRI (For literature dealing explicitly with responsible (research) and innovation. If the publication deals with one of the 5 key dimensions, please proceed to 11.)		
10.1 Which RRI-related developments (international, EU, national, sub-national) are mentioned, how are they characterized and what are they aiming at (strategies, funding initiatives, regulation etc.)?	-	
10.2 Which approaches, instruments are discussed to facilitate the uptake of RRI?	-	

Basic information	**Document no.:** (citavi #)	**#1079**
10.3 Which problems, barriers, potential drawbacks for RRI are brining discussed, how could they be addressed?	-	
Comments on 10.		
11. Claims regarding the effects of RRI and / or the key dimension (benefits, costs, disadvantages, trade-offs)		
11.1 What claims are being made?	Public participation is today one of the key dynamics at the core of the co-evolutionary, co-production processes redefining the means of science and the public, knowledge and citizenship, expertise and democracy.	
11.2 Which arguments are used to support the claim(s)?	Activities resulting from critique of the deficit model share certain assumptions and features: - PUS largely coincides with *scientific literacy* - Understanding, once achieved, guarantees favorable attitudes toward science and technological innovation - Tendency to problematize the relationship between science and the public only as regards the public However, these are assumption have been strongly criticized since the early 90is. More systematic and detailed analysis is necessary. Critics of deficit model also pointed out that these complex matters are difficult to grasp with large-scale surveys. Criticism prompted the use of ethnographic methods and discourse analysis tools, see 8.2. Authors furthermore refer to h*ybrid forums and the co-production of scientific knowledge*, where expert and lay knowledge are not produced independently in separate contexts, but they rather result from common processes carried forward in "hybrid fora" in which both specialists and nonspecialists can actively interact (cf. Callon et al 2001). ➔ Example, where co-production has been particularly visible: medical research ➔ Public mobilization of technoscience issues ➔ Making science in the court ➔ Users and the shaping of technology In addition, the authors also identify formal initiatives promoting public participation in science. Authors propose an interpretative framework: by arguing that the typology of Rowe/Frewer (2005) has some shortcomings, they develop a framework that also includes "spontaneous" participatory forms, based on the work of Callon et al (2001). Relevant dimensions of the	

Basic information	**Document no.:** (citavi #)	**#1079**
	framework: - **intensity** of cooperation among different actors in knowledge production processes. - **Extent** to which public participation is elicited by a sponsor: degree of spontaneity of public participation  Figure 19.1 A map of public participation in science and technology. The proposed framework seeks to account for the simultaneous coexistence of different patterns of participation that may coalesce depending on specific conditions and on the issues at stake – from the „zero degree" of participation entailed by the deficit model to the most substantial forms of cooperation. Rather than „which model of participation accounts best" for expert-public interactions, one of the key questions becomes „under what conditions do different forms of public participation emerge?"	
11.3 What evidence is presented to support the claims? (e.g., data, indicators, research results, case studies, anecdotal evidence)		
11.4 According to the author(s), which type of evidence/data is missing to better support the claim? (e.g. data gaps, limitations with regard to analytical levels, lack of indicator specifications etc.)		
Comments on 11.		

Basic information	**Document no.:** (citavi #)	**#1079**
12. Key dimensions of RRI (For literature dealing with one or more of the 5 key dimensions.)		
12.1 How is the key dimension defined? (terminology applied, central features/characteristics)	Public participation may be broadly defined as the diversified set of situations and activities, more or less spontaneous, organized and structured, whereby nonexperts become involved, and provide their own input to, agenda setting, decision-making, policy forming, and knowledge production processes regarding science (Callon et al 2001, Rowe & Frewer 2005)	
12.2 Does the document reach beyond one single dimension / are more than one of the key dimensions discussed? If yes, what is the proposed relationship between different dimensions (complementary, contradictory…)?	Science literacy	
12.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to? (e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy, …)	STS	
Comments on 12.		
13. Are other important "dimensions" / aspects of RRI discussed, presented which are so far not covered by MoRRI?		
14. Anything else deemed relevant?		

Basic information		**Document no.:** (citavi #)	**#1079**
15. General comments and remarks			
16. Relevant sources cited (Please list references to other sources cited in the literature which seem to be highly relevant for MoRRI and/or represent important contributions in the field)	Callon 1999, Callon et al 2001, Sheila Jasanoff, Rowe & Frewer (2000, 2005)		

Basic information									**Document no.:** (citavi #)	**#982**
Reviewer's name	Kerstin Goos									
1. Bibliographical information (author/s, year, title, editor/s, journal/book, volume, publisher, place of publication, pages, DOI)	Stirling, Andy (2008:) "Opening Up" and "Closing Down". Power, Participation, and Pluralism in the Social Appraisal of Technology. *Science, Technology, & Human Values.* Volume 33 Number 2, 262-294.									
2. Abstract (copy and paste)	Discursive deference in the governance of science and technology is rebalancing from expert analysis toward participatory deliberation. Linear, scientistic conceptions of innovation are giving ground to more plural, socially situated understandings. Yet, growing recognition of social agency in technology choice is countered by persistently deterministic notions of technological progress. This article addresses this increasingly stark disjuncture. Distinguishing between "appraisal" and "commitment" in technology choice, it highlights contrasting implications of normative, instrumental, and substantive imperatives in appraisal. Focusing on the role of power, it identifies key commonalities transcending the analysis/participation dichotomy. Each is equally susceptible to instrumental framing for variously weak and strong forms of justification. To address the disjuncture, it is concluded that greater appreciation is required—in both analytic and participatory appraisal—to facilitating the opening up (rather than the closing down) of governance commitments on science and technology.									
3. Main focus (key dimensions according to MoRRI)	RRI / RI	☐	Citizen participation	x	Science literacy	☐	Gender equality	☐		
	Open access	☐	R&I governance	☐	Other	☐				

Basic information								**Document no.:** (citavi #)	**#982**
			and ethics						
Comment on 3:									
4. Main perspective (multiple entries possible)	Theoretical, conceptual	x	Methodological	☐	Policy oriented	☐	Evaluative	☐	
	Other	☐	Comment on 4:						
5. Type of document	Scientific article	x	Book chapter	☐	Book	☐	Report	☐	
	Project deliverable	☐	Policy/ strategy document	☐	Other	☐			
Comment on 5:									
6. System level (if applicable)	Global	☐	European	☐	National	☐	Sub-national	☐	
Comment on 6:	-								
7.1 Country focus (if applicable, please specify)	No country focus. Several UK examples are mentioned though.								
7.2 Country/ies of origin indicated by institutional affiliation of editor(s)/ author(s) (if applicable, please specify)	UK				Comments on 7:				
Data and indicator availability									
8.1 Data, indicators, measurements	Document contains data	x	If yes, please specify (including page numbers in document)		Authors mentions several examples from the UK to support his arguments - p. 265: UK policy on nuclear power - p.266: UK energy policy - further references to UK policy: p.269, p.273, p.277 - p. 271 : environmentalist stakeholders in Germany, European environment agency.				
Comment on 8.1									

Basic information					**Document no.:** (citavi #)	**#982**
8.2 Reference made to data, indicators measurements in other sources	Document refers to relevant sources	☐	If yes, please list source(s): (URLs, data banks, reports, statistics, etc.)			
Comment on 8.2:						
Guiding questions for review *- please add page numbers where appropriate -*						
9. How is RRI characterized? (For literature dealing explicitly with responsible (research) and innovation. If the publication deals with one of the 5 key dimensions, please proceed to 11.)						
9.1 Which definition of RRI is being used? (author's definition or reference to other source)	-					
9.2 Which aspects of RRI receive special emphasis? (e.g., certain normative goals, procedural approaches, reference to one or more of the 5 key dimensions, …)	-					
9.2 Which arguments are presented in support or						

Basic information	**Document no.:** (citavi #)	**#982**
rejection/criticism of RRI?	-	
9.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to? (e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy, …)	-	
Comments on 9.		
10. Policy context of RRI (For literature dealing explicitly with responsible (research) and innovation. If the publication deals with one of the 5 key dimensions, please proceed to 11.)		
10.1 Which RRI-related developments (international, EU, national, sub-national) are mentioned, how are they characterized and what are they aiming at (strategies, funding initiatives, regulation etc.)?	-	
10.2 Which approaches, instruments are discussed to facilitate the uptake of RRI?	-	

Basic information	**Document no.:** (citavi #)	**#982**
10.3 Which problems, barriers, potential drawbacks for RRI are brining discussed, how could they be addressed?	-	
Comments on 10.		
11. Claims regarding the effects of RRI and / or the key dimension (benefits, costs, disadvantages, trade-offs)		
11.1 What claims are being made?	- Efforts both to understand and to affect progressive change should shift attention away from stylized analysis/participation contrasts and towards "opening up" analytic and participatory appraisal alike. Stirling questions the stark dichotomy between expert analysis and participatory practices. (p.268) It is necessary to place attention to the validity and utility of the dichotomy. Therefore he: o Distinguishes between appraisal and commitment o Identifies crosscutting attributes of appraisal, applying equally to analytic and participatory approaches (instrumental, substantive and normative imperatives) o Considers the role of political, institutional and economic power o And finally comes to the conclusion that both have crosscutting issues and one way to think about these is as a distinction between the role of social appraisal in opening up or closing down wider policy discourses on science and technology choice. - Whatever the result, consideration of these questions of framing, justification, and power shows that the distinction between opening up and closing down is of considerable normative, substantive, and instrumental importance. In many ways, the distinction may therefore be more salient than conventional contrasts couched in terms such as new versus old, citizens versus specialists, quantitative versus qualitative, or analytic versus deliberative. The significance is all the more acute for being subject to such relative neglect in the academic and policy literature.	
11.2 Which arguments are used to support the claim(s)?	Technological commitments: represent "ontological", discursive, institutional, economic, and infrastructural attachments to particular technological pathways. Such commitments encompass a range of structures and processes for allocating resources (such as policy attention, research funding, venture capital, training investments, regulatory standards, fiscal support, contractual risks, and legal liabilities). Commitments need not necessarily take the form of explicit, discrete or even deliberate decisions. (p.265) - Example: recent U.K. policy on nuclear power, activities broadly constituting social commitment include statements of "necessity" by senior officials (King 2005), announcements of government objectives (Blair 2005), drawing up of	

Basic information	Document no.: (citavi #)	#982

international agreements (Blair 2006), enactment of laws (Nuclear Industry Association 2006), establishing organizations (Beckett 2002), issuing licenses and setting standards (Health and Safety Executive 2006), developing new research programs (Engineering and Physical Science Research Council 2006), introducing educational curricula (Office of Nuclear Energy 2006), and establishing training and procurement exercises.

The social appraisal of technology, on the other hand, concerns the ways in which knowledges, understandings, and evaluations are constructed and rendered salient to inform these commitments. Here we find epistemic processes of learning and communication (Webler, Kastenholz, and Renn 1995; Wynne 1995), rather than substantive ontologies of intervention and deliberate choice (Leach, Scoones, and Wynne 2005). Appraisal does not just imply formalized assessment routines, but also includes wider sociopolitical discourse in what is elsewhere termed the "agora" (Nowotny, Scott, and Gibbons 2001). (p.265 ff.)

- activities that might be seen broadly to constitute social appraisal in U.K. energy policy include parliamentary inquiries (Environmental Audit Committee 2005), government reviews (Strategy Unit of the Prime Minister [SU] 2002), advisory body reports (Sustainable Development Commission 2006), and academic and commercial (de W. Waller et al. 2006) assessments. The wider discursive aspects of appraisal include media interventions (BBC 2006), nongovernmental organization initiatives (Nuclear Spin 2006), and wider cultural ctivities (BBC 1985).

A common feature of participation and analysis lies in the importance of intentionality. Rationales and motivations underlying appraisal involves three starkly distinguishable types of imperatives: "normative", "instrumental" and "substantive".

- **Normative imperatives** take a variety of forms, all focusing on the *process* of appraisal. In expert analysis, a range of idealized Mertonian or Popperian norms are invoked to characterize ostensibly "value free" (Morris 2000) and "sound science" (Blair 2003). In participatory deliberation, normative imperatives variously highlight Habermas's notions of "ideal speech" (1968), "legitimacy" (1975), and "communicative rationality" (1984); Rawls's "public reason" (1993, 1997); or qualities of "social learning" (Wynne 1992), "authenticity" (Dryzek 2002, 1), and "reflexivity" (Wynne 2002; Stirling 2006b). such widening of social agency beyond immediately proximate political actors can be problematic for incumbent interests. As a consequence, examples abound of participatory exercises being ignored by their sponsors (Pimbert and Wakeford 2002).
  - Example: Tony Blair illustrates the underlying attitude in the assertion that repetition of a consultation process will not affect policy. Accordingly, practitioners and researchers alike frequently find themselves reflecting on the persistent failure of participatory appraisals to "impact" tangibly on policy making (Renn, Webler, and Wiedemann 1995). (p.269)
- **Instrumental imperative** in appraisal: focus is on outcomes. appraisal is regarded in terms of efficacy in realizing particular favored ends.
  - Example: the U.K. government's elaborate "GM Nation" initiative (Department for Environment, Food and Rural Affairs [DEFRA] 2003) actually exercised

Basic information	**Document no.:** (citavi #)	**#982**
	little impact on policy (Baldwin, Webster, and Elliott 2004). In justifying their caution (DEFRA 2004), the government itself cited a critical officially contracted evaluation in which negative conclusions were partly based on application of this kind of policy impact criterion. (p. 270) - **Substantive imperative**: Like instrumental imperatives, it concerns outcomes rather than explicitly normative preoccupations with process. The distinguishing feature of a substantive perspective, however, is that the outcomes in question are not defined instrumentally, in terms of particular values or interests (whose normative justifications remain implicit or concealed). Instead, the focus is on explicit, socially deliberated, publicly reasoned evaluative criteria for the outcomes themselves. One particular instance of this substantive perspective on appraisal is found in high-profile debates about the "precautionary principle" (O'Riordan and Jordan 2000). (p. 271) • Example: environmentalist stakeholders in Germany led to what even manufacturers eventually acknowledged not only as environmental and health but also technical and economic improvements. Similar substantive arguments are advanced by the European Environment Agency. **Power** (p.273ff): it is not necessarily the case that exercise of power in any particular appraisal exercise will be explicit or deliberate, nor that the particular power structures immediately concerned will automatically be those that are extant in wider governance. Whether the exercise of power is judged to be good or bad depends on the context and the point of view. The most well-established context for discussion of power in appraisal concerns the way in which outputs of ostensibly definitive expert analysis are highly susceptible to various kinds of „framing". What is less well recognized is that the design, implementation, and interpretation of participatory appraisal also display similar latitude for contingency and agency (Scoones and Thompson 2001; Wakeford 2001). Framing thus raises important queries both for analytic and participatory appraisal—under normative, substantive, and instrumental perspectives alike. It reveals the enormous latitude for inadvertent, tacit (or deliberate, covert) influence of power. - Examples: management of BSE in the UK food chain (p.277) (expert analysis); UK national consensus conference on GMO (participatory procedure) **Closing down** the formation of technological commitments: the aim is instrumentally to assist incumbent policy-making actors by providing means to justification. - Example: routine features of scientific advisory processes in many countries. (p. 279) **Opening up**: emphasis lies in revealing to wider policy discourses any inherent indeterminacies, contingencies or capacities for agency. - Example: UK science advisory body, GM SRP (p.280)	
11.3 What evidence is presented to support the claims? (e.g., data, indicators, research results, case studies, anecdotal evidence)	See 11.2. /8.1.	

Basic information		**Document no.:** (citavi #)	**#982**
11.4 According to the author(s), which type of evidence/data is missing to better support the claim? (e.g. data gaps, limitations with regard to analytical levels, lack of indicator specifications etc.)	-		
Comments on 11.			
12. Key dimensions of RRI (For literature dealing with one or more of the 5 key dimensions.)			
12.1 How is the key dimension defined? (terminology applied, central features/characteristics)	Stirling contrasts participatory activities with expert analysis. (p.267). On one hand, there are established, narrow, rigid, quantitative, opaque, exclusive, expert-based, analytic procedures tending to privilege economic considerations and incumbent interests (Collingridge 1980; Schwartz and Thompson 1990; Flyvbjerg 1998). Broadly, these include approaches like risk/cost–benefit analysis, technology/life cycle assessment, Delphi methods, and expert advice. On the other hand are seen new, relatively unconstrained, qualitative, sensitive, inclusive, transparent, deliberative, democratically legitimate, "participatory" processes promising greater emphasis on otherwise marginal issues and interests such as environment, health, and fairness (Fischer 1990; Irwin 1995; Sclove 1995). In this way, in fields such as agriculture, energy, transport, and communications (Renn, Webler, and Wiedemann 1995; Joss and Durant 1995), citizen engagement is defended by contrast with (if not a substitute for) conventional expert analysis.		
12.2 Does the document reach beyond one single dimension / are more than one of the key dimensions discussed? If yes, what is the proposed relationship between different dimensions (complementary, contradictory…)?	-		
12.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to? (e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy,	STS, deliberative democracy		

Basic information	**Document no.:** (citavi #)	**#982**
…)		
Comments on 12.		
13. Are other important "dimensions" / aspects of RRI discussed, presented which are so far not covered by MoRRI?	-	
14. Anything else deemed relevant?		
15. General comments and remarks		
16. Relevant sources cited (Please list references to other sources cited in the literature which seem to be highly relevant for MoRRI and/or represent important contributions in the field)	Work of Luigi Pellizzoni, Brian Wynne, Sheila Jasanoff; literature related to the UK cases	

Basic information		**Document no.:** (citavi #)	**#1077**
Reviewer's name	Kerstin Goos		
1. Bibliographical information (author/s, year, title, editor/s, journal/book, volume, publisher, place of publication, pages, DOI)	Vargiu, Andrea 2014: Indicators for the Evaluation of Public Engagement of Higher Education Institutions. In: Journal of Knowledge Economy, 5, 3, 562-584.		

Basic information								**Document no.:** (citavi #)	**#1077**
2. Abstract (copy and paste)	The expression "third mission" is generally used to refer to universities' direct and indirect contribution to society. Some authors maintain the idea that a relevant aspect of third mission concerns public engagement of universities. Relevance and visibility of institutions' as well as scholars' public engagement is connected with the possibility of accounting for it. The debate about the evaluation of teaching and research is quite advanced and so are assessment instruments and techniques (although far from producing generalized consensus). Confrontation on the assessment of public engagement lags behind, although some significant advancements exist. The paper presents and discusses possible indicators for the evaluation of public engagement of universities, on the basis of comparison between three reports that were chosen after analysis of both mainstream publishing and grey literature. Indicators for institutional public engagement proposed by those three reports are subsumed under a common framework which encompasses them within six domains, such as: mission, governance and overarching institutionalized strategies for public engagement; research; student engagement and educational outreach; dissemination; accessibility and use of facilities; community partnerships, stakeholders' relations and participation in external activities. Conclusions identify a shortlist of indicators based on validity and feasibility. Some integration will also be proposed in the light of critical aspects pointed out in discussion.								
3. Main focus (key dimensions according to MoRRI)	RRI / RI	☐	Citizen participation	x	Science literacy	☐	Gender equality		
	Open access	☐	R&I governance and ethics	☐	Other	☐			
Comment on 3:									
4. Main perspective (multiple entries possible)	Theoretical, conceptual	☐	Methodological	☐	Policy oriented	☐	Evaluative		
	Other	☐	Comment on 4:						
5. Type of document	Scientific article	x	Book chapter	☐	Book	☐	Report		
	Project deliverable	☐	Policy/ strategy document	☐	Other	☐			
Comment on 5:									

Basic information					**Document no.:** (citavi #)		**#1077**
6. System level (if applicable)	Global	☐	European	☐	National	☐	Sub-national
Comment on 6:							
7.1 Country focus (if applicable, please specify)							
7.2 Country/ies of origin indicated by institutional affiliation of editor(s)/ author(s) (if applicable, please specify)	Italy				Comments on 7:		
Data and indicator availability							
8.1 Data, indicators, measurements	Document contains data	x	If yes, please specify (including page numbers in document)		Author develops a Framework for Possible Indicators for the Evaluation of Public Engagement based on the three reports mentioned in 8.2.(see p. 574ff) PE indicators are grouped within 6 thematic areas: (A) Mission, governance and overarching institutionalized strategies for public engagement (B) Research (C) Student engagement and educational outreach (D) Dissemination (E) Accessibility and use of facilities (F) Community partnerships, stakeholders' relations and participation in external activities. See synthesis list of public engagement indicators in Table 8, p.580.		
Comment on 8.1							

Basic information				**Document no.:** (citavi #)	**#1077**
8.2 Reference made to data, indicators measurements in other sources	Document refers to relevant sources	x	If yes, please list source(s): (URLs, data banks, reports, statistics, etc.)	**Hart et al. (2009),** Some examples of approaches to audit, benchmarking and evaluation of public engagement are briefly presented and schematically discussed against the seven dimensions of public engagement that authors used to identify indicators: – Public access to facilities – Public access to knowledge – Student engagement – Faculty engagement – Widening participation – Encouraging economic regeneration and enterprise in social engagement – Institutional relationship and partnership building. **Molas-Gallart et al. (2002),** report rests upon a first distinction between exploitation and use of existing capabilities knowledge capabilities and facilities) and what are identified as the core of academic activities: research, teaching and communication. Dimensions and indicators proposed in the document refer to a wide range of activities which include also mainly marked oriented activities. broad set of indicators: – Technology commercialisation – Entrepreneurial activities – Advisory work and contracts – Commercialisation of facilities – Contract research – Collaboration in academic research – Staff flow – Student placements – Learning activities – Curricula alignment – Social networking – Non-academic dissemination. **E3M (2011):** A Delphi study was used in order to develop a global view of a set of indicators for the three dimensions of third mission that were identified in previous phases of the E3M project, i.e. continuing education, technology transfer and innovation and social engagement. E3M (2011) presents the methodological approach and techniques used for the Delphi study and its main results		

Basic information				**Document no.:** (citavi #)	**#1077**
				Also: reference to Neresini and Bucchi (2011): Which indicators for the new public engagement activities? An exploratory study of European research institutions. Public Understanding of Science, 20, 64–79.	
Comment on 8.2:					
Guiding questions for review *- please add page numbers where appropriate -*					
9. How is RRI characterized? (For literature dealing explicitly with responsible (research) and innovation. If the publication deals with one of the 5 key dimensions, please proceed to 11.)					
9.1 Which definition of RRI is being used? (author's definition or reference to other source)				-	
9.2 Which aspects of RRI receive special emphasis? (e.g., certain normative goals, procedural approaches, reference to one or more of the 5 key dimensions, …)				-	
9.2 Which arguments are presented in support or rejection/criticism of RRI?					

Basic information	**Document no.:** (citavi #)	**#1077**
	-	
9.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to? (e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy, …)	-	
Comments on 9.		
10. Policy context of RRI (For literature dealing explicitly with responsible (research) and innovation. If the publication deals with one of the 5 key dimensions, please proceed to 11.)		
10.1 Which RRI-related developments (international, EU, national, sub-national) are mentioned, how are they characterized and what are they aiming at (strategies, funding initiatives, regulation etc.)?	-	
10.2 Which approaches, instruments are discussed to facilitate the uptake of RRI?	-	

Basic information	**Document no.:** (citavi #)	**#1077**
10.3 Which problems, barriers, potential drawbacks for RRI are brining discussed, how could they be addressed?	-	
Comments on 10.		
11. Claims regarding the effects of RRI and / or the key dimension (benefits, costs, disadvantages, trade-offs)		
11.1 What claims are being made?	- Further elaboration is needed to develop accountability criteria and forms of evaluation capable of grasping the complexity of academic work and the variety of experiences and practices. Notably, evaluation could extend beyond research and teaching, to include community service and partnership; whereas, accountability could be more intensively oriented to civil society stakeholders. - it would be desirable to develop new indicators to consider and promote practices and experiences that tend to sharing and co-production of socially and culturally relevant knowledge (p.568) - But also: a concrete risk exists of overloading faculties and administrations with yet another heavy organizational burden. Avoiding such a risk entails investments at institutional level on self-assessment tools, dedicated personnel and the creation of specific inventories of public engagement activities. That implies strategic choices that are forms of engagement in themselves and that realistically deal with a context where resources are often scarce.	
11.2 Which arguments are used to support the claim(s)?	- Widespread emphasis on the growing relevance of a knowledge-driven economy tends to reduce the role of universities to the economic dimension or even simply to the market. → reflected in policies and academic debates that are inclined to relegate third stream activities to their commercial relevance. - Many authors tend to identify third mission with a service mission and prefer emphasizing community engagement and impact on polices, rather than other forms of university-society interactions. - Practices and approaches to PE differ considerably. - The principles and practices adopted for HES' governance, generally favour vertical control, are mainly state- or market-oriented and tend to disregard civil society (Chessa and Vargiu 2011). - Institutional competition in the form of academic ranking values more traditional forms of research, teaching and dissemination, thus reinforcing them (Hazelkorn 2011; Kehm and Stensaker 2008). (p.567)	

Basic information	**Document no.:** (citavi #)	**#1077**
	- systematic assessment of community engagement could contribute to ensure better quality standards, more effective management of existing experiences and eventually more relevant impacts.	
11.3 What evidence is presented to support the claims? (e.g., data, indicators, research results, case studies, anecdotal evidence)	Literature review.	
11.4 According to the author(s), which type of evidence/data is missing to better support the claim? (e.g. data gaps, limitations with regard to analytical levels, lack of indicator specifications etc.)	Impact evaluation remains a crucial issue. Valuable work already exists, but further investigation is needed to develop indicators to assess how much a university's public engagement affects the following subject areas. - Research-based policies - Advocacy capacity - Promotion of active citizenship and civic participation - Building or reinforcing social capital and production of relational goods (social added value) - Better understanding of research and trust in science - Retroactivity of engagement on research, teaching and institutional change - Capacity in meeting the user's needs.	
Comments on 11.		
12. Key dimensions of RRI (For literature dealing with one or more of the 5 key dimensions.)		
12.1 How is the key dimension defined? (terminology applied, central features/characteristics)	Paper focuses on "third mission" of universities. Based on Schuetze (2010) three kinds of activities are covered by this term (p.565): - Academic knowledge transfer: It is mainly, although not exclusively, valued for its economic benefits and commercial relevance. According to Varga (2009), it may take place via formal or informal networks of professionals connected to universities, through formalized business relations or thanks to access to HEI's facilities like laboratories or libraries. - University continuing education: concerns outreach activities that are provided for by universities beyond traditional curricular study courses and may thus include public seminars and lectures, professional education and short-term courses - Community based research and service learning: CBR is a kind of research that is generally done with communities and people, instead of on or about them. It can be run by recurring to different degrees and ways of participation of community members, but always aims at redefining the asymmetric relations that characterize traditional research practices (Vargiu 2008). Likewise, service-learning is a kind of educational activity that goes beyond normal	

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study visits or apprenticeships, as it aims at forms of collaboration which benefit not only both the student and the community but also the researcher and the institution as a whole.

Table 1 Third mission: a schematic overview of semantics of most commonly used expressions

Most commonly used expressions			Main regulatory actor	Main regulatory principle	Relationships	Prevailing interest	Prevailing epistemology	Kind of action	Participation	Examples
Third mission	Knowledge transfer		Market	Exchange	Asymmetric	Technical-instrumental	Empirical-analytical	Strategic action	Participation as influence	Knowledge transfer, spin-off creation, patenting
	Public engagement		State	Redistribution	Asymmetric	Practical	Hermeneutic-interpretative	Mechanical-instrumental action	Participation as cooperation	Science communication, evidence-based policies, public hearings, science museums and science festivals, continuing education
		Community engagement	Community	Reciprocity	Symmetric	Emancipative	Critical	Communicative action	Participation as involvement and action	CBR, service-learning and science shops, deliberative science, bottom-up approaches to citizens participation in science, technology assessment

P.567

12.2 Does the document reach beyond one single dimension / are more than one of the key dimensions discussed? If yes, what is the proposed relationship between different dimensions (complementary, contradictory…)?	
12.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to? (e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy, …)	
Comments on 12.	
13. Are other important "dimensions" / aspects of RRI discussed, presented which are so far not covered by MoRRI?	

Basic information	**Document no.:** (citavi #)	**#1077**
14. Anything else deemed relevant?		
15. General comments and remarks		
16. Relevant sources cited (Please list references to other sources cited in the literature which seem to be highly relevant for MoRRI and/or represent important contributions in the field)		

Basic information	**Document no.:** (citavi #)	**#983**
Reviewer's name	Kerstin Goos	
1. Bibliographical information (author/s, year, title, editor/s, journal/book, volume, publisher, place of publication, pages, DOI)	Wilsdon, James; Willis, Rebecca (2004): See-through Science Why public engagement needs to move upstream, Demos, London.	
2. Abstract (copy and paste)	Spurred on by high profile controversies over BSE, GM crops and now nanotechnology, scientists have gradually started to involve the public in their work. They looked first to education as the answer, then to processes of dialogue and participation. But these efforts have not yet proved sufficient. In See-through Science, James Wilsdon and Rebecca Willis argue that we are on the cusp of a new phase in debates over science and society. Public engagement is about to move upstream. Scientists need to find ways of listening to and valuing more diverse forms of public knowledge and social intelligence. Only by opening up innovation processes at an early stage can we ensure that science contributes to the common good. Debates about risk are important. But the public also wants answers to the more fundamental questions at stake in any new technology: Who owns it? Who benefits from it? To what purposes will it be directed? This pamphlet	

<table>
<tr><td colspan="6">Basic information</td><td colspan="2">Document no.:
(citavi #)</td><td>#983</td></tr>
<tr><td></td><td colspan="8">offers practical guidance for scientists, policy-makers, research councils, businesses and
NGOs – anyone who is trying to make engagement work. It is an argument with profound
implications for the future of science. Can upstream engagement reshape not only the way that scientists relate to the public, but also the very foundations on which the scientific enterprise rests?</td></tr>
<tr><td rowspan="3">3. Main focus (key dimensions according to MoRRI)

Comment on 3:</td><td>RRI / RI</td><td>☐</td><td>Citizen participation</td><td>x</td><td>Science literacy</td><td>☐</td><td>Gender equality</td><td>☐</td></tr>
<tr><td>Open access</td><td>☐</td><td>R&I governance and ethics</td><td>☐</td><td>Other</td><td>☐</td><td colspan="2"></td></tr>
<tr><td colspan="8"></td></tr>
<tr><td rowspan="2">4. Main perspective

(multiple entries possible)</td><td>Theoretical, conceptual</td><td>☐</td><td>Methodological</td><td>☐</td><td>Policy oriented</td><td>x</td><td>Evaluative</td><td>☐</td></tr>
<tr><td>Other</td><td>☐</td><td colspan="6">Comment on 4:</td></tr>
<tr><td rowspan="3">5. Type of document

Comment on 5:</td><td>Scientific article</td><td>☐</td><td>Book chapter</td><td>☐</td><td>Book</td><td>☐</td><td>Report</td><td>x</td></tr>
<tr><td>Project deliverable</td><td>☐</td><td>Policy/ strategy document</td><td>☐</td><td>Other</td><td>☐</td><td colspan="2"></td></tr>
<tr><td colspan="8"></td></tr>
<tr><td rowspan="2">6. System level (if applicable)

Comment on 6:</td><td>Global</td><td>☐</td><td>European</td><td>☐</td><td>National</td><td>☐</td><td>Sub-national</td><td>☐</td></tr>
<tr><td colspan="8"></td></tr>
<tr><td>7.1 Country focus (if applicable, please specify)</td><td colspan="8">Main focus is on UK policy.</td></tr>
<tr><td>7.2 Country/ies of origin indicated by institutional affiliation of editor(s)/ author(s) (if applicable, please specify)</td><td colspan="4">UK</td><td colspan="4">Comments on 7:</td></tr>
<tr><td colspan="9">Data and indicator availability</td></tr>
<tr><td>8.1 Data, indicators, measurements</td><td>Document contains data</td><td>☐</td><td colspan="2">If yes, please specify (including page numbers in document)</td><td colspan="4"></td></tr>
</table>

Basic information				**Document no.:** (citavi #)	**#983**
Comment on 8.1					
8.2 Reference made to data, indicators measurements in other sources	Document refers to relevant sources	x	If yes, please list source(s): (URLs, data banks, reports, statistics, etc.)	Throughout their pamphlet, the authors refer to several developments in UK policy.	
Comment on 8.2:					

Guiding questions for review

- please add page numbers where appropriate -

9. How is RRI characterized? (For literature dealing explicitly with responsible (research) and innovation. If the publication deals with one of the 5 key dimensions, please proceed to 11.)	
9.1 Which definition of RRI is being used? (author's definition or reference to other source)	-
9.2 Which aspects of RRI receive special emphasis? (e.g., certain normative goals, procedural approaches, reference to one or more of the 5 key dimensions, …)	-

Basic information	**Document no.:** (citavi #)	**#983**
9.2 Which arguments are presented in support or rejection/criticism of RRI?	-	
9.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to? (e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy, …)	-	
Comments on 9.		
10. Policy context of RRI (For literature dealing explicitly with responsible (research) and innovation. If the publication deals with one of the 5 key dimensions, please proceed to 11.)		
10.1 Which RRI-related developments (international, EU, national, sub-national) are mentioned, how are they characterized and what are they aiming at (strategies, funding initiatives, regulation etc.)?	-	
10.2 Which approaches, instruments are discussed to facilitate the uptake of RRI?		

Basic information		**Document no.:** (citavi #)	**#983**
	-		
10.3 Which problems, barriers, potential drawbacks for RRI are brining discussed, how could they be addressed?	-		
Comments on 10.			
11. Claims regarding the effects of RRI and / or the key dimension (benefits, costs, disadvantages, trade-offs)			
11.1 What claims are being made?	The nanotechnology report represents a change in the scientific community's approach to the risks, uncertainties and wider social implications of new and emerging technologies. - Royal Societys working group consisted alongside the ususal principals (natural scientitsts), also an environmentalist, a social scientist and a consumer champion. - Inquiry tried to be more open to the public, usually such advises take place out of sight enthusiasm for upstream engagement exists - policy-makers and the science community are desperate to avoid nanotechnology becoming 'the next GM'. - this desire to learn from what has gone before extends beyond GM across the wider realm of biotechnology and the life sciences. It is widely felt that processes of public debate and engagement around human embryology and genetics, from the pioneering work of the Warnock Committee in the 1980s through to the activities of the Human Fertilisation and Embryology Authority and the Human Genetics Commission today, have 'worked' in a way that similar processes around GM have 'failed'. - The government has placed great emphasis on science and innovation as central pillars of its economic strategy. Debates over science and technology, even when they involve processes of public engagement, have been dominated by questions of risk assessment. This framework is too narrow, and fails to ask or answer the more fundamental questions at stake in any new technology: Who owns it? Who benefits from it? To what ends will it be directed? Public engagement needs to move upstream - Lesson learned from GM nation Tensions between innovation policy and public engagement exist, some		

Basic information	**Document no.:** (citavi #)	**#983**
	can be resolved by drawing on management theory and debates over CSR - Moving public engagement upstream is hard enough in the context of taxpayer-funded – and publicly-accountable – science. How can it possibly work in the private sector? Several obstacles stand in the way: the profit motive; pressures for commercial confidentiality; and tight frameworks of patent and intellectual property law.	
11.2 Which arguments are used to support the claim(s)?		
11.3 What evidence is presented to support the claims? (e.g., data, indicators, research results, case studies, anecdotal evidence)	Throughout the pamphlet, the authors refer to many UK examples (GM nation, policy changes, examples for citizen deliberation, BT and Unilever as examples for companies that promote public dialogue ...)	
11.4 According to the author(s), which type of evidence/data is missing to better support the claim? (e.g. data gaps, limitations with regard to analytical levels, lack of indicator specifications etc.)		
Comments on 11.		
12. Key dimensions of RRI (For literature dealing with one or more of the 5 key dimensions.)		
12.1 How is the key dimension defined? (terminology applied, central features/characteristics)	Three phases of PE are presented (p.15 ff): - Public understanding of science - From deficit to dialogue - Moving engagement upstream Authors vote for the upstream move of engagement. they refer to policy statements (p.19): - Most developments in nanotechnologies, as viewed in 2004, are clearly "upstream" in nature'14 and calls for 'a constructive and proactive debate about the future of nanotechnologies [to] be undertaken now – at a stage when it can inform key decisions about their development and before deeply entrenched or polarised positions appear.' - The government's new ten-year strategy for science and innovation includes a commitment 'to enable [public] debate to take place "upstream" in the scientific and technological development process, and not "downstream" where technologies are waiting to be exploited but may be held back	

Basic information		**Document no.:** (citavi #)	**#983**
	by public scepticism brought about through poor engagement and dialogue on issues of concern.'		
12.2 Does the document reach beyond one single dimension / are more than one of the key dimensions discussed? If yes, what is the proposed relationship between different dimensions (complementary, contradictory…)?			
12.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to? (e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy, …)	Deliberative democracy, CSR		
Comments on 12.			
13. Are other important "dimensions" / aspects of RRI discussed, presented which are so far not covered by MoRRI?			
14. Anything else deemed relevant?			
15. General comments and remarks			
16. Relevant sources cited			

Basic information		**Document no.:** (citavi #)	**#983**
(Please list references to other sources cited in the literature which seem to be highly relevant for MoRRI and/or represent important contributions in the field)			

Basic information									**Document no.:** (citavi #)	**#1094**
Reviewer's name	Kerstin Goos									
1. Bibliographical information (author/s, year, title, editor/s, journal/book, volume, publisher, place of publication, pages, DOI)	Newton, Kenneth and Brigitte Geissel (2012): Evaluating Democratic Innovations: Curing the Democratic Malaise? New York: Routledge									
2. Abstract (copy and paste)	In the face of increasing political disenchantment, many Western governments have experimented, with innovations which aim to enhance the working and quality of democracy as well as increasing citizens' political awareness and understanding of political matters. This text is the most comprehensive account of these various democratic innovations. Written by an outstanding team of international experts it examines the theories behind these democratic innovations, how they have worked in practice and evaluates their success or failure. It explains experiments with new forms of democratic engagement such as: Direct Democracy Deliberative Democracy Co-Governance E-Democracy Drawing on a wide variety of theoretical perspectives and with a broad range of case studies, this is essential reading for all students of democratic theory and all those with an interest in how we might revitalise democracy and increase citizen involvement in the political process.									
3. Main focus (key dimensions according to MoRRI)	RRI / RI	☐	Citizen participation	x	Science literacy	☐	Gender equality	☐		
	Open access	☐	R&I governance and ethics	☐	Other	☐				
Comment on 3:										
4. Main perspective (multiple entries possible)	Theoretical, conceptual	☐	Methodological	☐	Policy oriented	☐	Evaluative	☐		
	Other	☐	Comment on 4:							
5. Type of document	Scientific article	☐	Book chapter	☐	Book	x	Report	☐		

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<tr><td colspan="6">Basic information</td><td colspan="2">Document no.:
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<tr><td rowspan="2">Comment on 5:</td><td>Project deliverable</td><td>☐</td><td>Policy/ strategy document</td><td>☐</td><td>Other</td><td>☐</td><td colspan="2"></td></tr>
<tr><td colspan="8">It is an edited book. This review is based on the introduction and conclusion of the book.</td></tr>
<tr><td rowspan="2">6. System level (if applicable)
Comment on 6:</td><td>Global</td><td>☐</td><td>European</td><td>☐</td><td>National</td><td>☐</td><td>Sub-national</td><td>☐</td></tr>
<tr><td colspan="8"></td></tr>
<tr><td>7.1 Country focus (if applicable, please specify)</td><td colspan="8"></td></tr>
<tr><td>7.2 Country/ies of origin indicated by institutional affiliation of editor(s)/ author(s) (if applicable, please specify)</td><td colspan="4">Germany, UK, US</td><td colspan="4">Comments on 7:</td></tr>
<tr><td colspan="9">Data and indicator availability</td></tr>
<tr><td rowspan="2">8.1 Data, indicators, measurements
Comment on 8.1</td><td>Document contains data</td><td>☐</td><td>If yes, please specify (including page numbers in document)</td><td colspan="5"></td></tr>
<tr><td colspan="8"></td></tr>
<tr><td rowspan="2">8.2 Reference made to data, indicators measurements in other sources
Comment on 8.2:</td><td>Document refers to relevant sources</td><td>☐</td><td>If yes, please list source(s):
(URLs, data banks, reports, statistics, etc.)</td><td colspan="5"></td></tr>
<tr><td colspan="8"></td></tr>
<tr><td colspan="9">Guiding questions for review
- please add page numbers where appropriate -</td></tr>
<tr><td colspan="9">9. How is RRI characterized?</td></tr>
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Basic information	**Document no.:** (citavi #)	**#1094**
(For literature dealing explicitly with responsible (research) and innovation. If the publication deals with one of the 5 key dimensions, please proceed to 11.)		
9.1 Which definition of RRI is being used? (author's definition or reference to other source)	-	
9.2 Which aspects of RRI receive special emphasis? (e.g., certain normative goals, procedural approaches, reference to one or more of the 5 key dimensions, …)	-	
9.2 Which arguments are presented in support or rejection/criticism of RRI?	-	
9.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to? (e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy, …)		

Basic information	**Document no.:** (citavi #)	**#1094**
	-	
Comments on 9.		
10. Policy context of RRI (For literature dealing explicitly with responsible (research) and innovation. If the publication deals with one of the 5 key dimensions, please proceed to 11.)		
10.1 Which RRI-related developments (international, EU, national, sub-national) are mentioned, how are they characterized and what are they aiming at (strategies, funding initiatives, regulation etc.)?	-	
10.2 Which approaches, instruments are discussed to facilitate the uptake of RRI?	-	
10.3 Which problems, barriers, potential drawbacks for RRI are brining discussed, how could they be addressed?	-	
Comments on 10.		
11. Claims regarding the effects of RRI and / or the key dimension (benefits, costs, disadvantages, trade-offs)		
11.1 What claims are being made?		

Basic information	**Document no.:** (citavi #)	**#1094**
	General claim: past two or three decades has seen a gathering wave of democratic innovations, some pioneered by the established democracies, some introduced by new democracies. - Consequence of increasing political interest AND increasing critique of political institutions. Two views exist: according to the citizens centered, input theory, democratic innovation should concentrate on educating and informing citizens, according to the top-down, output approach, innovations should focus on political structures and processes. Book focuses on bottom-up innovation. - Top-down innovation: vertical accountability (decentralization of government, the abolition of dual mandates, term limits for elected representatives, new institutions of international and multinational government,…), horizontal accountability (parliamentary checks on the power of the executive, independent central banks, legal oversight, new public management reforms, freedom of information, ombudsmen, human rights,…) - Bottom-up innovation: voting and elections (electronic voting, early voting,…), information/consultation/deliberation (consensus conferences, scenario workshops, study circles,…), co-governance (participatory budgeting, citizens assemblies,…), direct democracy, electronic democracy. Book chapters cover the following topics: - Relationship between new forms of political involvement and old forms. - Claims about capabilities of citizens to engage in informed, thoughtful, and public-spirited collective decision-making. - Success of democratic innovations in informing and mobilizing the groups in the population that are typically the most uninformed and inactive - Trade-offs between different democratic innovations and more conventional forms of representative government - Impact of innovations There are two main theoretical and empirical potentials and failings of democratic innovations. - The yardsticks by which innovations may be judged: recurring criteria are o inclusive, equal participation: authors of the volume show that democratic innovations per se do not guarantee equal participation. Without continued endeavors democratic innovations are likely to result in exclusive and unequal participation o improvement of democratic skills: chapters in the volume show that biggest effect seems to be the improvement of knowledge. 'Becoming a better citizen' takes place mainly in deliberative procedures that provide sufficient support in the shape of mediators and facilitators o impact on public policies: difficult to prove and up to theoretical arguments that are more convincing than the sparse empirical findings. Still open question whether the decisions made by innovatory procedures are in fact better. o Quality of deliberation o Political satisfaction and feeling of legitimacy o Transparency - and the empirical methods of doing so: o comprehensive dataset is still missing. If such a set	

Basic information	**Document no.:** (citavi #)	**#1094**
	became available, two problems will continue to challenge research on participatory innovations: heterogeneity and multi-collinearity	
11.2 Which arguments are used to support the claim(s)?	References to the contribution in the edited book.	
11.3 What evidence is presented to support the claims? (e.g., data, indicators, research results, case studies, anecdotal evidence)	References to the contribution in the edited book.	
11.4 According to the author(s), which type of evidence/data is missing to better support the claim? (e.g. data gaps, limitations with regard to analytical levels, lack of indicator specifications etc.)		
Comments on 11.		
12. Key dimensions of RRI (For literature dealing with one or more of the 5 key dimensions.)		
12.1 How is the key dimension defined? (terminology applied, central features/characteristics)	Authors talk about "democratic innovations", defined as "the successful implementation of a new idea that is intended to change the structures or processes of democratic government and politics in order to improve them". (p.4)	
12.2 Does the document reach beyond one single dimension / are more than one of the key dimensions discussed? If yes, what is the proposed relationship between different dimensions (complementary, contradictory…)?		
12.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to?		

Basic information	**Document no.:** (citavi #)	**#1094**
(e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy, …)	Democratic theory	
Comments on 12.		
13. Are other important "dimensions" / aspects of RRI discussed, presented which are so far not covered by MoRRI?		
14. Anything else deemed relevant?		
15. General comments and remarks		
16. Relevant sources cited (Please list references to other sources cited in the literature which seem to be highly relevant for MoRRI and/or represent important contributions in the field)		

Basic information	**Document no.:** (citavi #)	**#979**
Reviewer's name	Kerstin Goos	
1. Bibliographical information (author/s, year, title, editor/s, journal/book, volume, publisher, place of publication, pages, DOI)	Rowe, Gene; Frewer, Lynn, J. 2000: Public Participation Methods: A Framework for Evaluation.	

Basic information									**Document no.:** (citavi #)	**#979**
2. Abstract (copy and paste)	There is a growing call for greater public involvement in establishing science and technology policy, in line with democratic ideals. A variety of public participation procedures exist that aim to consult and involve the public, ranging from the public hearing to the consensus conference. Unfortunately, a general lack of empirical consideration of the quality of these methods arises from confusion as to the appropriate benchmarks for evaluation. Given that the quality of the output of any participation exercise is difficult to determine, the authors suggest the need to consider which aspects of the process are desirable and then to measure the presence or quality of these process aspects. To this end, a number of theoretical evaluation criteria that are essential for effective public participation are specified. These comprise two types: acceptance criteria, which concern features of a method that make it acceptable to the wider public, and process criteria, which concern features of the process that are liable to ensure that it takes place in an effective manner. Future research needs to develop instruments to measure these criteria more precisely and identify the contextual and environmental factors that will mediate the effectiveness of the different participation methods									
3. Main focus (key dimensions according to MoRRI)	RRI / RI	☐	Citizen participation	**X**	Science literacy	☐	Gender equality	☐		
	Open access	☐	R&I governance and ethics	☐	Other	☐				
Comment on 3:										
4. Main perspective (multiple entries possible)	Theoretical, conceptual	**X**	Methodological	☐	Policy oriented	☐	Evaluative	**X**		
	Other	☐	Comment on 4:							
5. Type of document	Scientific article	**X**	Book chapter	☐	Book	☐	Report	☐		
	Project deliverable	☐	Policy/ strategy document	☐	Other	☐				
Comment on 5:										
6. System level (if applicable)	Global	☐	European	☐	National	☐	Sub-national	☐		
Comment on 6:										
7.1 Country focus (if applicable, please specify)										
7.2 Country/ies of origin indicated by institutional	UK				Comments on 7:					

Basic information				**Document no.:** (citavi #)	**#979**
affiliation of editor(s)/ author(s) (if applicable, please specify)					
Data and indicator availability					
8.1 Data, indicators, measurements	Document contains data	x	If yes, please specify (including page numbers in document)	- authors developed a comparative framework (or normative model) by specifying a number of evaluation criteria. They use the existing research on 'evaluation' to theoretically assess a variety of participation methods - based on suggestions form academics and practitioners rather than findings form empirical studies (p.10) - the developed evaluation criteria may be divided into 'acceptance criteria' (related to effectvie construction and implementation of a procedure) and 'process criteria' (which are related to the potential public acceptance of a procedure). - both 'acceptance criteria' and 'process criteria' are necessary for evaluation: If a procedure is effectively constituted but perceived by the public to be in some sense unfair or undemocratic, then the procedure may fail in alleviating public concerns. On the other hand, if a procedure and its recommendations are accepted by the public but the ultimate decision is attained in an ineffective manner, then its implementation could prove objectively damaging for sponsors and public (p.11) - authors define a subset of criteria that addresses particular key aspects of public acceptance and good process in participation exercises. They suggest that it is important for participation methods to score well on all the criteria, no claim about the relative importance of the criteria is made (p.12) --> **acceptance criteria**: criterion of representativeness, criterion of independence (process should be conducted in an independent, unbiased way), criterion of early involvement (public should be involved as early as possible), criterion of influence (genuine impact on policy), criterion of transparency (public should be able to see what is going on) --> **process criteria**: criterion of resource accessibility (public participants should have access to the appropriate resources (information r., human r., material r., time r.), criterion of task defintion (nature and scope of the participation task should be clearly defined), criterion of structured decision making (exercise should provide appropriate mechanisms for structuring and displaing the decision-making process), criterion of cost-effectiveness		

Basic information					**Document no.:** (citavi #)	**#979**
Comment on 8.1						
8.2 Reference made to data, indicators measurements in other sources	Document refers to relevant sources	x	If yes, please list source(s): (URLs, data banks, reports, statistics, etc.)	- Fiorino 1990 assesses a number of procedures on the basis of "democratic criteria" - Webler (1995) discusses criteria of "fairness" and "competence" in citizen participation		
Comment on 8.2:						

Guiding questions for review

- please add page numbers where appropriate -

9. How is RRI characterized? (For literature dealing explicitly with responsible (research) and innovation. If the publication deals with one of the 5 key dimensions, please proceed to 11.)	
9.1 Which definition of RRI is being used? (author's definition or reference to other source)	-
9.2 Which aspects of RRI receive special emphasis? (e.g., certain normative goals, procedural approaches, reference to one or more of the 5 key dimensions, …)	-

Basic information	**Document no.:** (citavi #)	**#979**
9.2 Which arguments are presented in support or rejection/criticism of RRI?	-	
9.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to? (e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy, …)	-	
Comments on 9.		
10. Policy context of RRI (For literature dealing explicitly with responsible (research) and innovation. If the publication deals with one of the 5 key dimensions, please proceed to 11.)		
10.1 Which RRI-related developments (international, EU, national, sub-national) are mentioned, how are they characterized and what are they aiming at (strategies, funding initiatives, regulation etc.)?	-	

Basic information		**Document no.:** (citavi #)	**#979**
10.2 Which approaches, instruments are discussed to facilitate the uptake of RRI?	-		
10.3 Which problems, barriers, potential drawbacks for RRI are brining discussed, how could they be addressed?	-		
Comments on 10.			
11. Claims regarding the effects of RRI and / or the key dimension (benefits, costs, disadvantages, trade-offs)			
11.1 What claims are being made?	GENERAL CLAIMS ABOUT PUBLIC PARTICIPATION IN TECHNICAL POLICY MATTERS (p.5) - traditional view: decisions regarding technical issues should be left in the hands of experts and scientists. o Perhac 1996 e.g. suggests that environmental policy based on the public's conceptualization of risk fails to adequately protect fundamental human rights to health and liberty. o Moffet 1996 warns that policies involving the public must balance the desire to foster legitimacy and support for decisions with concerns to avoid priorities being driven by "the crisis of the day". o human inadequacies limit the public's capacity to be effectively involved in complex decisions (deficit model) (Brooks/Johnson 1991) o apart from ignorance, other factors may limit the potential for the public to contribute to complex policy decisions related to their attitudes, beliefs and motivations (Ravetz 1986, McCallum/Santos 1997) - Counterarguments to these positions o there are frequently limitations in the knowledge of experts, who often disagree among themselves o the public is not necessarily irrational in its concerns about risks or is its rejection of experts' claims, given abundant historical experience of episodes in which risk promoters have concealed or ignored relevant risk data or simply sought to advance their own interests by using such data selectively (e.g. Jasanoff 1993) o value judgments are made at all stages of the risk management process, such as in deciding which risks to evaluate (Levidow 1994). Implication is that the public is theoretically able to play a role in risk management at most,		

Basic information	Document no.: (citavi #)	#979

if not all, stages

GENERAL CLAIMS ABOUT EVALUATION

- general claim is made that there is a lack of appropriate benchmarks against which the quality of participation exercises might be compared. Existing attempts to specify criteria against which effectiveness may be assessed (Fiorino 1990, Webler 1995) have certain limitations (p.4).
- academic literature offers little comprehensive or systematic consideration of what constitutes a 'good' or 'successful' process. Participation methods often seem to be employed simply in recognition of a need to involve the public in some way, assuming that involvement is an end in itself, rather than a means to an end (p.10).
- most of the criteria discussed in the literature are procedural rather than substantive in that they relate to what makes for an effective process, rather than how to measure effective outcomes (p.10)

RESULTS OF EVALUATION (p.19/20)

Table 2. An Assessment of the Most Formalized Public Participation Techniques According to a Variety of Evaluation Criteria

	Referenda	*Public Hearings*	*Public Opinion Survey*	*Negotiated Rule Making*	*Consensus Conference*	*Citizens' Jury/Panel*	*Citizen Advisory Committee*	*Focus Groups*
Acceptance criteria								
Representativeness of participants	High (assuming full turnout at poll)	Low	Generally high	Low	Moderate (limited by small sample)	Moderate (limited by small sample)	Moderate to low	Moderate (limited by small sample)
Independence of true participants	High	Generally low	High	Moderate	High	High	Moderate (often relation to sponsor)	High
Early involvement?	Variable	Variable	Potentially high	Variable	Potentially high	Potentially high	Variable but may be high	Potentially high
Influence on final policy	High	Moderate	Indirect and difficult to determine	High	Variable but not guaranteed	Variable but not guaranteed	Variable but not guaranteed	Liable to be indirect
Transparency of process to the public	High	Moderate	Moderate	Low	High	Moderate	Variable but often low	Low

(continued)

Table 2 Continued

	Referenda	*Public Hearings*	*Public Opinion Survey*	*Negotiated Rule Making*	*Consensus Conference*	*Citizens' Jury/Panel*	*Citizen Advisory Committee*	*Focus Groups*
Process criteria								
Resource accessibility	Low	Low-moderate	Low	High	High	High	Variable	Low
Task definition	High	Generally high	Low	High	Generally high	Generally high	Variable but may be high	Variable but may be high
Structured decision making	Low	Low	Low	Moderate	Moderate (influence of facilitator)	Potentially high	Variable (influence of facilitator)	Low
Cost-effectiveness	Variable/low	Low	Potentially high	Potentially high	Moderate to high	Moderate to high	Variable	Potentially high

Basic information		**Document no.:** (citavi #)	**#979**
	- authors point out that table is limited as it does not identify the contextual and environmental factors that will contigently affect effectiveness but instead represents a broad analysis. --> inevitable, as gaps in our knowledge exist (p.25) - authors conclude that it is difficult to categorically declare that any one method is the best. the most appropriate techniques for public participation are likely to be hybrids of more traditional methods. An effective technique is also liable to access one or more of the decision aids that already exist, there is no reason why these may not be used to enrich standard participation methods (as done by Renn et al 1993). Authors also emphasise that contextual and environmental factors will interact with a method to determine effectiveness (p.25)		
11.2 Which arguments are used to support the claim(s)?			
11.3 What evidence is presented to support the claims? (e.g., data, indicators, research results, case studies, anecdotal evidence)	evaluation is based on authors' own opinion: subjective evaluation. More reliable and valid measurement tools are required. (p.24)		
11.4 According to the author(s), which type of evidence/data is missing to better support the claim? (e.g. data gaps, limitations with regard to analytical levels, lack of indicator specifications etc.)			
Comments on 11.			
12. Key dimensions of RRI (For literature dealing with one or more of the 5 key dimensions.)			
12.1 How is the key dimension defined? (terminology applied, central features/characteristics)	- authors talk about lower level of involvement (information, communication between scientists or regulators and the public; top-down, one way communication (p.6)) and higher level of involvement ("public views are actively solicited through such mechanisms as consultation exercises, focus groups, and questionnaires" (p.3) and "members of the public may be selected to take part in exercise that provide them with a degree of decision-making authority", dialogue, two-way communication (p.6)). - in this article the "main focus is on public participation methods that aim to include the public in policy making in at least to the level of		

Basic information		**Document no.:** (citavi #)	**#979**
	gathering their opinions; specifically, the authors' interest is in the evaluation of such methods" (p.3/4)		
12.2 Does the document reach beyond one single dimension / are more than one of the key dimensions discussed? If yes, what is the proposed relationship between different dimensions (complementary, contradictory…)?			
12.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to? (e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy, …)			
Comments on 12.			
13. Are other important "dimensions" / aspects of RRI discussed, presented which are so far not covered by MoRRI?			
14. Anything else deemed relevant?			
15. General comments and remarks			
16. Relevant sources cited (Please list references to	Webler, T. 1995: "Right" Discourse in citizen participation: An evaluative yardstick. In Renn, O., Webler T., Wiedemann, P. (eds): Fairness and		

Basic information	**Document no.:** (citavi #)	**#979**
other sources cited in the literature which seem to be highly relevant for MoRRI and/or represent important contributions in the field)	competence in citizen participation: Evaluating models for environmental discourse. Fiorino, D.J. 1990: Citizen Participation and environmental risk: A survey of institutional mechanisms. Science, Technology & Human Values 15 (2): 226 – 43.	

Basic information									**Document no.:** (citavi #)	**#974**
Reviewer's name	Kerstin Goos									
1. Bibliographical information (author/s, year, title, editor/s, journal/book, volume, publisher, place of publication, pages, DOI)	Arnstein, Sherry R. 1969: A Ladder of Citizen Participation, in: JAIP, Vol.35, No.4, p.216-224.									
2. Abstract (copy and paste)	The heated controversy over "citizen participation", "citizen control", and "maximum feasible involvement of the poor", has been waged largely in terms of exacerbated rhetoric and misleading euphemisms. To encourage a more enlightened dialogue, a typology of citizen participation is offered using examples from three federal social programs: urban renewal, antipoverty, and Model Cities. The typology, which is designed to be provocative, is arranged in a ladder pattern with each rung corresponding to the extent of citizens' power in determining the plan and/or program.									
3. Main focus (key dimensions according to MoRRI) Comment on 3:	RRI / RI	☐	Citizen participation	**X**	Science literacy	☐	Gender equality	☐		
	Open access	☐	R&I governance and ethics	☐	Other	☐				
4. Main perspective (multiple entries possible)	Theoretical, conceptual	**X**	Methodological	☐	Policy oriented	☐	Evaluative	☐		
	Other	☐	Comment on 4:							

<table>
<tr><td colspan="5">Basic information</td><td colspan="2">Document no.:
(citavi #)</td><td>#974</td></tr>
<tr><td rowspan="3">5. Type of document

Comment on 5:</td><td>Scientific article</td><td>X</td><td>Book chapter</td><td>☐</td><td>Book</td><td>☐</td><td>Report</td><td>☐</td></tr>
<tr><td>Project deliverable</td><td>☐</td><td>Policy/ strategy document</td><td>☐</td><td>Other</td><td>☐</td><td colspan="2"></td></tr>
<tr><td colspan="8"></td></tr>
<tr><td rowspan="2">6. System level (if applicable)

Comment on 6:</td><td>Global</td><td>☐</td><td>European</td><td>☐</td><td>National</td><td>☐</td><td>Sub-national</td><td>☐</td></tr>
<tr><td colspan="8">Development of the ladder of participation is based on US examples</td></tr>
<tr><td>7.1 Country focus (if applicable, please specify)</td><td colspan="7"></td></tr>
<tr><td>7.2 Country/ies of origin indicated by institutional affiliation of editor(s)/ author(s) (if applicable, please specify)</td><td colspan="3">US</td><td colspan="4">Comments on 7:</td></tr>
<tr><td colspan="8">Data and indicator availability</td></tr>
<tr><td rowspan="2">8.1 Data, indicators, measurements

Comment on 8.1</td><td>Document contains data</td><td>x</td><td>If yes, please specify (including page numbers in document)</td><td colspan="4">Arnstein developed a typology of participation to support analyses of participation. 8 types of participation are arranged in a ladder pattern with each rung corresponding to the extent of citizens' power in determining the end product. (p.217)
- Non participation: manipulation and therapy
- Degrees of tokenism: informing, consultation, placation
- Degrees of citizen power: partnership, delegated power, citizen control

Arnstein uses examples from federal social programs to illustrate the characteristics of the eight rungs. (see 11.3.)</td></tr>
<tr><td colspan="7"></td></tr>
</table>

Basic information				**Document no.:** (citavi #)	**#974**
8.2 Reference made to data, indicators measurements in other sources	Document refers to relevant sources	☐	If yes, please list source(s): (URLs, data banks, reports, statistics, etc.)		
Comment on 8.2:					
Guiding questions for review *- please add page numbers where appropriate -*					
9. How is RRI characterized? (For literature dealing explicitly with responsible (research) and innovation. If the publication deals with one of the 5 key dimensions, please proceed to 11.)					
9.1 Which definition of RRI is being used? (author's definition or reference to other source)	-				
9.2 Which aspects of RRI receive special emphasis? (e.g., certain normative goals, procedural approaches, reference to one or more of the 5 key dimensions, …)	-				
9.2 Which arguments are presented in support or rejection/criticism of RRI?	-				

Basic information	**Document no.:** (citavi #)	**#974**
9.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to? (e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy, …)	-	
Comments on 9.		
10. Policy context of RRI (For literature dealing explicitly with responsible (research) and innovation. If the publication deals with one of the 5 key dimensions, please proceed to 11.)		
10.1 Which RRI-related developments (international, EU, national, sub-national) are mentioned, how are they characterized and what are they aiming at (strategies, funding initiatives, regulation etc.)?	-	
10.2 Which approaches, instruments are discussed to facilitate the uptake of RRI?	-	
10.3 Which problems, barriers, potential drawbacks for RRI are brining discussed, how could they	-	

Basic information	**Document no.:** (citavi #)	**#974**
be addressed?		
Comments on 10.		
11. Claims regarding the effects of RRI and / or the key dimension (benefits, costs, disadvantages, trade-offs)		
11.1 What claims are being made?	Critical difference between going through the empty ritual of participation and having the real power needed to affect the outcome of the process. Participation without redistribution of power is an empty and frustrating process for the powerless. It allows the powerholders to claim that all sides were considered, but makes it possible for only some of those sides to benefit. It maintains the status quo. (p.216)	
11.2 Which arguments are used to support the claim(s)?	Eight-rung ladder is a simplification but it helps to illustrate the point that so many have missed – that there are significant gradations of citizen participation. Knowing these gradations makes it possible to cut through the hyperbole to understand the increasingly strident demands for participation from the have-nots as well as the gamut of confusing responses from the powerholders.	
11.3 What evidence is presented to support the claims? (e.g., data, indicators, research results, case studies, anecdotal evidence)	Arnstein uses examples from federal social programs to illustrate the characteristics of the eight rungs. - *Manipulation*: in the name of citizen participation, people are placed on rubberstamp advisory committees or advisory boards for the express purpose of "educating" them or engineering their support. The bottom rung of the ladder signifies the distortion of participation into a public relations vehicle by powerholders. - *Therapy*: group therapy masked as citizen participation should be on the lowest rung of the ladder, because it is both dishonest and arrogant. Its administrators (mental health experts form social workers to psychiatrists) assume that powerlessness is synonymous with mental illness. On this assumption under a masquerade of involving citizens in planning, the experts subject the citizens to clinical group therapy. Citizens are engaged in extensive activity, but the focus of it is on curing them of their "pathology" rather than changing the racism and victimization that create their "pathologies". - *Informing*: under conditions of one way communication (news media, pamphlets, posters, responses to requests) people have little opportunity to influence the program designed "for	

Basic information		**Document no.:** (citavi #)	**#974**
	their benefit". - *Consultation*: inviting citizens' opinions, like informing them, can be legitimate step toward their full participation. But if consulting them is not combined with other modes of participation, this rung of the ladder is still a sham since it offers no assurance that citizen concerns and ideas will be taken into account. The most frequent methods used for consulting people are attitude surveys, neighborhood meetings, and public hearings. Possibility to manipulate/misuse by offering limited options in questionnaires/limited knowledge about respondents concerns exists. - *Placation:* tokenism still apparent, though citizens begin to have some degree of influence. Strategy is to place a few handpicked "worthy" poor on boards of Community Action Agencies or on public bodies like the board of education, police commission, or housing authority. The degree to which citizens are actually placated depends largely on two factors: the quality of technical assistance they have in articulating their priorities; and the extent to which the community has been organised to press for those priorities. - *Partnership:* power is in fact redistributed through negotiation between citizens and powerholders. They agree to share planning and decision-making responsibilities through such structures as joint policy boards, planning committees and mechanisms for resolving impasses. After the groundrules have been established though some form of give-and-take, they are not subject to unilateral change. Looking to empirical cases it can be seen that in most cases where power has come to be shared it was 'taken by the citizens' not given by the city. - *Delegated power:* negotiations between citizens and public officials can also result in citizens achieving dominant decision-making authority over a particular plan or program. Model City policy boards or CAA delegate agencies on which citizens have a clear majority of seats and genuine specified powers are typical examples. At this level, the ladder has been scaled to the point where citizens hold the significant cards to assure accountability of the program to them. To resolve differences, powerholders need to start the bargaining process rather than respond to pressure from the other end. - *Citizen control:* demands for community controlled schools, black control, and neighborhood control are on the increase. Though no one in the nation has absolute control, it is very important that the rhetoric not be confused with intent. People are simply demanding that degree of power (or control) which guarantees that participants or residents can govern a program or an institution, be in full charge of policy and managerial aspects, and be in full charge of policy and managerial aspects, and be able to negotiate the conditions under which "outsiders" may change them. A neighborhood corporation with no intermediaries between it and the source of fund is the model most frequently advocated.		
11.4 According to the author(s), which type of evidence/data is missing to better support the claim? (e.g. data gaps, limitations with regard to analytical levels, lack of indicator specifications etc.)			
Comments on 11.			

Basic information	**Document no.:** (citavi #)	**#974**
12. Key dimensions of RRI (For literature dealing with one or more of the 5 key dimensions.)		
12.1 How is the key dimension defined? (terminology applied, central features/characteristics)	Citizen participation is a categorical term for citizen power. It is the redistribution of power that enables the have-not citizens, presently excluded from the political and economic processes, to be deliberately included in the future. It is the strategy by which the have-nots join in determining how information is shared, goals and policies are set, tax resources are allocated, programs are operated, and benefits like contracts and patronage are parceled out. In short, it is the means by which they can induce significant social reform which enables them to share in the benefits of the affluent society. (p.216)	
12.2 Does the document reach beyond one single dimension / are more than one of the key dimensions discussed? If yes, what is the proposed relationship between different dimensions (complementary, contradictory…)?		
12.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to? (e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy, …)		
Comments on 12.		
13. Are other important "dimensions" / aspects of RRI discussed, presented which are so far not covered by MoRRI?		

Basic information		**Document no.:** (citavi #)	**#974**
14. Anything else deemed relevant?			
15. General comments and remarks			
16. Relevant sources cited (Please list references to other sources cited in the literature which seem to be highly relevant for MoRRI and/or represent important contributions in the field)			

Basic information		**Document no.:** (citavi #)	**#975**
Reviewer's name	Kerstin Goos		
1. Bibliographical information (author/s, year, title, editor/s, journal/book, volume, publisher, place of publication, pages, DOI)	Smith, Graham (2005): *Beyond the ballot. 57 Democratic Innovations from Around the World*. The POWER Inquiry.		
2. Abstract (copy and paste)	The aim of this study is to provide The Power Inquiry with details and assessments of democratic innovations that might increase and deepen citizen participation in the political decision-making process. The study analyses fifty-seven different innovations – eleven of these are considered in more depth in case studies.		

Basic information									**Document no.:** (citavi #)	**#975**
3. Main focus (key dimensions according to MoRRI)	RRI / RI	☐	Citizen participation	**X**	Science literacy	☐	Gender equality	☐		
	Open access	☐	R&I governance and ethics	☐	Other	☐				
Comment on 3:										
4. Main perspective (multiple entries possible)	Theoretical, conceptual	☐	Methodological	☐	Policy oriented	**X**	Evaluative	**X**		
	Other	☐	Comment on 4:	Aim of the study is to evaluate democratic innovations that might increase and deepen citizen participation in the political decision-making process.						
5. Type of document	Scientific article	☐	Book chapter	☐	Book	☐	Report	**X**		
	Project deliverable	☐	Policy/ strategy document	☐	Other	☐				
Comment on 5:										
6. System level (if applicable)	Global	☐	European	☐	National	☐	Sub-national	☐		
Comment on 6:	Examples of democratic innovation come from all over the world.									
7.1 Country focus (if applicable, please specify)	Focus lies on the UK. Mainly policy recommendations.									
7.2 Country/ies of origin indicated by institutional affiliation of editor(s)/ author(s) (if applicable, please specify)	UK				Comments on 7:					
Data and indicator availability										
8.1 Data, indicators, measurements	Document contains data	x	If yes, please specify (including page numbers in document)		Based on a literature review, the authors develop a typology of democratic innovations. See 11.1.					
Comment on 8.1										
8.2 Reference made to data,	Document refers to	☐	If yes, please list							

Basic information				**Document no.:** (citavi #)	**#975**
indicators measurements in other sources	relevant sources		source(s): (URLs, data banks, reports, statistics, etc.)		
Comment on 8.2:					
Guiding questions for review *- please add page numbers where appropriate -*					
9. How is RRI characterized? (For literature dealing explicitly with responsible (research) and innovation. If the publication deals with one of the 5 key dimensions, please proceed to 11.)					
9.1 Which definition of RRI is being used? (author's definition or reference to other source)	-				
9.2 Which aspects of RRI receive special emphasis? (e.g., certain normative goals, procedural approaches, reference to one or more of the 5 key dimensions, …)	-				
9.2 Which arguments are presented in support or rejection/criticism of RRI?	-				

Basic information	**Document no.:** (citavi #)	**#975**
9.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to? (e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy, …)		
Comments on 9.		
10. Policy context of RRI (For literature dealing explicitly with responsible (research) and innovation. If the publication deals with one of the 5 key dimensions, please proceed to 11.)		
10.1 Which RRI-related developments (international, EU, national, sub-national) are mentioned, how are they characterized and what are they aiming at (strategies, funding initiatives, regulation etc.)?	-	
10.2 Which approaches, instruments are discussed to facilitate the uptake of RRI?	-	
10.3 Which problems, barriers,		

Basic information	**Document no.:** (citavi #)	**#975**
potential drawbacks for RRI are brining discussed, how could they be addressed?	-	
Comments on 10.		
11. Claims regarding the effects of RRI and / or the key dimension (benefits, costs, disadvantages, trade-offs)		
11.1 What claims are being made?	Typology used in this report divides innovations into six broad categories.(p.15) - **Electoral innovations**: *aim to increase electoral turnout*. Examples include postal ballots, electronic voting, positive abstention, compulsory voting, reducing voting age, universal citizenship. ➔ Aside from compulsory voting, the extent to which any of the innovations will increase turnout is unclear. (p.26) ➔ Many of the innovations may improve the 'experience' of voting – in some senses deepening participation (but obviously only for the group of citizens who actually vote).(p.26) - **Consultative innovations**: *aim to inform decision-makers of citizens' views*. Examples include public meetings, focus groups, planning for real, community visioning, standing forums, standing citizens' panels. ➔ standard techniques for eliciting public opinion on services and policies can be used in highly creative and innovative ways. (p.38) ➔ There are general concerns, however, about many consultation exercises – open forms of engagement tend to attract citizens who already have a strong political interest; whereas more statistically representatives techniques (such as opinion polling and focus groups) tend to lack depth. (p.38) - **Deliberative innovations**: *aim to bring citizens together to deliberate on policy issues, the outcomes of which may influence decision-makers*. Examples include citizens' juries, consensus conferences, deliberative opinion polling, America Speaks, national issues forums, study circles, deliberation days. ➔ Deliberative approaches certainly offer advantages over many traditional approaches to consultation. (p.55) ➔ The fundamental idea behind deliberative innovations is that if a diverse range of citizens is brought together they have the capacity and skills to deliberate and make recommendations on complex public policy issues. Evidence suggests that this assumption holds. (p.55) ➔ Many deliberative innovations have relatively large resource implications since they typically involve independent facilitation in order to protect and nurture deliberation and to ensure against criticisms of manipulation by sponsoring authorities. (p.55) - **Co-governance innovations**: aim to give citizens significant	

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	influence during the process of decision-making. Examples include Chicago community policing, youth councils, participatory appraisal, participatory budgeting, Citizens' Assembly on Electoral Reform, British Columbia. ➔ Where assemblies are open, there is more opportunity to *increase* citizen participation; where a form of selection is used, participation levels will obviously be more limited. There are some concerns that open access will simply lead to assemblies that reflect current patterns of political participation – they will be dominated by articulate citizens who tend to be relatively wealthy, educated, middleaged and male. (p.77) ➔ The fact that citizens are involved in actual political decision-making and have some degree of power should lead to a *deepening* of participation and act as an incentive to take engagement more seriously. ➔ What is also abundantly clear from the examples and case studies is that citizens need dedicated support and resources if they are to engage effectively. (p.77) - **Direct democracy innovations**: *aim to give citizens final decision-making power on key issues*. Examples include New England town meetings, referendum, initiative, recall, citizens' assemblies selected by sortition. ➔ This section has shown that there are ways of increasing citizen involvement in the most important aspect of the political system – legislating (open meeting, referendum, citizens assemblies) (p.89) ➔ One of the limitations of many of the innovations that we have looked at to date is that citizens have little or no agenda-setting or legislative power – public officials decide what is to be discussed and how recommendations are to be used. (p.89) - **E-democracy innovations**: aim to use ICT to engage citizens in the decisionmaking process. Examples include e-voting, e-consultation, e-representatives, online deliberative polling, e-petitions, e-referendum, Minnesota E-Democracy, BBCiCan, HeadsUp. ➔ Justified concerns about e-democracy exist: e.g. reinforcement of existing patterns of political participation (p.104) ➔ However, evidence from some e-democracy innovations challenges this simplistic picture. Where innovations are carefully designed – e.g. Womenspeak and online deliberative polling – citizens with little or no experience of the internet can be engaged. (p.104) Authors develop five criteria by which the study assesses the value of the various innovations: (p.16 ff) - Selection mechanism - Form of involvement - Role in decision-making - Scale and transferability - Resource implications	
11.2 Which arguments are used to support the claim(s)?	Typology: The choice of categories follows a basic logic. The first category focuses attention on elections – the most basic and long-standing method of citizen engagement in decision-making. The next four categories focus on the role that citizens can play in the decision-making process outside of electoral activity. As we move from consultation to deliberation, co-governance and direct democracy, the	

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	potential impact of citizens on decision-making is increased – from simply providing citizens' views on proposals through to citizen control of policy design to citizens holding the final decision on a key policy. The logic of including the final category – e-democracy – is slightly different. Given the many (positive and negative) claims made about the potential impact of information and communication technology (ICT), it is worth gathering ICT- based innovations together to offer an overall sense of their potential. The motivation behind each category is discussed in more depth in the introduction to each section.(p.15-16) Conclusions for the respective category: based on literature review and an analysis of a selection of democratic innovation and in depth case studies.	
11.3 What evidence is presented to support the claims? (e.g., data, indicators, research results, case studies, anecdotal evidence)	The study draws on existing studies of democratic innovations – academic and policy-orientated – and on a large number of conversations and interviews with activists, officials, researchers and academics involved in promoting or studying innovations. Obviously (due to time restrictions and available space) not all innovations could be included. Authors' hope is that the variety of different types of innovations discussed in this report manages to convey the amazing amount of energy, imagination and creativity that exists in this area of democratic practice. (p.14)	
11.4 According to the author(s), which type of evidence/data is missing to better support the claim? (e.g. data gaps, limitations with regard to analytical levels, lack of indicator specifications etc.)		
Comments on 11.		
12. Key dimensions of RRI (For literature dealing with one or more of the 5 key dimensions.)		
12.1 How is the key dimension defined? (terminology applied, central features/characteristics)	Focus lies on democratic innovations in general, no particular focus on S&T. Democratic innovations are defined as *formal methods for involving citizens in the political decision-making process*. The definition is institutional in the sense that the report will review formal methods of engagement. The focus is also primarily on the citizen-political authority relationship. This means that, for example, autonomous political activities by citizens within civil society, innovations that primarily engage voluntary groups rather than individuals, and democratic innovations within the workplace are not discussed.(p.14)	

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12.2 Does the document reach beyond one single dimension / are more than one of the key dimensions discussed? If yes, what is the proposed relationship between different dimensions (complementary, contradictory…)?		
12.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to? (e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy, …)	Political science knowledge about participation	
Comments on 12.		
13. Are other important "dimensions" / aspects of RRI discussed, presented which are so far not covered by MoRRI?		
14. Anything else deemed relevant?		
15. General comments and remarks		
16. Relevant sources cited (Please list references to other sources cited in the literature which seem to be highly relevant for MoRRI and/or represent important contributions in the		

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field)		

Basic information								
					Document no.: (citavi #)		**#966**	
Reviewer's name	Kerstin Goos							
1. Bibliographical information (author/s, year, title, editor/s, journal/book, volume, publisher, place of publication, pages, DOI)	Bauer, M.W., Allum, N., Miller, S. 2007: What can we learn from 25 years of PUS survey research? Liberating and expanding the agenda. In Public Understanding of Science, 16,1, 79-95.							
2. Abstract (copy and paste)	This paper reviews key issues of public understanding of science (PUS) research over the last quarter of a century. We show how the discussion has moved in relation to large-scale surveys of public perceptions by tracing developments through three paradigms: *science literacy*, *public understanding of science* and *science and society*. Naming matters here like elsewhere as a marker of "tribal identity." Each paradigm frames the problem differently, poses characteristic questions, offers preferred solutions, and displays a rhetoric of "progress" over the previous one. We argue that the polemic over the "deficit concept" voiced a valid critique of a common sense concept among experts, but confused the issue with methodological protocol. PUS research has been hampered by this "essentialist" association between the survey research protocol and the public deficit model. We argue that this fallacious link should be severed to liberate and to expand the research agenda in four directions: contextualizing survey research, searching for cultural indicators, integrating datasets and doing longitudinal analysis, and including other data streams. Under different presumptions, assumed and granted, we anticipate a fertile period for survey research on public understanding of science.							
3. Main focus (key dimensions according to MoRRI)	RRI / RI	☐	Citizen participation	**X**	Science literacy	☐	Gender equality	☐
	Open access	☐	R&I governance and ethics	☐	Other	☐		
Comment on 3:								
4. Main perspective (multiple entries possible)	Theoretical, conceptual	☐	Methodological	☐	Policy oriented	☐	Evaluative	☐
	Other	**X**	Comment on 4:	Paper is a review.				
5. Type of document	Scientific article	**X**	Book chapter	☐	Book	☐	Report	☐

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<tr><td colspan="5">Basic information</td><td colspan="2">Document no.:
(citavi #)</td><td>#966</td></tr>
<tr><td rowspan="2">Comment on 5:</td><td>Project deliverable</td><td>☐</td><td>Policy/ strategy document</td><td>☐</td><td>Other</td><td>☐</td><td colspan="2"></td></tr>
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<tr><td rowspan="2">6. System level (if applicable)

Comment on 6:</td><td>Global</td><td>☐</td><td>European</td><td>☐</td><td>National</td><td>☐</td><td>Sub-national</td><td>☐</td></tr>
<tr><td colspan="7">Not specified. But references to various countries (Europe and US), many references to the UK case.</td></tr>
<tr><td>7.1 Country focus (if applicable, please specify)</td><td colspan="7"></td></tr>
<tr><td>7.2 Country/ies of origin indicated by institutional affiliation of editor(s)/ author(s) (if applicable, please specify)</td><td colspan="3">UK</td><td colspan="4">Comments on 7:</td></tr>
<tr><td colspan="8">Data and indicator availability</td></tr>
<tr><td rowspan="2">8.1 Data, indicators, measurements

Comment on 8.1</td><td>Document contains data</td><td>☐</td><td colspan="2">If yes, please specify (including page numbers in document)</td><td colspan="3"></td></tr>
<tr><td colspan="7"></td></tr>
<tr><td>8.2 Reference made to data, indicators measurements in other sources</td><td>Document refers to relevant sources</td><td>x</td><td colspan="2">If yes, please list source(s):

(URLs, data banks, reports, statistics, etc.)</td><td colspan="3">In their line of argumentation, the authors refer to several surveys:
- Eurobarometer 31, 1989;
- PISA 2006
- Reference to literature that uses indicators: Allum et al 2007, Eagly and Chaiken 1993, Converse 1964, Miller et al 2002, Butschi/Nentwich 2002, Joss/Bellucci 2002, Turner/Michael 1996, Bauer et al 1994, Durant et al 2000, Allum et al 2002
- NSF annual science indicators report
- Canadian indicators (see Schiele 1994, Godin/Gingras 2000
- India Science report (Shukla</td></tr>
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				2005) - ISSP	
Comment on 8.2:					

Guiding questions for review

- please add page numbers where appropriate -

9. How is RRI characterized? (For literature dealing explicitly with responsible (research) and innovation. If the publication deals with one of the 5 key dimensions, please proceed to 11.)	
9.1 Which definition of RRI is being used? (author's definition or reference to other source)	-
9.2 Which aspects of RRI receive special emphasis? (e.g., certain normative goals, procedural approaches, reference to one or more of the 5 key dimensions, …)	-
9.2 Which arguments are presented in support or rejection/criticism of RRI?	-

Basic information		**Document no.:** (citavi #)	**#966**
9.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to? (e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy, …)	-		
Comments on 9.			
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10.1 Which RRI-related developments (international, EU, national, sub-national) are mentioned, how are they characterized and what are they aiming at (strategies, funding initiatives, regulation etc.)?	-		
10.2 Which approaches, instruments are discussed to facilitate the uptake of RRI?	-		
10.3 Which problems, barriers, potential drawbacks for RRI are brining discussed, how could they be addressed?			

Basic information	**Document no.:** (citavi #)	**#966**
	-	
Comments on 10.		
11. Claims regarding the effects of RRI and / or the key dimension (benefits, costs, disadvantages, trade-offs)		
11.1 What claims are being made?	- The critique of the public deficit model as a common sense prejudice among experts is valid, but its identification with the protocol of survey research is dysfunctional. Authors suggest that a liberated agenda might include: o contextualizing survey results through a reframing of the knowledge–attitude problem and within a framework of science indicators, o analyzing data in search for cultural indicators, o the global integration and analysis of longitudinal databases, o and the mobilization of additional, preferably qualitative data streams with a long-term perspective. (p.90) - The three paradigms (science literacy, public understanding, science and society) do not supersede each other but continue to inform research. Key feature of each paradigm is the attribution of a deficit. (p.80) - Authors state that as long as science and society are not identical, the public's understanding of science as well as the scientists' understanding of the public will continue to be a pressing issue. (p.87ff) - Authors question the claimed path of progress from phase 1 to phase 3. They state that ironically, the call for evaluation of participatory policy making invites a re-entry of traditional paradigms of PUS research. Researchers come to advocate quasi-experimental evaluation of deliberative events (Macoubrie, 2005), using indicators such as media coverage, shifts in issue awareness, knowledge and attitudes, and impact on policy agendas (e.g. Butschi and Nentwich, 2002; Joss and Bellucci, 2002). With ignorance of its history, this revival of the classical paradigms of PUS might amount to the reinvention of the wheel, but this time for a different car. Public deficit is no longer under scrutiny, but the performances of "angels" who spend public monies.	
11.2 Which arguments are used to support the claim(s)?	Authors outline three "paradigms" of research in chronological order of origin. Each paradigm has its prime time, more or less clearly defined, and is characterized by a diagnosis of the problem that science faces in its relationship with the public. A key feature of each paradigm is the *attribution of a deficit*. Each paradigm defines particular problems and offers preferred solutions. They argue that, contrary to common rhetoric, these paradigms do not supersede each other, but continue to inform research. (p.80) Phase 1: science literacy (1960 onwards) (p.80ff) - Science literacy builds on two analogies: "basic literacy" in reading, writing and numeracy, and "political literacy". Literacy idea attributes a knowledge deficit to an insufficiently literate	

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public. The deficit model serves the education agenda, demanding increased efforts in science education at all stages of the life cycle.

- Key research problem of this paradigm is the psychometrics of factual knowledge. Miller suggests two dimensions to count as scientific knowledge: facts and methods.
- The literacy paradigm is concerned with the public deficit of scientific knowledge. Interventions are mainly in the area of public *education*.

Phase 2: Public understanding of science (1985-mid 90s)(p.82ff.)

- PUS shares with the previous phase the diagnosis of a *public deficit*. It is public attitudes that are highlighted (Bodmer, 1987). The public is not positive enough about science and technology; there are dangers citizens will become negative or outright anti-science, and this is of natural concern to institutions of science.
- Key research problem of this paradigm: research agenda shifts away from the measurement of knowledge to that of public attitudes. The concern for scientific literacy carried over into PUS. However, the emphasis shifts from a threshold measure to that of a continuum: not "one is either literate or not," but "one is more or less knowledgeable." The correlation between knowledge and attitudes becomes the focus of research (Evans and Durant, 1989; Durant et al., 2000).
- *Critique: institutional neuroticism.* Both the scientific literacy and PUS paradigm assume a public state of deficiency: citizens lack either enough or the right kind of knowledge, and thus fail to display sufficiently positive attitudes or "reasonable" risk perceptions. But, some critics argue, of far more importance is knowledge-in-context that emerges from local controversies and people's life concerns (see Ziman, 1991; Irwin and Wynne, 1996).

Phase 2: science and society (mid 90s – onwards)(p.85ff.)

- focus of attention shifted to the *deficit of the technical experts*.
- The research problem: A *crisis of trust* of the public vis-a-vis science indicates a breach of contract that needs a re-negotiation. The implicit and explicit views of the public held by scientific experts come under scrutiny, they explain part of the trust crisis
- *Critique: of "angels" and "monaud". Market for PE consultancy has been created,* There is as yet little critique of the achievements. Evaluation criteria needed. Ex. UK GM nation: consensus is reached by "monaud": all "sides" are talking; but only the public is supposed to listen.

The four suggestions for a liberated agenda are:

- **various ways of contextualising the survey evidence**: multi disciplinary character of PUS research led to a lack of common foundations and the reluctance on the part of PUS researchers to see the public's relationship with s&t as but one example of the range of political and social issues relevant to citizens in modern democracies. Evidence from political science literature on political attitudes and behaviour also offers insights for PUS research.
- **cultural indicators**: inventory of international PUS movement is urgently needed. How much money do governments spend on PUS, what is done? The idea that literacy and attitudes are part of a wider framework for the accounting of the national science base, alongside the figures for research and development investments, counts of publications and citations, patent outputs, and size of high tech industry, is not new, but worth reiterating. One can look at PUS indicators also as comparative measures of *performance* of the PUS movement. But instead of evaluating performance, they can be just as validly interpreted as indicators of the *cultural climate.* Comparative analysis might focus on

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	clustering response patterns that indicate distinct patterns of attitudes rooted in transnational cultural milieus. Here a combination of survey analysis, ethnographic data, and current and official social statistics will be informative. - **longitudinal data integration and analysis**: few efforts have been made so far to systematically integrate existing longitudinal datasets (US, UK, France, EU). Integrated databases and longitudinal modelling will bring a step change to PUS research. - **a widening of the range of data**: authors' plea is to expand the range of data "officially and legitimately" relevant for monitoring public understanding of science. Qualitative data have been used in the field for some time, so have mass media analyses. But little effort has gone into persistent and comparative collection and analysis of such data. Yet both mass media and qualitative enquiry lend themselves to longitudinal data streaming, albeit the methodology might need development.		
11.3 What evidence is presented to support the claims? (e.g., data, indicators, research results, case studies, anecdotal evidence)	Literature review. Often reference to the UK example of history of PE.		
11.4 According to the author(s), which type of evidence/data is missing to better support the claim? (e.g. data gaps, limitations with regard to analytical levels, lack of indicator specifications etc.)	To expand the research: global integration and analysis of longitudinal databases, and the mobilization of additional, preferably qualitative data streams with a long-term perspective (p.90)		
Comments on 11.			
12. Key dimensions of RRI (For literature dealing with one or more of the 5 key dimensions.)			
12.1 How is the key dimension defined? (terminology applied, central features/characteristics)	Terminology mainly used is "PUS survey research". No explicit definition. But by elaborating on the three paradigms the authors see as a key feature of each paradigm the attribution of a deficit. (p.80)		

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	Table 1. Paradigms, problems and proposals Period / Attribution Problems / Proposals Research **Science Literacy** 1960s onwards: Public deficit, Knowledge / Literacy measures, Education **Public Understanding** After 1985: Public deficit, Attitudes, Education / Knowledge–attitude, Attitude change, Image marketing **Science and Society** 1990s–present: Trust deficit, Expert deficit, Notions of public, Crisis of confidence / Participation, Deliberation, "Angels" mediators, Impact evaluation		
12.2 Does the document reach beyond one single dimension / are more than one of the key dimensions discussed? If yes, what is the proposed relationship between different dimensions (complementary, contradictory…)?	Within the science literacy paradigm, science education is framed as a solution to the problem of public deficit of scientific knowledge (p.80).		
12.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to? (e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy, …)			
Comments on 12.			
13. Are other important "dimensions" / aspects of RRI discussed, presented which are so far not covered by MoRRI?			

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14. Anything else deemed relevant?			
15. General comments and remarks			
16. Relevant sources cited (Please list references to other sources cited in the literature which seem to be highly relevant for MoRRI and/or represent important contributions in the field)	Authors often refer to their own earlier work: see references p.91 ff.		

Basic information		**Document no.:** (citavi #)	**#977**
Reviewer's name	Kerstin Goos		
1. Bibliographical information (author/s, year, title, editor/s, journal/book, volume, publisher, place of publication, pages, DOI)	Mejlgaard N., Stares, S. 2013: Performed and preferred participation in science and technology across Europe: Exploring an alternative idea of "democratic deficit", in Public Understanding of Science, 22, 6, 660-673.		
2. Abstract (copy and paste)	Republican ideals of active scientific citizenship and extensive use of deliberative, democratic decision making have come to dominate the public participation agenda, and academic analyses have focused on the deficit of public involvement vis-à-vis these normative ideals. In this paper we use latent class models to explore what Eurobarometer survey data can tell us about the ways in which people participate in tacit or in policy-active ways with developments in science and technology, but instead of focusing on the distance between observed participation and the dominant, normative ideal of participation, we examine the distance between what people do, and what they themselves think is appropriate in terms of involvement. The typology of citizens emerging from the analyses entails an entirely different diagnosis of democratic deficit, one that stresses imbalance between performed and preferred participation.		

Basic information									**Document no.:** (citavi #)	**#977**
3. Main focus (key dimensions according to MoRRI) Comment on 3:	RRI / RI	☐	Citizen participation	**X**	Science literacy	☐	Gender equality	☐		
	Open access	☐	R&I governance and ethics	☐	Other	☐				
4. Main perspective (multiple entries possible)	Theoretical, conceptual	**X**	Methodological	☐	Policy oriented	☐	Evaluative	☐		
	Other	☐	Comment on 4:							
5. Type of document Comment on 5:	Scientific article	**X**	Book chapter	☐	Book	☐	Report	☐		
	Project deliverable	☐	Policy/ strategy document	☐	Other	☐				
6. System level (if applicable)	Global	☐	European	**X**	National	☐	Sub-national	☐		
Comment on 6:	Particular focus of analysis is to explore cross-national patterns in orientations towards participation.									
7.1 Country focus (if applicable, please specify)										
7.2 Country/ies of origin indicated by institutional affiliation of editor(s)/ author(s) (if applicable, please specify)	DK and UK				Comments on 7:					
Data and indicator availability										
8.1 Data, indicators, measurements	Document contains data	**X**	If yes, please specify (including page numbers in document)		Authors develop a composite measure of public participation that includes indicators of citizens' participatory practice as well as their preferences with regard to the level of public involvement in science and technology. By identifying commonly occurring groups of people on the basis of a combined measure of "performed" and "preferred" participation, we aim to explore an alternative idea of "democratic deficit," based on the distance between performed and preferred participation, and to examine the patterns and extent of such					

Basic information				**Document no.:** (citavi #)	**#977**
				democratic deficits across Europe. **performance aspect of engagement** - First item: measure of horizontal participation. Respondents are asked first if they have heard of animal cloning for food products, and if so, if they have talked about it or searched for information about it. - 2nd – 4th item: measure of vertical participation: Respondents are asked if they have attended public meetings or debates about science and technology; signed petitions or joined street demonstrations about science issues likely to attract such activities (nuclear power, biotechnology or the environment); or taken part in the activities of non-governmental organizations (NGOs) dealing with science and technology related issues **People's preferences or the normative elements of participation**; - How do respondents think people in general should be involved in decisions about science and technology? **People's views on processes of governance in science and technology** - Owing to the design of the survey, specifically in relation to the development of animal cloning for food production.
Comment on 8.1					
8.2 Reference made to data, indicators measurements in other sources	Document refers to relevant sources	**x**	If yes, please list source(s): (URLs, data banks, reports, statistics, etc.)	The data analysed are from two modules within the Eurobarometer survey (73.1): "Europeans, Science and Technology" and "Biotechnology and the Life Sciences." The survey was conducted in 2010, in 32 European countries, with samples of mostly circa 1,000 respondents per country (samples of 500 were drawn in Luxembourg, Cyprus, Malta and	

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Comment on 8.2:				Iceland).(p.662)	
Guiding questions for review *- please add page numbers where appropriate -*					
9. How is RRI characterized? (For literature dealing explicitly with responsible (research) and innovation. If the publication deals with one of the 5 key dimensions, please proceed to 11.)					
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9.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to? (e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy, …)	-	
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10.1 Which RRI-related developments (international, EU, national, sub-national) are mentioned, how are they characterized and what are they aiming at (strategies, funding initiatives, regulation etc.)?	-	
10.2 Which approaches, instruments are discussed to facilitate the uptake of RRI?	-	
10.3 Which problems, barriers,		

Basic information	**Document no.:** (citavi #)	**#977**
potential drawbacks for RRI are brining discussed, how could they be addressed?	-	
Comments on 10.		
11. Claims regarding the effects of RRI and / or the key dimension (benefits, costs, disadvantages, trade-offs)		
11.1 What claims are being made?	The authors'contention is that it is relevant to consider whether democratic deficiencies might be most severe when citizens' actual participation is out of balance with what they desire and consider legitimate. Rather than examining the distance between observed levels and forms of participation on the one hand and the ideal model of extensive, dialogical public participation on the other hand, the authors offer an alternative analysis of the distance between observed behaviour, or what they call "performed" participation, and individually desired or "preferred" participation.(p.662) Rather than imposing, top-down, a particular normative model of democratic governance of science, and, in turn, continuously discovering that observed levels of public participation do not live up to expectations, it might be relevant to take public preferences as an alternative point of departure when studying the democratic legitimacy of science and technology, and to address, when developing science communication activities and political initiatives aimed at enhancing such democratic legitimacy, specifically those groups of citizens who are discontented. It is our argument that current studies and discussions of democratic deficiencies in science and technology would be more meaningful and rich if social scientists would challenge the dominant deliberative model, and that science communication and engagement activities would be more effective if they would take seriously the actual desire for involvement and conceptions of appropriate governance among the different publics for science and technology.	
11.2 Which arguments are used to support the claim(s)?		
11.3 What evidence is presented to support the claims? (e.g., data, indicators, research results, case studies, anecdotal evidence)	See 8.2. Authors use latent class models to explore what types of participation might be found among the European public (p.664). Authors clearly see elements of convergence and divergence between countries in terms of orientations towards participation (p.666). Table 2 (p.667) shows five classes labelled „Unengaged", "Spectators", "Attentive", "Discontented" and "Over-achiever". Classes are describes	

Basic information	**Document no.:** (citavi #)	**#977**
	as follows: - **Unengaged**: respondents are most likely to report not having heard of animal cloning before, with a probability of 0.56. They are extremely unlikely to have attended public meetings or debates on science and technology, signed petitions or joined demonstrations on nuclear power, biotechnology or the environment, or participated in an NGO that works on science issues (the chances of saying "no" to these questions are 0.98, 0.98 and 0.99, respectively). When asked what role the public should have in decisions about science and technology, they are most likely to say either that the public should be kept informed (with probability 0.33), but almost as likely to say "don't know" (probability 0.28). On the subject of whether decisions should be made on the basis of public or expert views, they might choose either way, and are in fact most likely to say "don't know" (with probability 0.41). - **Spectators**: tend to have a somewhat higher level of awareness of animal cloning, but still very low chance of active engagement in science and technology issues. And their behaviours seem congruent with their preferences; they are most likely to say that the public only needs to be informed about decisions in science and technology (probability 0.59) and that decisions about animal cloning should be based on the advice of experts (probability 0.76) rather than on what the majority of people think. As a group, spectators are more likely than the unengaged to keep informed or simply to be exposed to information about science and technology, but they refrain from getting "on the field," which is congruent with their preferences. - **Attentive**: a group of people with a high level of awareness (0.72 probability of having heard and talked about or searched for information about animal cloning) but low level of active vertical engagement – with at most a 0.22 probability of having signed a petition or joined a demonstration on science and technology issues. As a group these respondents are split on the subject of preferred participation. They have very similar probabilities of saying the public should be consulted on science and technology issues (probability 0.50) or just kept informed (0.41); and similar probabilities of wanting to place decisions about animal cloning with experts (0.50) or the majority view (0.42). This combination of high awareness, low policy-oriented action, and ambivalence on the public's proper role suggests to us that they might comprise an "attentive" section of the public, with rather unsettled preferences with regard to public involvement. - **Discontented**: These people are not notably highly aware of applications like animal cloning, and are extremely unlikely to report having taken part in science and technology issues in an active way. But these low levels of participation in terms of performance do not seem to match people's preferences. People in this class are most likely to say either that the public should be consulted about decisions relating to science and technology (probability 0.34) or that public opinion should even be binding (probability 0.33); and overwhelmingly that decisions about animal cloning should be made on the basis of what the public thinks (probability 0.78). This mismatch between performed and preferred levels of participation leads to the idea of discontentment. - **Over-achiever**: These people are likely to have a high level of awareness of animal cloning (probability 0.63) and high probabilities of having attended meetings or debates (0.70),	

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	having signed petitions or joined demonstrations (0.57) and working with an NGO (0.64). But their personal experience does not necessarily reflect their preferences regarding wider public involvement. They are most likely to say that the public only needs to be informed about science and technology decisions (probability 0.40) and that the advice of experts should prevail in these decisions (probability 0.53). Five-class models run separately within each country reveal variations from the main themes in the joint model, but alongside a good deal of common ground. For example, a "spectator" class can be identified clearly in all countries but Iceland; often in fact in two forms within countries, one with higher and one with lower levels of performed participation. "Discontented" classes are found clearly in thirteen countries, "over-achievers" and "unengaged" in nineteen. The "attentive" as seen in the joint model appear clearly in six countries, but in all countries there is at least one class that contains this or a similar intriguing mixture of preferences as regards participation.	
11.4 According to the author(s), which type of evidence/data is missing to better support the claim? (e.g. data gaps, limitations with regard to analytical levels, lack of indicator specifications etc.)	Finer nuances will be explored in a future paper. At the current time authors lack the computational tools to calculate residual fit statistics for joint models with any of the existing parameter constraints relaxed. For example, we cannot assess the fit of models that allow the relationship between the survey responses and the underlying participation orientation to vary by country (i.e. including interactions between item, country and latent variable). Given our current computational capabilities, and weighing up interpretability and fit, the five-class joint model in Table 2 seems to be the best stopping point, for now at least.	
Comments on 11.		
12. Key dimensions of RRI (For literature dealing with one or more of the 5 key dimensions.)		
12.1 How is the key dimension defined? (terminology applied, central features/characteristics)	Authors mainly use the terminology "public participation", to a lesser extent also "citizen involvement" and "public engagement". PE is not explicitly defined but authors refer to deliberative models and Stirling 2008 re rationales and motivation.	
12.2 Does the document reach beyond one single dimension / are more than one of the key dimensions discussed? If yes, what is the proposed relationship between different dimensions (complementary, contradictory…)?		

Basic information	**Document no.:** (citavi #)	**#977**
12.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to? (e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy, …)	Deliberative democracy, republican ideals of active citizenry	
Comments on 12.		
13. Are other important "dimensions" / aspects of RRI discussed, presented which are so far not covered by MoRRI?		
14. Anything else deemed relevant?		
15. General comments and remarks	Rather than examining the distance between observed levels and forms of participation on the one hand and the ideal model of extensive, dialogical public participation on the other hand, we offer an alternative analysis of the distance between observed behaviour, or what we call "performed" participation, and individually desired or "preferred" participation. In comparison with the republican ideals of participation underpinning the currently dominant deliberative model, clearly our approach in this paper is more in line with liberal conceptions of citizenship and public participation, which tend to emphasize individual interests rather than civic responsibilities, and opportunity for participation rather than obligation to participate.	
16. Relevant sources cited (Please list references to other sources cited in the literature which seem to be highly relevant for MoRRI and/or represent important contributions in the field)	Dryzek JS (1990) *Discursive Democracy: Politics, Policy, and Political Science*. Cambridge: Cambridge University Press. Dryzek JS (2000) *Deliberative Democracy and Beyond: Liberals, Critics, Contestations*. Oxford: Oxford University Press. Eriksen EO (ed.) (1995) *Deliberativ Politikk*. Oslo: Tano. Eriksen EO (1999) *Is Democracy Possible Today?* Aarhus:	

Basic information		**Document no.:** (citavi #)	**#977**
	Magtudredningen		

Basic information									**Document no.:** (citavi #)	**#1051**
Reviewer's name	Kerstin Goos									
1. Bibliographical information (author/s, year, title, editor/s, journal/book, volume, publisher, place of publication, pages, DOI)	Neresini, F. Bucchi, M. 2011: Which indicators for the new public engagement activities? An exploratory study of European research institutions. In: Public Understanding of Science, 20, 1, 64-79.									
2. Abstract (copy and paste)	Public engagement (PE) activities have become a regular feature for several research institutions in Europe. However, while research and teaching functions can count on established indicators, PE functions are often performed as a sort of "goodwill exercise." Few studies have focused on defining appropriate indicators and standards, particularly at the organizational level. An exploratory study was carried out on a sample of 40 European research institutions with a view to understanding whether the diffusion of PE activities has led to incorporating the PE perspective into "routine" activities of organizations. The results point to quite unequal performances among European research institutions. Also, while most research institutions examined have dedicated resources for PE activities, the study suggests that such activities are not yet considered essential. Performance indicators and standards might prove of great support for institutions and policy actors that wish to take seriously the challenge of public engagement and societal dialogue.									
3. Main focus (key dimensions according to MoRRI)	RRI / RI	☐	Citizen participation	**X**	Science literacy	☐	Gender equality	☐		
	Open access	☐	R&I governance and ethics	☐	Other	☐				
Comment on 3:	Exploratory study on a sample of 40 European research institutions with a view to understanding whether the diffusion of PE activities has led to incorporating the PE perspective into "routine" activities of organizations.									
4. Main perspective	Theoretical, conceptual	☐	Methodological	**X**	Policy oriented	☐	Evaluative	**X**		

Basic information									**Document no.:** (citavi #)	**#1051**
(multiple entries possible)	Other	☐	Comment on 4:							
5. Type of document	Scientific article	**X**	Book chapter	☐	Book	☐	Report	☐		
	Project deliverable	☐	Policy/ strategy document	☐	Other	☐				
Comment on 5:										
6. System level (if applicable)	Global	☐	European	☐	National	☐	Sub-national	☐		
Comment on 6:										
7.1 Country focus (if applicable, please specify)	129 among the most important European research institutes in the fields of physics (66) and biomedical sciences (63) were identified, 40 research institutions completed the questionnaire.									
7.2 Country/ies of origin indicated by institutional affiliation of editor(s)/ author(s) (if applicable, please specify)	Italy				Comments on 7:					
Data and indicator availability										
8.1 Data, indicators, measurements	Document contains data	**X**	If yes, please specify (including page numbers in document)		Obtained from their survey, authors develop indicators of PE activities of research organisations. See Table 1, p.69 Q1 Dedicated resources for PE Q2 Public availability of information about research activities Q3 Attention to ethical issues Q4 Press and/or PR office Q5 Intensity of relationships with media Q6 Publications addressed to the public Q7Participation in EU projects and/or networks about PE Q8 Museum and/or permanent exhibitions					

Basic information				**Document no.:** (citavi #)	**#1051**
				Q9 Specific activities with schools Q10 Visits to laboratories Q11 Open days Q12 Collaboration with NGOs and local government bodies? Q13 Meetings, conferences etc. addressed to the public Obtained from their analysis of research institutions websites, authors develop indicators of PE activities. See Table 2, p.71. W1: Is the website easily findable (googling) and easy to open? W2: Has the website been updated during the last month? W3: Does the home page contain an introduction for the non-expert? W4: Is the information about resources for research activities easily available? W5: E-mail address for contact by the public? W6: Has the website a specific section for the public? W7: Does the website offer specific services for the public (like documents, mailing list, forum etc.)? W8: Has the website a specific section for the media? Based on these 21 indicators, a synthetic index of PE activities through which the research institutes could be assessed, compared and potentially ranked, was build. See Table 3, p.71: absolute rating and relative rating (irrespective of size of research institution)
Comment on 8.1					
8.2 Reference made to data, indicators measurements in other sources	Document refers to relevant sources	**X**	If yes, please list source(s): (URLs, data banks, reports, statistics, etc.)	Authors mention various studies: - Poliakoff, E. and Webb, T.L. (2007) "What Factors Predict Scientists' Intentions to Participate in Public Engagement of Science Activities?," *Science Communication* 29(2): 242–63. - Royal Society (2006) *Factors Affecting Science Communication: A Survey of Scientists and Engineers*. URL: http://www2.royalsociety.org/page.asp?id=3180 - Lévy-Leblond, J.M. (1992) "About	

Basic information					**Document no.:** (citavi #)	**#1051**
					Misunderstandings about Misunderstandings," *Public Understanding of Science* 1(1): 17–21. - Young, N. and Matthews, R. (2007) "Experts' Understanding of the Public: Knowledge Control in a Risk Controversy," *Public Understanding of Science* 16(1): 123–44. - Martín-Sempere, M.J., Garzón-García, B. and Rey-Rocha, J. (2008) "Scientists' Motivation to Communicate Science and Technology to the Public: Surveying Participants at the Madrid Science Fair," *Public Understanding of Science* 17(3): 349–67. - Davies, S.R. (2008) "Constructing Communication: Talking to Scientists about Talking to the Public," *Science Communication* 29(4): 413–34.	
Comment on 8.2:						
Guiding questions for review *- please add page numbers where appropriate -*						
9. How is RRI characterized? (For literature dealing explicitly with responsible (research) and innovation. If the publication deals with one of the 5 key dimensions, please proceed to 11.)						
9.1 Which definition of RRI is being used? (author's definition or reference to other source)	-					
9.2 Which aspects of RRI receive special emphasis? (e.g., certain normative goals, procedural approaches, reference to						

Basic information	**Document no.:** (citavi #)	**#1051**
one or more of the 5 key dimensions, …)	-	
9.2 Which arguments are presented in support or rejection/criticism of RRI?	-	
9.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to? (e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy, …)	-	
Comments on 9.		
10. Policy context of RRI (For literature dealing explicitly with responsible (research) and innovation. If the publication deals with one of the 5 key dimensions, please proceed to 11.)		
10.1 Which RRI-related developments (international, EU, national, sub-national) are mentioned, how are they characterized and what are they aiming at (strategies, funding initiatives, regulation etc.)?	-	

Basic information	**Document no.:** (citavi #)	**#1051**
10.2 Which approaches, instruments are discussed to facilitate the uptake of RRI?	-	
10.3 Which problems, barriers, potential drawbacks for RRI are brining discussed, how could they be addressed?	-	
Comments on 10.		
11. Claims regarding the effects of RRI and / or the key dimension (benefits, costs, disadvantages, trade-offs)		
11.1 What claims are being made?	- Authors interpretation of survey and website data: data can be interpreted that PE initiatives do not play yet a relevant role within research institutions in Europe.(p.74) The presence of dedicated resources for public engagement activities (Q1) do nevertheless seem not dependent on the research organization's size. - Substantial failure by research institutes to incorporate evaluation of PE activities into their practices and organisational cultures can be viewed as signalling that they still regard PE as bearing marginal significance. (p.74) ➔ Several research institutes organize initiatives aimed at schools – visits, workshops, exhibitions – and produce educational materials; only five do nothing, while 19 demonstrate significant efforts in such activities (Q9). Also visits to laboratories (Q10) and open days (Q11) are organized by several institutes. However, in almost all cases no monitoring whatsoever is made of the public involved through these initiatives, nor evaluation of their impact: a finding which bears particular relevance for understanding the role of PE in the organizational cultures of research organizations.(p.69) - Organisational change engendered by PE activities is mainly of incremental (single-loop) type, rather than systemic (double-loop).(p.75)	

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	➔ Homepages didn't offer descriptions of the institutes activities aimed at non-experts; research institutes still conceive themselves as concerned with "science for scientists" rather than "science for the public"; only one out of twelve research institutes surveyed attributed an explicit and institutionally recognised value to participation by its researchers in PE.(p.76) ➔ the minor role that organizational scale seems to play in terms of resources explicitly devoted to PE can be explained, on the one hand, by the significant variety of policies characterizing research institutions in this area; on the other hand, by the fact that such activities still mostly rely on the goodwill of individuals (p.68) ➔ The lack of involvement in PE collaborative projects or net-works by almost half of the research institutions considered as well as the weak connection between this indicator and the size can also be interpreted as further signs that PE efforts add up, moreover with limited weight, to research activities instead of becoming a substantial part of those activities.(p.68) - Failing to acquire an organisational culture of which PE is an integral part, on the part of research institutions, engenders two types of risks: no consensus of what PE actually means and goodwill of scientists is likely to be confined to circumscribed and episodic initiatives.(p.76) - Results point to significantly unequal PE performances among research institutions in Europe. Remarkable distance between a few, very active institutions and a majority of scarcely active institutions in terms of PE.(p.77) - Significant awareness of the importance of evaluation emerges, at least at the individual level. On the one hand, therefore, the lack of significant investments in evaluation by the research organizations surveyed suggests that transition to an organizational culture of which PE is an integral (second-loop) part has not yet come about; on the other hand, widespread individual awareness of its importance may sustain its implementation in the near future.(p.70) ➔ Only one out of twelve institutions studied in the second phase of the study actually turn out to be doing systematic evaluation of its PE efforts, while five institutions occasionally put into place evaluation of specific initiatives, mostly through self-administered questionnaires to participants immediately after the conclusion of each initiative. Nevertheless, 25 out of 48 interviewees, including several researchers, clearly recognize, at least in principle, the importance of evaluation in this area. - the research organisations' websites exhibit relatively little interest in interacting with the lay public (p.70) ➔ all the websites were easily findable and constantly updated. Only the presence of a section of the website dedicated to relations with the media turns out to be associated with the organization's size.	
11.2 Which arguments are used to support the claim(s)?	See 11.1	

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11.3 What evidence is presented to support the claims? (e.g., data, indicators, research results, case studies, anecdotal evidence)	Survey to collect and analyse data on public engagement activities by means of a questionnaire submitted to a sample of research organization, followed by a detailed evaluation of the websites of those same organisations. (p.66)	
11.4 According to the author(s), which type of evidence/data is missing to better support the claim? (e.g. data gaps, limitations with regard to analytical levels, lack of indicator specifications etc.)	As has been mentioned, analysis and evaluation of PE activities is still underdeveloped, lacking robust and shared indicators of output and performance. In this light, the paper aims at contributing to move forward the discussion, by exploring the potential and limits of a series of indicators in terms of both statistical reliability and perception by the very actors involved. A more specific limit of the study relates to the anonymity of individual results and performances by specific research institutions in the area of PE. Given the exploratory nature of the study, anonymity was promised to the institutions sampled as part of the original contact and data requests. However, on the basis of the results described in the following pages and of the discussion of indicators' reliability and robustness, one could easily project as a future research step the definition of non-anonymous levels of PE performances of research institutions, based on those indicators which proved to be more informative and reliable. (p.68)	
Comments on 11.		
12. Key dimensions of RRI (For literature dealing with one or more of the 5 key dimensions.)		
12.1 How is the key dimension defined? (terminology applied, central features/characteristics)	Terminology used: communication and public engagement activities. No explicit definition. But understanding of PE is driven by the following questions (p.64): 1. How can one recognize whether an institution makes its results and activities available to non-specialists in an accessible and transparent fashion? 2. How can one assess the extent to which a research body is actually paying attention to its relationship with the public?	
12.2 Does the document reach beyond one single dimension / are more than one of the key dimensions discussed? If yes, what is the proposed relationship between different dimensions (complementary,		

Basic information	**Document no.:** (citavi #)	**#1051**
contradictory…)?		
12.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to? (e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy, …)		
Comments on 12.		
13. Are other important "dimensions" / aspects of RRI discussed, presented which are so far not covered by MoRRI?		
14. Anything else deemed relevant?		
15. General comments and remarks		
16. Relevant sources cited (Please list references to other sources cited in the literature which seem to be highly relevant for MoRRI and/or represent important contributions in the field)		

Basic information									**Document no.:** (citavi #)	**#976**
Reviewer's name	Kerstin Goos									
1. Bibliographical information (author/s, year, title, editor/s, journal/book, volume, publisher, place of publication, pages, DOI)	Delgado, A.; Lein Kjolberg, K.; Wickson, F. 2011: Public engagement coming of age: From theory to practice in STS encounters with nanotechnology. In Public Understanding of Science, 20, 6, 826-845.									
2. Abstract (copy and paste)	In this paper, we present a study of Science and Technology Studies (STS) perspectives on public engagement, specifically focusing on the gap between theory and practice. In aiming to develop a conceptual map of this gap, we identify five top topics of tension. These are related to the general questions of: "Why should we do public engagement?," "Who should be involved?," "How should it be organised?," "When should it be done?" and "Where should it be grounded?" We employ nanotechnology as a paradigmatic case to help us explore these tensions. In practice, the choices one makes in relation to one topic of tension may influence the choices available for others. Enhanced awareness of the presence of these tensions, as well as their interconnections, can help build reflexive capacity and make visible the various alternative routes available for STS practitioners working in the "age of engagement."									
3. Main focus (key dimensions according to MoRRI)	RRI / RI	☐	Citizen participation	**X**	Science literacy	☐	Gender equality	☐		
	Open access	☐	R&I governance and ethics	☐	Other	☐				
Comment on 3:										
4. Main perspective (multiple entries possible)	Theoretical, conceptual	**X**	Methodological	☐	Policy oriented	☐	Evaluative	☐		
	Other	☐	Comment on 4:							
5. Type of document	Scientific article	**X**	Book chapter	☐	Book	☐	Report	☐		
	Project deliverable	☐	Policy/ strategy document	☐	Other	☐				
Comment on 5:										
6. System level (if applicable)	Global	☐	European	☐	National	☐	Sub-national	☐		
Comment on 6:	Author compiled a list of PE/PP exercises on nanotechnology to illustrate and analyse them. Cases have been organised internationally.									

Basic information				**Document no.:** (citavi #)	**#976**
7.1 Country focus (if applicable, please specify)					
7.2 Country/ies of origin indicated by institutional affiliation of editor(s)/ author(s) (if applicable, please specify)	Norway			Comments on 7:	
Data and indicator availability					
8.1 Data, indicators, measurements	Document contains data	**X**	If yes, please specify (including page numbers in document)	Methods followed a two step approach: **1)** authors analysed the book of abstracts of the 4s/EASST conference in Rotterdam in 2008, selecting all sessions in which PP/PE appeared as central. In later analysis of notes and impressions from the conference, authors identified a set of repeating keywords (e.g. lay–knowledge, expertise, deliberation, science democratisation, governance, civic epistemologies). Through a process of clustering related concepts, they saw the keywords crystallising into three main themes: - the construction of expertise and publics (CEP), - the organisation of PP/PE exercises (ORG), and - the dynamics of dialogue (DOD). **2)** literature review of three key STS journals: "Science, Technology and Human Values", "Social Studies of Scinece" and "Public Understanding of Science". Jan 2000 – Oct 2008, all papers containing "participation" and/or "engagement" were included. Also, papers containing the key words identified in step 1 were taken into account. Based on step 1 and 2, 5 key tensions were identified, see 11.1.
Comment on 8.1					
8.2 Reference made to data, indicators measurements in	Document refers to relevant	☐	If yes, please list source(s): (URLs, data banks,		

Basic information				**Document no.:** (citavi #)	**#976**
other sources	sources		reports, statistics, etc.)		
Comment on 8.2:					
Guiding questions for review *- please add page numbers where appropriate -*					
9. How is RRI characterized? (For literature dealing explicitly with responsible (research) and innovation. If the publication deals with one of the 5 key dimensions, please proceed to 11.)					
9.1 Which definition of RRI is being used? (author's definition or reference to other source)	-				
9.2 Which aspects of RRI receive special emphasis? (e.g., certain normative goals, procedural approaches, reference to one or more of the 5 key dimensions, …)	-				
9.2 Which arguments are presented in support or rejection/criticism of RRI?	-				

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9.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to? (e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy, …)	-	
Comments on 9.		
10. Policy context of RRI (For literature dealing explicitly with responsible (research) and innovation. If the publication deals with one of the 5 key dimensions, please proceed to 11.)		
10.1 Which RRI-related developments (international, EU, national, sub-national) are mentioned, how are they characterized and what are they aiming at (strategies, funding initiatives, regulation etc.)?	-	
10.2 Which approaches, instruments are discussed to facilitate the uptake of RRI?	-	
10.3 Which problems, barriers, potential drawbacks for RRI are brining discussed, how could they		

Basic information	**Document no.:** (citavi #)	**#976**
be addressed?	-	
Comments on 10.		
11. Claims regarding the effects of RRI and / or the key dimension (benefits, costs, disadvantages, trade-offs)		
11.1 What claims are being made?	5 topics of tension within STS in its age of engagement have been identified based on the 4S/EASST conference and a literature review. - The rationale: why should PE/PP be done? - Expertise and publics: Who should be included in PP/PE? - Invited or uninvited: How should PP/PE be initiated? - Upstream, midstream or downstream: when is the right time for PP/PE? - Universal or context specific: Where should PP/PE be grounded?	
11.2 Which arguments are used to support the claim(s)?	- The rationale: why should PE/PP be done? Stirling's (2008) reintroduction of the three rationales (substantive, instrumental, normative), based on Fiorino, has been helpful, but in practice the distinctions are not always sharp. Tension generated by competing rationales is also closely linked with another tension: that between democratic openness and technocratic closure. - Expertise and publics: Who should be included in PP/PE? Tension between different ideas of who should be involved in PP/PE. Some STS scholars have argued that more public involvement is not necessarily desirable or advisable in every instance and clearly the direct involvement of all members of the public in techno-scientific developments is not feasible. Authors therefore identify tension between different approaches to deciding who is a "relevant" participant and what criteria this decision should be based on. Wynne (1996) has recommended a radical dismanteling of the expert-lay distinction, others make distinction, not only between diff types of "relevant" expertise, but also between different kinds of "relevant" publics. - Invited or uninvited: How should PP/PE be initiated? The third topic of tension is between PP/PE framed and arranged by political authorities and more grassroots initiatives. Examples of invited engagement include events such as consensus conferences, focus groups, citizen juries, public consultations etc. Uninvited engagement is most commonly channelled through civil society organisations and networks of concerned citizens in the form of protests, campaigns and lobbying. Some authors analyse self-organising nature of parts of the public, other authors analyse the question of how the public is constructed through "invited" PP/PE.	

Basic information	**Document no.:** (citavi #)	**#976**
	- Upstream, midstream or downstream: when is the right time for PP/PE? Despite a general theoretical agreement in the STS community in favour of upstream PP/PE, tension remains between diverging answers to the question of how far "upstream" it makes sense to go. The question is related to whether it is possible to make a clear distinction between stages of basic research and applied technological development. Some have suggested a type of "midstream" engagement in laboratories and research activities (e.g. see Fisher et al., 2006), while others have suggested PP/PE move all the way up to research funding decisions. The question of what exactly "upstream" means in practice remains open to contestation. - Universal or context specific: Where should PP/PE be grounded? The claim for contextualisation – together with the critique of the universal character of science – is a foundational element of the STS tradition (Shapin and Schaffer, 1985; Latour, 1993). In accordance with this line of thought, techno-scientific objects appear as the product of situated practices (Latour, 1987) and context embeddedness appears as a main condition of reflexive scientific practice (Nowotny et al., 2001; Jasanoff, 2003a). Based on this, it is understandable that STS scholars are today reflecting upon the conditions for and implications of PP/PE as well as adjusting PP/PE ideas, approaches and models to suit particular contexts. For instance, it has been argued that particular political cultures should be taken into account when analysing both invited and uninvited forms of PP/PE (Jasanoff, 2005; Seifert, 2006; Felt, 2008) and that there is a need to adjust PP/PE to the concrete challenges that technological development introduces in particular contexts (Hamlett, 2003). Despite this insistence on the importance of context sensitivity, however, STS authors have demonstrated that some PP/PE models, particularly consensus conferences and citizens' juries, can "travel well" (Einsiedel et al., 2001: 83). Participatory models are therefore increasingly travelling across cultures, justified on the basis of a general (Western but globalised) tendency to portray PP/PE as a universal element of good governance. The will to be coherent with a theoretical tradition that emphasises reflexivity and context embeddedness therefore comes into tension with a contemporary need in practice for transferrable models that can allow for comparisons and a standardisation in quality control measures	
11.3 What evidence is presented to support the claims? (e.g., data, indicators, research results, case studies, anecdotal evidence)	See methodological approach presented in 8.1.	
11.4 According to the author(s), which type of evidence/data is missing to better support the claim? (e.g. data gaps, limitations with regard to analytical levels, lack of indicator specifications etc.)		

Basic information	**Document no.:** (citavi #)	**#976**
Comments on 11.		
12. Key dimensions of RRI (For literature dealing with one or more of the 5 key dimensions.)		
12.1 How is the key dimension defined? (terminology applied, central features/characteristics)	No clear definition, but elaboration on how it is usually defined and what the literature says. Both the terms public participation (PP) and public engagement (PE) are used simultaneously (PP/PE). This reflects the way in which these terms are largely used indistinctively in academic texts and in policy documents (e.g. Nowotny et al., 2001; Wynne and Felt, 2007). Since around 2000, however, there has been an increasing tendency within STS to favour the term "public engagement" over "public participation." The reasons for, and meanings of, this shift remain poorly articulated. Authors suggest that the current preference for the term PE is related to the emergence of the concept of "upstream engagement" (Wilsdon, 2005) and particularly the prominence of this term for nanotechnology (often portrayed within the STS community as the paradigmatic test case for the concept) (Macnaghten et al., 2005; Pidgeon and Rogers-Hayden, 2007; Barben et al., 2008). PE could therefore be taken to refer to both a need to generate early interest, and a more inclusive form of participation. The lack of clear definitions of PP/PE may relate to a lack of agreement on how inclusion of the public should take place in practice (Rowe and Frewer, 2004; Lengwiler, 2008). Notably, despite diverging terminology and arguments, there is an apparent consensus that PP/PE should be something different than the so-called "deficit model" (Lewenstein, 2003; Scott and Du Plessis, 2008). Hence, PP/PE should not simply be about generating public acceptance through the provision of information on science and technology, but about citizens' active involvement in the development of socio-technical trajectories. The increasing institutionalisation of PP/PE exercises has, however, come under criticism from some STS scholars as representing a response to a new type of deficit model – a public deficit of trust in experts and science (Irwin, 2001, 2006; Wynne, 2006; Rogers-Hayden and Pidgeon, 2007; Tutton, 2007; Chilvers, 2008). The fear is that where science has lost public confidence, PP/PE exercises are being used to deactivate scepticism and opposition to new technologies. It has been argued that PP/PE exercises commonly reproduce assumptions and consequences of the deficit model, whereby science still proceeds by excluding lay views instead of opening up for real dialogue (Wynne, 2006, 2007a). In line with this, STS scholars have recommended that it is important to "mind the gap" between the theoretical ideals of PP/PE and the realities of their implementation in practice (Irwin, 2001; Wynne, 2006).	
12.2 Does the document reach beyond one single dimension / are more than one of the key dimensions discussed? If yes,		

Basic information	**Document no.:** (citavi #)	**#976**
what is the proposed relationship between different dimensions (complementary, contradictory…)?		
12.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to? (e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy, …)	Mainly STS. One short reference to political philosophy.	
Comments on 12.		
13. Are other important "dimensions" / aspects of RRI discussed, presented which are so far not covered by MoRRI?		
14. Anything else deemed relevant?	Authors use the mapping of the five topics to take a closer look at the case of nanotechnology and to illustrate how theoretical demands and expectations for PP/PE are often in competition with each other and the way in which this can force undesirable compromises in choices in practice. .	
15. General comments and remarks	Authors aim to provide "map of the gap between theory and practice" by synthesising and exploring important topics of tension around PP/PE within the "epistemic community" of STS which appear in the shift from theory into practice. By tensions they mean places where opposing ideas about PP/PE pull against each other and generate stress and strain.	
16. Relevant sources cited (Please list references to other sources cited in the literature which seem to be highly relevant	Nowotny, H., Scott, P. and Gibbons, M. (2001) Re-Thinking Science: Knowledge and the Public in an Age of Uncertainty. London: Polity Press.	

Basic information		**Document no.:** (citavi #)	**#976**
for MoRRI and/or represent important contributions in the field)	Collins, H.M. and Evans, R. (2002) "The Third Wave of Science Studies: Studies of Expertise and Experience," Social Studies of Science 32(2): 235–96. Jasanoff, S. (2003a) "Technologies of Humility: Citizen Participation in Governing Science," Minerva 41: 223–44. Wynne, B. (1996) "May the Sheep Safely Graze? A Reflexive View of the Expert-Lay Knowledge Divide," in S. Lash, B. Szerszynski and B. Wynne (eds) Risk, Environment and Modernity: Towards a New Ecology, pp. 44–84. London: SAGE. Irwin, A. (2001) "Constructing the Scientific Citizen: Science and Democracy in the Biosciences," Public Understanding of Science 10(1): 1–18. Stirling, A. (2008) "'Opening Up' and 'Closing Down': Power, Participation and Pluralism in the Social Appraisal of Technology," Science, Technology and Human Values 33(2): 262–94.		

Basic information		**Document no.:** (citavi #)	**#980**
Reviewer's name	Kerstin Goos		
1. Bibliographical information (author/s, year, title, editor/s, journal/book, volume, publisher, place of publication, pages, DOI)	Rowe/Frewer 2005: A Typology of Public Engagement Mechanisms. In Public Understanding of Science, 30,2, 251-290.		
2. Abstract (copy and paste)	Imprecise definition of key terms in the "public participation" domain have hindered the conduct of good research and militated against the development and implementation of effective participation practices. In this article, we define key concepts in the domain: public communication, public consultation, and public participation. These concepts are differentiated according to the nature and flow of information between exercise sponsors and participants. According to such an information flow perspective, an exercise's effectiveness may be ascertained by the efficiency with which full, relevant information is elicited from all appropriate sources, transferred to (and processed by) all appropriate recipients, and combined (when required) to give an aggregate/consensual response. Key variables that may theoretically affect effectiveness—and on which engagement mechanisms differ—are identified and used to develop a typology of mechanisms. The resultant typology reveals four communication, six consultation, and four participation mechanism classes. Limitations to the typology are discussed, and future research needs identified.		

<table>
<tr><td colspan="6">Basic information</td><td colspan="2">Document no.:
(citavi #)</td><td>#980</td></tr>
<tr><td></td><td colspan="7"></td></tr>
<tr><td rowspan="3">3. Main focus (key dimensions according to MoRRI)

Comment on 3:</td><td>RRI / RI</td><td>☐</td><td>Citizen participation</td><td>X</td><td>Science literacy</td><td>☐</td><td>Gender equality</td><td>☐</td></tr>
<tr><td>Open access</td><td>☐</td><td>R&I governance and ethics</td><td>☐</td><td>Other</td><td>☐</td><td colspan="2"></td></tr>
<tr><td colspan="7">In this article, a number of definitions of the most important participation concepts will be forwarded to clarify what public engagement entails and does not entail, and to clarify how the various mechanisms are similar and dissimilar.</td></tr>
<tr><td rowspan="2">4. Main perspective

(multiple entries possible)</td><td>Theoretical, conceptual</td><td>X</td><td>Methodological</td><td>☐</td><td>Policy oriented</td><td>☐</td><td>Evaluative</td><td>☐</td></tr>
<tr><td>Other</td><td>☐</td><td colspan="6">Comment on 4:</td></tr>
<tr><td rowspan="3">5. Type of document

Comment on 5:</td><td>Scientific article</td><td>X</td><td>Book chapter</td><td>☐</td><td>Book</td><td>☐</td><td>Report</td><td>☐</td></tr>
<tr><td>Project deliverable</td><td>☐</td><td>Policy/ strategy document</td><td>☐</td><td>Other</td><td>☐</td><td colspan="2"></td></tr>
<tr><td colspan="7"></td></tr>
<tr><td rowspan="2">6. System level (if applicable)

Comment on 6:</td><td>Global</td><td>☐</td><td>European</td><td>☐</td><td>National</td><td>☐</td><td>Sub-national</td><td>☐</td></tr>
<tr><td colspan="7">In their compilation of engagement mechanisms, the authors draw on international literature.</td></tr>
<tr><td>7.1 Country focus (if applicable, please specify)</td><td colspan="7"></td></tr>
<tr><td>7.2 Country/ies of origin indicated by institutional affiliation of editor(s)/ author(s) (if applicable, please specify)</td><td colspan="3">UK and Netherlands</td><td colspan="4">Comments on 7:</td></tr>
<tr><td colspan="8">Data and indicator availability</td></tr>
<tr><td>8.1 Data, indicators, measurements</td><td>Document contains data</td><td>x</td><td colspan="2">If yes, please specify (including page numbers in document)</td><td colspan="3">Authors develop a typology of engagement mechanisms:

Table of key engagement mechanisms classified according to structural variability is developed (p.276ff).</td></tr>
</table>

Basic information				**Document no.:** (citavi #)	**#980**
				Based on this table, the mechanisms that share identical features in terms of the between-mechanism variables (see below) are grouped together and described: types of engagement mechanisms are grouped into 4 communication types, 6 consultation types and 4 participation types (see p.278 ff.)	
Comment on 8.1					
8.2 Reference made to data, indicators measurements in other sources	Document refers to relevant sources	x	If yes, please list source(s): (URLs, data banks, reports, statistics, etc.)	Authors draw on a variety of references to develop a list of participation mechanisms. (p.257)	
Comment on 8.2:					
Guiding questions for review *- please add page numbers where appropriate -*					
9. How is RRI characterized? (For literature dealing explicitly with responsible (research) and innovation. If the publication deals with one of the 5 key dimensions, please proceed to 11.)					
9.1 Which definition of RRI is being used? (author's definition or reference to other source)	-				

Basic information	**Document no.:** (citavi #)	**#980**
9.2 Which aspects of RRI receive special emphasis? (e.g., certain normative goals, procedural approaches, reference to one or more of the 5 key dimensions, …)	-	
9.2 Which arguments are presented in support or rejection/criticism of RRI?	-	
9.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to? (e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy, …)	-	
Comments on 9.		
10. Policy context of RRI (For literature dealing explicitly with responsible (research) and innovation. If the publication deals with one of the 5 key dimensions, please proceed to 11.)		
10.1 Which RRI-related		

Basic information	**Document no.:** (citavi #)	**#980**
developments (international, EU, national, sub-national) are mentioned, how are they characterized and what are they aiming at (strategies, funding initiatives, regulation etc.)?	-	
10.2 Which approaches, instruments are discussed to facilitate the uptake of RRI?	-	
10.3 Which problems, barriers, potential drawbacks for RRI are brining discussed, how could they be addressed?	-	
Comments on 10.		
11. Claims regarding the effects of RRI and / or the key dimension (benefits, costs, disadvantages, trade-offs)		
11.1 What claims are being made?	The literature at present lacks a thorough and systematic description of the available mechanisms, discussion of their similarities and differences, or discussion of how such differences may affect their contingent appropriateness (e.g.,Webler 1999; see in particular p. 61 for a quote from the US National Research Council). (p.253)	
11.2 Which arguments are used to support the claim(s)?	A huge number and variety of engagement mechanisms exist. Authors list various terms for mechanisms described in the literature. Points they make about their list concern *comprehensiveness* (there are undoubtedly more than the ones they listed), *functional equivalence*, *independence* and *uncertain and contradictory nomenclature* of the mechanisms (dissimilar mechanisms have in the past been written about or described using the same term; and essentially similar mechanisms have been described using different terms.). (p.258) Rowe/Frewer name the authors that have recognized the	

Basic information	**Document no.:** (citavi #)	**#980**
	multidimensional nature of the participation concept: Arnstein 1969, Webler 1999, Glass 1979, Nelkin/Pollak 1979, Rosener 1975. They see the value of these approaches but state that none of the frameworks in these articles, however, may be called a typology of mechanisms, because the mechanisms alluded to are generally examples that possess one particular function, structure, or objective and that differ from other examples that possess different functional, structural (and so on) attributes. (p.261) In order to classify engagement mechanisms in a typology, the sources of variance have to be identified. First step: clarify what effectiveness means. Two main concepts: 1) effectiveness concerns **fairness** of the mechanism/exercise (Related to the concept of fairness are concepts of public acceptability, equity, democracy, representativeness, transparency, and influence, among others.). 2) the **competence/efficiency** of the mechanisms/exercise in achieving its intended purpose (refers to the appropriate elicitation, transfer, and combination of public and/or sponsor views). Using the language the information flow model of *public engagement*, it refers to *maximizing the relevant information (knowledge and/or opinions) from the maximum number of relevant sources and transferring this efficiently to the appropriate receivers*. The effectiveness of public engagement will depend on the particular mechanism chosen and the way in which this mechanism is applied (in the specific exercise). Differences among mechanisms are due to *between-mechanism variables* and in the application of mechanisms to *within-mechanism variables*. (p.264)	
11.3 What evidence is presented to support the claims? (e.g., data, indicators, research results, case studies, anecdotal evidence)	Authors identified the deficit in the literature as it is not clarified what public engagement entails and does not entail, and how various mechanisms are similar or dissimilar. (p.253) As a conceptual task they identify key variables that may theoretically affect effectiveness. The list of various engagement mechanisms are based on literature review. In order to develop a typology, the authors detail a number of the most formalized of the engagement mechanisms compiled in their list (see p. 257), describing them according to their similarities and differences on the main between-mechanism variables. Table 2 (p.276) shows the key engagement mechanisms classified according to structural variability. Based on this, they develop the typology with groups of 4 communication types, 6 consultation types and 4 participation types (see p.278 ff.)	
11.4 According to the author(s), which type of evidence/data is missing to better support the claim? (e.g. data gaps, limitations with regard to analytical levels, lack of indicator specifications etc.)	- The typology presented in this article should be regarded primarily as a working model and an aid to research rather than as a definitive typology (in many ways, the typology itself should be seen as of secondary importance to the explication of the rationale for its necessary development and the process of producing it). There are certainly limitations to the typology itself. For example, there may be other between mechanism variables of equal or greater importance to those used in developing the typology, which ought to be used in	

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	preference to, or in addition to, these. And there may also be other basic mechanism classes that have been missed, because we have not taken into account all existing engagement mechanisms. Underlying these potential difficulties is the fact that of the plethora of engagement mechanisms that have been developed and used, there are relatively few definitive accounts of their natures (and these are often contradictory), and this has limited the number of mechanisms we could classify with confidence. - A further step involves understanding and defining, perhaps via a second typology, the different types of *context* in which engagement takes place. Matching an appropriate class of engagement mechanisms to an appropriate context will not, however, guarantee that an engagement exercise will be a success. There are other important variables related to the actual application of the particular exercise that will play an equal and perhaps greater role in this respect (e.g., Webler 1999). We have termed these *within-mechanism variables*: they differ from between-mechanism variables in showing variation *across* the different practical applications of any specific mechanism. Identifying these, and understanding their potential impact on exercise effectiveness, is another area requiring future study.	
Comments on 11.		
12. Key dimensions of RRI (For literature dealing with one or more of the 5 key dimensions.)		
12.1 How is the key dimension defined? (terminology applied, central features/characteristics)	General definition: "public participation with which few would argue is the practice of involving members of the public in the agendasetting, decision-making, and policy-forming activities of organizations/ institutions responsible for policy development." This defintion is too braod though, because the public may be involved in a number of different ways o rat a number of levels. Authors propose using three different descriptors to differentiate initiatives that have in the past been referred to as public participation, based on the *flow of information* between participants and sponsors. These are *public communication*, *public consultation*, and *public participation*. - In *public communication*, information is conveyed from the sponsors of the initiative to the public. - In *public consultation*, information is conveyed from members of the public to the sponsors of the initiative, following a process *initiated by* the sponsor. - In *public participation*, information is exchanged between members of the public and the sponsors.	
12.2 Does the document reach beyond one single dimension / are more than one of the key dimensions discussed? If yes,		

Basic information		**Document no.:** (citavi #)	**#980**
what is the proposed relationship between different dimensions (complementary, contradictory…)?	-		
12.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to? (e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy, …)	-		
Comments on 12.			
13. Are other important "dimensions" / aspects of RRI discussed, presented which are so far not covered by MoRRI?			
14. Anything else deemed relevant?			
15. General comments and remarks			
16. Relevant sources cited (Please list references to other sources cited in the literature which seem to be highly relevant for MoRRI and/or represent important contributions in the field)			

Basic information									**Document no.:** (citavi #)	**#978**
Reviewer's name	Tine Ravn, AU									
1. Bibliographical information (author/s, year, title, editor/s, journal/book, volume, publisher, place of publication, pages, DOI)	Rask, Mikko, Saule Maciukaite-Zviniene and Jurgita Petrauskiene (2012): Innovations in public engagement and participatory performance of the nations. *Science and Public Policy* 39, pp. 710–721. Doi:10.1093/scipol/scipol/scs089									
2. Abstract (copy and paste)	In this paper we analyse innovations in public engagement in 37 countries in the context of science and technology policy, answering the following research questions: What types of public engagement procedures have in recent years been developed and experimented with in these countries? How have these processes been reflected in national policy discourses? How do the different countries perform in their public engagement activities? The main research focus will be on the study of the most innovative processes and practices. Using the results from the research, we construct a model of 'participatory performance' and classify the countries on the basis of their performance levels.									
3. Main focus (key dimensions according to MoRRI) Comment on 3:	RRI / RI	☐	Citizen participation	☒	Science literacy	☐	Gender equality	☐		
	Open access	☐	R&I governance and ethics	☐	Other	☐				
4. Main perspective (multiple entries possible)	Theoretical, conceptual	☒	Methodological	☐	Policy oriented	☒	Evaluative	☒		
	Other	☐	Comment on 4:							
5. Type of document Comment on 5:	Scientific article	☒	Book chapter	☐	Book	☐	Report	☐		
	Project deliverable	☐	Policy/ strategy document	☐	Other	☐				
6. System level (if applicable) Comment on 6:	Global	☐	European	☒	National	☐	Sub-national	☐		
	The article analyses PE innovations in 37 European countries (EU member countries and associated countries)									

Basic information				**Document no.:** (citavi #)	**#978**
7.1 Country focus (if applicable, please specify)					
7.2 Country/ies of origin (if applicable, please specify)				Comments on 7:	
Data and indicator availability					
8.1 Data, indicators, measurements	Document contains data	☒	If yes, please specify (including page numbers in document)	A model of 'participatory performance' is constructed to measure cross-country PE performance. Several indicators (referred to as model components) are constructed: **1. Participatory resources** _ regulations supporting PE activities _ community of practitioners, such as professional participatory agencies _ institutional infrastructures supporting participation, e.g. e-governance portals _ links to educational institutions and research programmes _ upgrading of participatory skills and procedures _ funding opportunities **2. Demand conditions** _ national culture of public debate and criticism _ level of public education _ stage of a nation's institutional development saturation of a participatory market _ level of techno-scientific controversy _ social capital **3. Related and supportive factors** _ activity of non-governmental organizations (NGOs) and civil society movements _ networking and coordination between participative actors _ availability of examples of success

Basic information				**Document no.:** (citavi #)	**#978**
				4. Governmental strategies and approaches _ strategies and ideas of PE _ history of deliberative and participatory processes _ competing national priorities _ international pressure (see page 711, the 'indicators' are furthermore explicated throughout the article, see in particular p. 718-719)	
Comment on 8.1					
8.2 Reference made to data, indicators measurements in other sources	Document refers to relevant sources	☒	If yes, please list source(s): (URLs, data banks, reports, statistics, etc.)	The 'participatory model' "has roots in both Dryzek's (2010; 2009) notions of the 'deliberative system' and in Porter's (1998) model of the national economic systems". (page 711). Full references: Dryzek, J. S.(2009) 'Democratization as deliberative capacity building', Comparative Political Studies, 42: 1379–402. ——. (2010) Foundations and Frontiers of Deliberative Governance. New York: OUP. Porter, M. E. (1998) Competitive Advantage of Nations - with a New Introduction. Basingstoke, UK: Macmillan.	
Comment on 8.2:					
Guiding questions for review *- please add page numbers where appropriate -*					
9. How is RRI characterized?					

Basic information	**Document no.:** (citavi #)	**#978**
(For literature dealing explicitly with responsible (research) and innovation. If the publication deals with one of the 5 key dimensions, please proceed to 11.) See 11.		
9.1 Which definition of RRI is being used? (author's definition or reference to other source)		
9.2 Which aspects of RRI receive special emphasis? (e.g., certain normative goals, procedural approaches, reference to one or more of the 5 key dimensions, …)		
9.2 Which arguments are presented in support or rejection/criticism of RRI?		
9.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to? (e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy, …)		

Basic information	**Document no.:** (citavi #)	**#978**
Comments on 9.		
10. Policy context of RRI (For literature dealing explicitly with responsible (research) and innovation. If the publication deals with one of the 5 key dimensions, please proceed to 11.)		
10.1 Which RRI-related developments (international, EU, national, sub-national) are mentioned, how are they characterized and what are they aiming at (strategies, funding initiatives, regulation etc.)?		
10.2 Which approaches, instruments are discussed to facilitate the uptake of RRI?		
10.3 Which problems, barriers, potential drawbacks for RRI are brining discussed, how could they be addressed?		
Comments on 10.		
11. Claims regarding the effects of RRI and / or the key dimension (benefits, costs, disadvantages, trade-offs)		
11.1 What claims are being	Several claims are made, the main ones being:	

Basic information	**Document no.:** (citavi #)	**#978**
made?	• In measuring/evaluating PE levels and quality (PE performances) it is not sufficient to include only resources and capacities available for deliberation, 'demand conditions' (mainly context indicators) as well as governmental strategies (context and input indicators) must be considered too (page 711 and 716). • In general, a modest level of PE performance is displayed among the 37 countries, while accordingly being highly differentiated with regard to their performance levels (page 712). • In general, legislative efforts are increasingly implemented to regulate PE activities (page 713) • A main recurring rationale for improving PE processes is a wish to correspondingly improve policy processes (page 715). • Western European countries display the highest levels of participatory performance (A-category countries) – this is partly explained by 'the past division of Eastern and Western Europe' (page 717) • Developments with regard to PE cultures and activities can be characterized as "non-linear" – this claim is illustrated by the case of Denmark and Switzerland (page 718). • In terms of 'participatory' resources, formalized regulations "delineating the role of PE in the processes of policy making" is observed to be an essential component for effective public participation – this claim is in particular supported by the case of UK and Switzerland (page 718). At the same time, an argument is made that too extensive a focus on governmental efforts might undermine the efforts/initiatives to promote PE activities by civil society actors (page 720). • Funding opportunities (and in particular EU funding programmes) is likewise regarded as an essential component (input indicator) for promoting PE activities. • The intensity of public protests and public debates increasingly necessitates "new approaches to socially acceptable decisions", and calls for adaptable S&T policy institutions (this claim is illustrated with the case of UK and Finland, respectively), page 718. • The level of education is found not to be a good predictor (indicator) of performance difference among countries (this claim is supported by the case of Israel, Finland and Norway, which all perform well in educational statistics but less so with regard to participatory performance), page 718 • CSO's have great potential in improving national participatory performances, the argument being that greater activity levels among SCO's will positively influence participatory performance levels, page 719.	
11.2 Which arguments are used to support the claim(s)?	See 11.1	

Basic information	**Document no.:** (citavi #)	**#978**
11.3 What evidence is presented to support the claims? (e.g., data, indicators, research results, case studies, anecdotal evidence)	The data material primarily consists of the 37 national MASIS country reports (Monitoring Policy and Research Activities on Science in Society in Europe). Specific sections of the reports dealing with 'Priority setting, governance and use of science in policy-making' have been analysed. Scientific journals (which include conceptual notions etc.) also occur in the data material.	
Comments on 11.		
12. Key dimensions of RRI (For literature dealing with one or more of the 5 key dimensions.)		
12.1 How is the key dimension defined? (terminology applied, central features/characteristics)	'Public engagement' is not explicitly defined but rather more implicitly expressed as relating to 'deliberative democratic processes' (page 710), accentuating 'new' dialogue-based approaches to engagement. In this regard 'innovation' is understood "in a Schumpeterian sense as novel combinations of knowledge, practices and resources that are taken in use, not in the context of commercialization but in the context of S&T governance (Schumpeter 1994 (original 1942))." (page 711)	
12.2 Does the document reach beyond one single dimension / are more than one of the key dimensions discussed? If yes, what is the proposed relationship between different dimensions (complementary, contradictory…)?	Implicitly, the governance dimension is also discussed – in a complementary fashion to PE.	
12.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to?	Deliberative democracy in particular (references to Habermas, Rawls, the literature on 'micro-publics' (Dryzek among others) etc.)	

Basic information	**Document no.:** (citavi #)	**#978**
(e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy, …)		
Comments on 12.		
13. Are other important "dimensions" / aspects of RRI discussed, presented which are so far not covered by MoRRI?		
14. Anything else deemed relevant?		
15. General comments and remarks	The participatory model represents an 'exploratory' attempt to measure and evaluate levels of public engagement. The model presents a range of indicators (context and input wise in particular) relevant for further exploration in terms of the objective of MoRRI and especially with regard to the public engagement dimension. In this exploration, the 'scope' of indicators, their precise definitions, their analytical levels as well as data foundation need to be considered.	
16. Relevant sources cited (Please list references to other sources cited in the literature which seem to be highly relevant for MoRRI)	See 8.2 Focus On Citizens. (2009) Public Engagement for Better Policy and Services. Paris: OECD, <www.oecd.org/dataoecd/20/4/ 42658020.pdf> accessed January 2012. Fung, A. (2003) 'Association and democracy: Between theories, hopes and realities', Annual Review of Sociology, 29: 515–39. Geurts, J. L. and Mayer, I. (1996) Methods for participatory policy analysis: Towards a conceptual model for research and development. Tilburg, the Netherlands: Work and Organization Research Centre. Science and Public Policy. (1999) 'Special issue on public participation in science and technology', Science and Public Policy, 26: 290–373.	

Basic information	**Document no.:** (citavi #)	**#978**

Basic information									**Document no.:** (citavi #)	**#981**
Reviewer's name	Kerstin Goos									
1. Bibliographical information (author/s, year, title, editor/s, journal/book, volume, publisher, place of publication, pages, DOI)	Stilgoe, J; Lock, Simon J.; Wilson, James 2014: Why should we promote public engagement with science? In: Public Understanding of Science, 23, 1, p. 4-15.									
2. Abstract (copy and paste)	This introductory essay looks back on the two decades since the journal *Public Understanding of Science* was launched. Drawing on the invited commentaries in this special issue, we can see narratives of continuity and change around the practice and politics of public engagement with science. Public engagement would seem to be a necessary but insufficient part of opening up science and its governance. Those of us who have been involved in advocating, conducting and evaluating public engagement practice could be accused of overpromising. If we, as social scientists, are going to continue a normative commitment to the idea of public engagement, we should therefore develop new lines of argument and analysis. Our support for the idea of public engagement needs qualifying, as part of a broader, more ambitious interest in the idea of publicly engaged science.									
3. Main focus (key dimensions according to MoRRI)	RRI / RI	☐	Citizen participation	**X**	Science literacy	☐	Gender equality	☐		
	Open access	☐	R&I governance and ethics	☐	Other	☐				
Comment on 3:										
4. Main perspective (multiple entries possible)	Theoretical, conceptual	☐	Methodological	☐	Policy oriented	☐	Evaluative	☐		
	Other	x	Comment on 4:	Introductory essay, introduction to a special issue in "public understanding of science"						
5. Type of	Scientific	x	Book chapter	☐	Book	☐	Report	☐		

Basic information									**Document no.:** (citavi #)	**#981**
document	article									
	Project deliverable	☐	Policy/ strategy document	☐	Other	☐				
Comment on 5:										
6. System level (if applicable)	Global	☐	European	☐	National	☐	Sub-national	☐		
Comment on 6:										
7.1 Country focus (if applicable, please specify)										
7.2 Country/ies of origin indicated by institutional affiliation of editor(s)/ author(s) (if applicable, please specify)	UK				Comments on 7:					
Data and indicator availability										
8.1 Data, indicators, measurements	Document contains data	☐	If yes, please specify (including page numbers in document)							
Comment on 8.1										
8.2 Reference made to data, indicators measurements in other sources	Document refers to relevant sources	☐	If yes, please list source(s): (URLs, data banks, reports, statistics, etc.)							
Comment on 8.2:										
Guiding questions for review *- please add page numbers where appropriate -*										
9. How is RRI characterized?										

Basic information	**Document no.:** (citavi #)	**#981**
(For literature dealing explicitly with responsible (research) and innovation. If the publication deals with one of the 5 key dimensions, please proceed to 11.)		
9.1 Which definition of RRI is being used? (author's definition or reference to other source)	-	
9.2 Which aspects of RRI receive special emphasis? (e.g., certain normative goals, procedural approaches, reference to one or more of the 5 key dimensions, …)	-	
9.2 Which arguments are presented in support or rejection/criticism of RRI?	-	
9.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to? (e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy, …)	-	

Basic information	**Document no.:** (citavi #)	**#981**
Comments on 9.		
10. Policy context of RRI (For literature dealing explicitly with responsible (research) and innovation. If the publication deals with one of the 5 key dimensions, please proceed to 11.)		
10.1 Which RRI-related developments (international, EU, national, sub-national) are mentioned, how are they characterized and what are they aiming at (strategies, funding initiatives, regulation etc.)?	-	
10.2 Which approaches, instruments are discussed to facilitate the uptake of RRI?	-	
10.3 Which problems, barriers, potential drawbacks for RRI are brining discussed, how could they be addressed?	-	
Comments on 10.		
11. Claims regarding the effects of RRI and / or the key dimension (benefits, costs, disadvantages, trade-offs)		
11.1 What claims are being	In the beginnings of PUS research, the focus was on questions of	

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made?	political legitimacy of S&T and governance questions → Why PE? Meanwhile, the HOW trumps the WHY, and there is insufficient systemic reflection on what all this activity has achieved. There is a growing recognition that too much analysis has focused on the wrong level of experimentation. We need to take a step back and view engagement in its wider political context. The rapid move from doing communication to doing dialogue has obscured an unfinished conversation about the broader meaning of this activity. It is not simply a matter of science providing a microphone as well as a megaphone. The need for institutional reflexivity (Wynne 1993) fundamentally challenges who should be doing engagement and why. RRI can be understood as an attempt to move beyond the pathologising of the public. RRI runs the same risks of instrumentalism that PE has suffered from (Owen et al 2012). (p.8) Referring to Jasanoff, authors argue that we should think of "the public" less as a pre-existing entity and more as a space within which publics selectively form around techno scientific objects and matters of concern. Diversity of civic epistemologies exists. Several contributions in the volume show that attention has to be paid to the political economy and "de facto" governance of science. PE may be a necessary but insufficient part of investigating these dynamics (p.6) Authors have seen at first hand the potential for public engagement to open up (Stirling, 2008) productive and surprising discussions about the politics and purposes of science and have seen institutions take these seriously. But authors have also seen unreflexive public engagement used to close down vital debates in contentious areas. (p.11) Sturgis and Horst both conclude that we overpromised on what PE activities can deliver.	
11.2 Which arguments are used to support the claim(s)?		
11.3 What evidence is presented to support the claims? (e.g., data, indicators, research results, case studies, anecdotal evidence)	Claims are based on literature review, especially the contributions in the same volume of PUS.	

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11.4 According to the author(s), which type of evidence/data is missing to better support the claim? (e.g. data gaps, limitations with regard to analytical levels, lack of indicator specifications etc.)		
Comments on 11.		
12. Key dimensions of RRI (For literature dealing with one or more of the 5 key dimensions.)		
12.1 How is the key dimension defined? (terminology applied, central features/characteristics)		
12.2 Does the document reach beyond one single dimension / are more than one of the key dimensions discussed? If yes, what is the proposed relationship between different dimensions (complementary, contradictory…)?	Science education, open access	
12.3 To which concepts, theories, approaches, schools of thought, communities (scientific or practice) in the area of research and innovation does the literature relate or make reference to? (e.g., STS, constructive TA, anticipatory governance, foresight, deliberative democracy, …)	Short references to several concepts: ELSA, deliberative democracy, TA, governance debates,	
Comments on 12.		
13. Are other important "dimensions" / aspects of RRI discussed, presented which are so far not covered by MoRRI?		

Basic information	**Document no.:** (citavi #)	**#981**
14. Anything else deemed relevant?		
15. General comments and remarks		
16. Relevant sources cited (Please list references to other sources cited in the literature which seem to be highly relevant for MoRRI and/or represent important contributions in the field)	Authors mainly cite the contributions in the special issue it its introducing.	