



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

Analytical report on the dimension of research and innovation ethics

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Sub-task 2.5, analytical report, Deliverable D2.4.2

Executive Summary

This report is one out of a series of six reports, targeting the dimension of research and innovation ethics. It analyses a sample of 10 key texts on ethics and categorises – according to this literature – the institutionalisation of ethics in *ethical governance*, *deliberation* and *reflection*. The report introduces several of the main instruments for the governance, deliberation and reflection of research and innovation ethics and suggests a working definition of ethics from the literature. Moreover, it presents the key claims made in the literature about the impact of ethics. The report suggests a number of meaningful categorisations of engagement in ethics such as formal/informal, types and level of engagement. The report reviews existing empirical knowledge of research and innovation ethics and characterises the selected commission studies STEPE, ProGReSS, GEST, EPOCH, MASIS, INES, Res-AGorA and XENO. It also assesses data availability on research and innovation ethics. The main findings are: In general, most available data relate to context and input; some output indicators are available; there is almost no data on outcome. The main aggregation level of available data is individuals and country. There is little quantitative data available. Much of the data about process quality are incidental findings, which cannot be used for comparative analysis. The report identifies an initial set of 28 indicators which could help to monitor the development of research and innovation ethics in Europe. This set of indicators has to be tested and can be reduced or expanded in the next step of research. Overall, there is a serious data gap in the area of research and innovation ethics, primarily in the area of output and outcome, which should be addressed in Task 3.

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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 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 “research and innovation ethics” (for the sake of brevity also referred to as the ethics 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, which provides a background for the following chapters.

Chapter 3 is concerned with the development of an operational understanding of ethics. The objective is to provide a functional vocabulary of ethics by clarifying important analytical components and definitions of ethics. This chapter includes a specification of the relationship and borderlines between the ethics dimension and the other five dimensions of RRI.

Chapter 4 accounts for existing empirical information on ethics. It is based on a review of selected studies funded by the European Commission, along with a review of evidence from other empirically oriented studies which are considered particularly relevant for the ethics dimension.

In chapter 5, availability of existing data on ethics is assessed. Following the scheme outlined in the MoRRI proposal, this chapter specifically considers the availability of data on ethics 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 report what is done 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, p. 64). In addition, the availability of data is 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.

Chapter 7 provides early thoughts on the development of indicators and metrics for ethics, which will be the objective of Task 3.

Finally, chapter 8 provides an outlet for collecting ideas, notes and thoughts on the design of indicators and in particular with regard to the subsequent analysis of RRI benefits.

2. Results of the literature review research and innovation ethics

This chapter includes a list of literature on ethics selected for review, 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 shortly summarises the main conceptual elements of the targeted dimension, and forms the background for the succeeding chapter about the “functional vocabulary” for the dimension.

2.1 Review of core literature relating to research and innovation ethics

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, and to
- 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.¹ 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 Task 1 and Task 2. Before it was rolled out to the individual reviewers, the template was subject to a pretest.

For the ethics dimension, the following key publications were selected and reviewed:

1. Brom, F. W. A., Chaturvedi, S., Ladikas, M., & Zhang, W. (2015). Institutionalizing Ethical Debates in Science, Technology, and Innovation Policy: A Comparison of Europe, India and China. In M. Ladikas, S. Chaturvedi,

¹ Within the MoRRI project dimension leader are responsible for a coherent approach towards the different dimensions of RRI across all tasks. In contrast tasks leader are responsible for single tasks.

- Y. Zhao & D. Stemerding (Eds.), *Science and Technology Governance and Ethics* (pp. 9–23). Cham/Heidelberg/New York/Dordrecht/London: Springer.
2. Felt, U., Fochler, M., Müller, A., & Strassnig, M. (2009). Unruly ethics: on the difficulties of a bottom-up approach to ethics in the field of genomics. *Public Understanding of Science*, 18(3), 354–371.
 3. Griessler, E., & Littig, B. (2006). Neosokratische Dialoge zu ethischen Fragen der Xenotransplantation. Ein Beitrag zur Bearbeitung ethischer Probleme in partizipativer Technikfolgenabschätzung. In E. Buchinger & U. Felt (Eds.), *Technik- und Wissenschaftssoziologie in Österreich. Stand und Perspektiven. Österreichische Zeitschrift für Soziologie. Sonderheft 8/2006* (pp. 131–157). Wiesbaden: VS Verlag.
 4. Grunwald, A. (2014). Technology Assessment for Responsible Innovation. In J. van den Hoven, N. Doorn, T. Swierstra, B.-J. Koops & H. Romijn (Eds.), *Responsible Innovation I: Innovative solutions for Global Issues* (pp. 15–29). Dordrecht: Springer.
 5. Hedlund, M. (2010). Democratic Expert Influence Through Bioethical Advisory Committees? The Case of PGD Legislation in Sweden. In U. Kristofferseon, J. Schmidte & J. J. Cassiman (Eds.), *Quality Issues in Clinical Genetic Services* (pp. 233–242). Dordrecht: Springer.
 6. Kiran, A. H., Oudshoorn, N., & Verbeek, P.-P. (2015). Beyond checklists: toward an ethical-constructive technology assessment. *Journal of Responsible Innovation*, 2(1), 1–15.
 7. Mali, F., Pustovrh, T., Groboljsek, B., & Coenen, C. (2012). National Ethics Advisory Bodies in the Emerging Landscape of Responsible Research and Innovation. *Nanotechnologies*, 6(3), 167–184.
 8. Sakkas, S. (2014). *Ethical Expertise facing the public regulation of reproductive biomedical issues. Results from a comparative study between the National Ethics Committee in France and Belgium* (unpublished PhD Thesis). Université Catholique de Louvain, Louvain-la-Neuve, Belgium.
 9. Schicktanz, S., Schweda, M., & Wynne, B. (2012). The ethics of 'public understanding of ethics' – why and how bioethics expertise should include public and patients' voices. *Medicine, Health Care and Philosophy*, 15(2), 129–139.
 10. Wilms, H. C. (2014). The Assumption of Scientific Responsibility by Ethical Codes – An European Dilemma of Fundamental Rights. In J. van den Hoven, N. Doorn, T. Swierstra, B.-J. Koops & H. Romijn (Eds.), *Responsible Innovation I: Innovative solutions for Global Issues* (pp. 89–96). Dordrecht: Springer.

The choice of this list of literature is based on the following considerations: Brom et al. (2015) present results from the Commission funded FP 7 GEST Project (Global Ethics in Science Technology) on the institutionalisation of ethics in Europe, India and China. The authors draw useful distinctions on how to delineate the institutionalisation of ethics and how to categorise in

- **ethical governance**, i.e. "institutionalizing ethics debate in terms of the implementation of standards in research ethics in science, technology and innovation policies" (Brom et al., 2015, p. 15);
- **ethical deliberation**, i.e. "institutionalizing ethics debate that raise issues in science and technological developments in science, technology and innovation policies" (ibid.);

- **ethical reflection**, i.e. “institutionalizing ethics debate that support critical reflection and engagement in debates on research standards, emerging technology issues and social justice in science, technology and innovation policies” (ibid.).

The selection of literature covers important contributions to these three categories.

In the area of ethical governance, **ethics commissions** are a major governance instrument, advising e.g. national government on policy-making. The articles of Hedlund (2010), Mali et al. (2012), Schicktanz et al. (2012) and Sakkas (2014) analyse ethics commissions from various angles. Schicktanz et al. (2012) criticise expert-oriented approaches towards ethics from a normative and theoretical perspective. Similarly, Hedlund (2010) is critical of the Swedish national government advisory committee on ethics because it is too expert-dominated and -oriented. Mali et al. (2012) observe a divide within Europe between ethics advisory bodies which engage with the public to different extents and in various ways, and institutions that do not. They also recognise the limited impact of opinions of ethics advisory bodies on policy-making. Sakkas (2014) focuses on the actual impact of national ethics committees on policy-making in Belgium and France and recognises a number of inhibiting and promoting factors.

Another important instrument to govern ethics in science and technology are **ethical codes and soft law**. This topic is covered by a contribution by Wilms (2014), who discusses from a legal perspective whether these kinds of instruments are suitable or in conflict with the fundamental right of freedom of science.

The selected papers also include a number of articles which address the area of ethical deliberation from various perspectives. One important instrument for ethical deliberation is **technology assessment** (TA). Grunwald (2014) identifies TA and engineering ethics as two major roots of responsible research and innovation. Kiran et al. (2015) advocate a particular form of TA, i.e. ethical constructive Technology Assessment (eCTA), in order to address “upstream” questions of science and technology and to include ethical questions as well.

In the same way as Hedlund (2010), Mali et al. (2012) and Schicktanz et al. (2012), Felt et al. (2009) in the area of **ethical reflection** advocate public engagement in deliberating the ethics of science and technology. However, instead on focusing on advisory committees they experimented with a *round table formats* to bring together experts and laypeople in an ethical debate about genomics. Griessler and Littig (2006) argue in the same direction and present results from an experiment using a particular method, the Neo-Socratic Dialogue to systematically discuss ethical problems of science and technology between experts and laypeople.

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 research and innovation ethics

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.

2.2.1 Main definitional elements and functional vocabulary

What is ethics?

The term “ethics” is rarely defined comprehensively in the analysed texts. It seems that most authors assume that the reader already knows what ethics means in the context of research and innovation.

Brom et al. (2015), for example, do not provide a definition of ethics but in another chapter of their volume a definition is given as a “common platform for deliberation and discussion of values in society, that is based on perceptions of right and wrong, is influenced by cultural norms, and aims at informing policy making” (Ladikas et al., 2015, p. 3).

Further exceptions to this lack of definition in the selected documents are Griessler and Littig (2006), and Schicktanz et al. (2012). Both articles draw on the distinction between ethics as a scientific discipline and moral. Griessler and Littig (2006) follow the literature in stating that: “Ethics as a scientific discipline is concerned with normative rules for everybody, which other than moral should be used to evaluate and not to guide actions” (Griessler & Littig, 2006, p. 134; translation by the author). In the same way, Schicktanz et al. (2012) define morality as “a set of rules and values actually guiding individual life and social interaction – and ethics as its normative reflection, justification or critique in view of validity, desirability and legitimacy” (2012: 131).

How is RRI defined?

Most of the reviewed texts are dealing with the dimension of ethics separately and not in the context of RRI. Therefore the selected documents rarely address and define RRI.

Ethical governance ethical deliberation, ethical reflection

As already mentioned, *ethical governance*, *deliberation* and *reflection* are important ways to deal with ethical issues on different levels. They cover questions of governance and compliance, information on decision-making and academic as well as societal thinking.

What are important elements demanded for the governance of ethics in the literature?

Key qualities of ethics in the context of R&I demanded by many authors are process qualities such as:

- openness towards stakeholders and the public,
- public participation (including information, consultation of, and with deliberation public),
- transparency and accountability of processes,
- thematic openness in terms of which questions can be raised,
- systematic argumentation in terms of a priority of arguing over (political) bargaining (this also includes scholarly integrity).

2.2.2 Policy context

Ethics is discussed in different political contexts (global, European, national). Brom et al. (2015) take a global perspective and compare the institutionalisation of ethics in science and technology in Europe, India and China. Mali et al. (2012) take a comprehensive European view and compare ethics advisory boards across Europe. Sakkas (2014) is less broad and compares France and Belgium to identify factors that explain the impact of national ethics committees on policy-making. Hedlund (2010) looks at the national level as well; she describes the role of the bioethical advisory committee in Sweden. Wilms (2015) discusses the role of soft regulation in

responsible research at the European level. These papers concentrate on the role of the state in the institutionalisation of ethics in science and innovation.

Felt et al. (2009) and Griessler and Littig (2006) take a different perspective and focus on experiments on an informal level. In two research projects they analyse the possibilities and limits of engaging experts and laypeople in a symmetrical discussion of the ethics of particular biomedical fields of research.

2.2.3 Most important claims about impacts

Several questions are important to identify the social, democratic and economic impact of the ethics dimension. It has to be made clear on what level to look for impact. Several levels can be delineated. Instruments of ethical deliberation and governance can have an impact on:

1. *Individual level in terms of changes in attitudes and behaviour*, e.g. by codes of conduct (ethical governance; Wilms, 2014) or deliberative events (ethical deliberation; Griessler & Littig, 2006);
2. *Level and quality of public debate*. More inclusive approaches towards debating ethics can transform and broaden the issues discussed (Schicktanz et al., 2012; Felt et al., 2009);
3. *Ethical deliberation and governance can lead to different policies*. Mali et al. (2012) claim that impact of ethical advisory bodies is restricted and – according to Sakkas (2014) – dependent on a number of factors.
4. *Different forms of deliberations on ethics could lead to different research approaches and methods as well as innovation which take into account ethical aspects*.
5. *Economy; the aforementioned levels of impact again might finally lead to new firms, job opportunities and growth*. This effect, however, is not addressed in the studied literature. Only Brom et al. (2015) indicate the strong embeddedness of science, technology and innovation in economic growth and competitiveness in Europe, India and China alike.
6. Furthermore, at all these levels the social, democratic and economic impacts of ethics in science and technology might be addressed. All these levels are interwoven.

2.2.4 Relationships to other key dimensions of RRI

The relationship between key dimensions of RRI that is most often addressed in the selected papers is the one between ethics and participation.

Griessler and Littig (2006), Felt et al. (2009), Heldund (2010) and Schicktanz et al. (2012) advocate public participation in the deliberation of ethics. Mail et al. (2012) call for opening up ethics advisory bodies to the public. Kiran et al. (2015) advocate ethical Constructive Technology Assessment. Wilms (2015) points out because it is not hierarchical, soft regulation would be more easily accepted by stakeholders than hard law.

3. Functional vocabulary of research and innovation ethics – definitions and terminology

Building on the results of the literature review, the purpose of this chapter is to arrive at a functional vocabulary of ethics. The intention of the chapter is to present the definitions and terminology related to ethics that will allow an empirical and practical

approach to the concept of ethics. The functional vocabulary will be the basis for the subsequent exploration of empirical studies and data on ethics. Importantly, this chapter will consider the borderlines and relationship between the ethics dimension and the remaining five dimensions of RRI.

3.1 Working Definition of Ethics

In the context of this report we use the already mentioned working definition: "*Ethics as a scientific discipline is concerned with normative rules for everybody, which other than moral should be used to evaluate action and not to guide actions*" (Griessler & Littig, 2006, p. 134; translation by the author). More tailored to the need in the context of R&I ethics is "*a common platform for deliberation and discussion of values in society, that is based on perceptions of right and wrong, is influenced by cultural norms, and aims at informing policy making*" (Ladikas et al., 2015, p. 3).

3.2 Several Categorisations

The engagement with ethics can be categorised in various ways.

3.2.1 Formalisation of ethical engagement

A first distinction can be drawn by the formalisation of engagement with ethics in R&I:

- *Formal engagement* (e.g. in institutions dealing with the compliance of research integrity; ethics advisory committees; ethics in agenda setting in science, technology and innovation) or
- *Informal engagement* (ad-hoc activities, e.g. research projects).

3.2.2 Types of ethical engagement

Ethics in R&I can be also categorised along different areas:

- *Ethical governance*, which focusses on the "institutionalisation of compliance" and addresses academic integrity and the protection of human subjects and animals in research (Brom et al., 2015, pp. 15ff).
- *Ethical deliberation*: In Europe, this is mainly institutionalised as advisory systems (e.g. ethics advisory bodies); in India and China, ethical deliberation exists as the integration of ethics in agenda setting in science, technology and innovation (ibid., pp. 16ff).
- *Ethical reflection*, i.e. academic and societal discussion of ethical issues (ibid., p. 20).

3.2.3 Level of ethical engagement

Engagement with ethics exists on several levels:

- Individual level (e.g. as attitudes);
- Level of individual organisations (e.g. universities, research funding organisations, corporations);
- On regional, national, European and international level (e.g. ethics advisory committees).

3.2.4 Institutions of ethical engagements

Important institutions in which ethics is deliberated and practiced can be distinguished along the aforementioned categorisation of governance/deliberation/reflection:

Table 3.1. Institutions of ethical engagement according to types

Types of ethical engagement	Institutionalisation
Ethical Governance	<ul style="list-style-type: none"> • Research ethics committees at research performing organisation • Research ethics committees at research funding organisations • Institutions governing academic integrity • Standards, codes, certification, seals of quality
Ethical Deliberation	<ul style="list-style-type: none"> • Ethics Advisory Committees providing advice to governments and parliaments • Mechanisms of priority setting that include ethical considerations • Ethics platforms (e.g. at universities) that promote ethical debate within the organisation • Ethical Technology Assessment
Ethical Reflection	<ul style="list-style-type: none"> • Informal and ad hoc deliberative activities (e.g. social science research projects or participatory TA arrangements) • Academic units dedicated to ethics

4. Review of existing empirical knowledge of research and innovation ethics

In this section, which constitutes the bulk of the report, focus is turned to empirical studies in the area of ethics. It presents the results of Sub-task 2.2 and Sub-task 2.3, which review the state of knowledge regarding the RRI dimensions, including empirical knowledge emerging from EC funded studies on the RRI dimensions. Results specifically for the ethics 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 ethics is reviewed. Second, a selection of other studies that equally hold rich information on ethics is presented schematically. The aim of the review of EC studies is to

1. specify the questions concerning ethics, 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 ethics following the intervention logic model,
4. specify the analytical level of the information, distinguishing between global, national, and sub-national (regional, institutional, programme/project and individual) levels, and to
5. specify whether the studies provide quantitative or qualitative data.

For the extensive list of other relevant empirical studies, the aim is to summarise 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 ethics in Task 3 of the MoRRI project.

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

4.1 Commission studies and projects in the area of research and innovation ethics

A number of commission projects have explored the dimension of research and innovation ethics. For the purpose of this report, six projects are reviewed which are considered particularly relevant for the research and innovation ethics dimension in terms of identifying empirical data for further analysis. These projects are listed in Table 4.1 below.

Table 4.1. Commission studies for review

Proposal Call	Project Acronym	Project Title	Project Start Date	Project End Date	Sources
FP7-SCIENCE-IN-SOCIETY-2007-1	STEPE	Sensitive technologies and European Public Ethics	01-05-2008	31-12-2011	http://cordis.europa.eu/project/rcn/89262_en.html Report: Final Report Summary – STEPE, http://cordis.europa.eu/result/rcn/57707_en.html
FP7-SCIENCE-IN-SOCIETY-2007-1	ETHICS-WEB	Inter-connected European Information and Documentation System for Ethics and Science: European Ethics Documentation Centre	01-06-2008	31-08-2011	http://www.ethicsweb.eu/node/1 Reports: Periodic Report Summary 2 – ETHICSWEB, http://cordis.europa.eu/result/rcn/56501_en.html Periodic Report Summary 1 – ETHICSWEB, http://cordis.europa.eu/result/rcn/45920_en.html Final Report – ETHICSWEB, http://cordis.europa.eu/publication/rcn/15617_en.html
FP7-SCIENCE-IN-SOCIETY-2009-1	EUREC-NET	European Research Ethics Committees' Network	01-03-2011	28-02-2014	http://www.eurecnet.org/index.html Report: Periodic Report Summary 1 – EURECNET, http://cordis.europa.eu/result/rcn/140032_en.html
FP7-SCIENCE-IN-SOCIETY-2013-1	SATORI	Stakeholders Acting Together On the ethical impact assessment of Research and Innovation	01-01-2014	30-09-2017	http://satoriproject.eu/
FP6-2003-SCIENCE AND SOCIETY-4	INES	The Institutionalisation of Ethics in Science Policy; Practices and Impact	01-02-2004	31-08-2007	http://cordis.europa.eu/project/rcn/73926_en.html

FP7-SCIENCE-IN-SOCIETY	EGAIS	The Ethical GovernAnce of emergIng technologieS New Governance Perspectives for Integrating Ethics into Technical Development Projects and Applications	01-05-2009	29-02-2012	http://cordis.europa.eu/project/rcn/91156_en.html Reports: Periodic Report 1 – EGAIS, http://cordis.europa.eu/publication/rcn/10741_en.html Periodic Report Summary 2 – EGAIS, http://cordis.europa.eu/result/rcn/53898_en.html Periodic Report Summary 1 – EGAIS, http://cordis.europa.eu/result/rcn/46390_en.html
FP7-SCIENCE-IN-SOCIETY	ProGReSS	Towards a European normative model for Responsible Research and Innovation globally, using constitutional values as a driver to inform societal desirability	01-02-2013	31-01-2016	http://www.progressproject.eu/ Report: Schroeder, D. et al. (2014). Funder Reports – How innovation is driven towards societal desirability through funding requirements, Report for FP7 Project "Progress", http://www.progressproject.eu/project-deliverables/ Cavallaro, F. et al. (2014). Responsible Research and Innovation and End-Users, Report for FP7 Project "ProGReSS", http://www.progressproject.eu/project-deliverables/
FP7-SCIENCE-IN-SOCIETY-2010-1	GEST	Global Ethics in Science and Technology	01-02-2011	30-04-2014	http://www.uclan.ac.uk/research/explore/projects/global_ethics_science_technology.php http://cordis.europa.eu/project/rcn/96890_en.html Reports: Result in Brief – GEST, http://cordis.europa.eu/result/rcn/90934_en.html Periodic Report Summary – GEST, http://cordis.europa.eu/result/rcn/54533_en.html Book: Ladikas, M. et al. (Eds.). (2015). Science and Technology Governance and Ethics. A Global Perspective from Europe, India and China. Heidelberg: Springer.
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-2010-1	EPOCH	Ethics in Public Policy Making: The Case of Human Enhancement	01-11-2010	31-10-2012	http://cordis.europa.eu/project/rcn/96892_en.html Report: Periodic Report Summary – EPOCH, http://cordis.europa.eu/result/rcn/55321_en.html

STEPE – Sensitive technologies and European Public Ethics

The STEPE project (2008-2011) set out to examine broader public concerns about sensitive technologies in the life sciences, conceptualising it as “public ethics”. An integrated European map of those public ethics based on empirical data was one aim of the project. For that, three research steps were taken:

- Expert interviews with key stakeholders such as policy-makers and advisors, ethicists, NGOs, scientists and journalists were conducted in order to “understand national policy contexts in relation to science and technology policy and society in science” (Gaskell, 2012, p. 4). Those interviews also provided input for updating the questionnaire of the Eurobarometer 2010 (see below).
- The heterogeneity of the interviews was significant across Europe and partly reflects different developmental stages of science and technology as well as democratic processes, but they could help in selecting and framing issues for the Eurobarometer.
- The Eurobarometer 2010 survey on biotechnology and life sciences – based on representative samples of 32 European states – was designed, conducted and analysed focusing especially on sensitive technologies, social values and the public’s view on governance of technological innovation. General patterns and trends concerning different (sensitive) technologies in all European member states were to be identified.
- The survey found that there seems to be a “critical concern with contents” (Gaskell, 2012, p. 2) such as the safety of technologies, their usefulness or the availability of better and more ethical alternatives. There also is a “nuanced view of technology governance” (ibid., p. 2) amongst Europeans pointing towards the wish for a “mixed model” of appropriate regulation of commercialisation of innovation and involvement in decision-making about most sensitive technologies – especially when ethics and social values are at stake.
- Advanced multivariate statistical procedures were employed in analysing the data of the Eurobarometer in order to segment the public and make cross-national comparisons. It was found that the “measurement properties of items on knowledge about science” (Gaskell, 2012, p. 2) vary considerably across countries. Individuals and countries were segmented in order to develop typologies and clusters. Support of embryonic stem cell research – being a sensitive technology – on an individual level was explained by combining personal characteristics and country level factors.
- Additionally, a review of 40 years of biotechnology was given that “traces the emergence of ethical questions, the evolution of public perceptions and of various methods designed to engage the public” (Gaskell, 2012, p. 2).

The STEPE project can provide information about the attitude of Europeans towards different sensitive technologies – see Eurobarometer survey 2010 – and their regulation.

Additionally, information for the dimension “citizen engagement and participation of societal actors in research and innovation” can be found, since the project offers a typology of European citizens according to their expectations and to the reality of their actions in terms of involvement in decision-making processes.

Table 4.2. Examples of research and innovation ethics indicators retrieved from STEPE

Guiding question	Indicator potential	Analytical level (intervention logic model)	Analytical level (aggregation)	Data classification and methods
How did the perception of ethics in science and innovation change amongst the European population?	development	Context	European level	Eurobarometer on life sciences and biotechnology
What are the ethical concerns of Europeans regarding which technologies?	typology	Input	European level National level	Eurobarometer on life sciences and biotechnology
How do the European patent system and the Court of Justice of the EU get to their decisions and which role do ethical considerations play in that?	processes	Input	National level European level	Patent decisions CJEU's decisions Desk research

ProGReSS – Towards a European normative model for Responsible Research and Innovation globally, using constitutional values as a driver to inform societal desirability

ProGReSS (2013-2016) aims to “establish a global network on responsible research and innovation (RRI) involving academia, SMEs, international organisations, policy advisors, research funders, NGOs and industry” (ProGReSS, 2016). Through stakeholder inclusion and –dialogue, the project stipulates the following objectives:

1. “Link existing international networks of RRI with relevant societal actors on a global scale to focus innovation on societal desirability.
2. Complete a major fact-finding mission comparing science funding strategies and innovation policies in Europe, the US, China, Japan, India, Australia, and South Africa.
3. Advocate a European normative model for RRI globally, using constitutional values as a driver to inform societal desirability.
4. Develop a strategy for fostering the convergence of regional innovation systems at the global level.” (ProGReSS, 2016)

ProGReSS is still in a phase of implementation and no final deliverables have so far been produced, including the European normative model for RRI. Of the data available, a global analysis of how ethical matters are taken into account in state and private funding bodies (see Table 4.5) could prove of interest for subsequent indicator design. This analysis includes all RRI dimensions and could therefore also be relevant across dimensions. Furthermore, the ProGReSS report produced on RRI and end-user involvement in terms of marginalised groups (Cavallaro et al., 2014) provides an interesting perspective on inclusive innovation vis-à-vis effective practices (see

Table 4.3).

Table 4.3. Examples of research and innovation ethics indicators retrieved from ProGRESS

Guiding question	Indicator potential	Analytical level (intervention logic model)	Analytical level (aggregation)	Data classification and methods
In what way are ethical issues taken into account in state and private funding bodies in order to achieve societal Desirability? Which funding strategies can be identified?	<ul style="list-style-type: none"> • Typology • Ethical categories 	Input	National level (10 countries across the world)	Analysis include all RRI dimensions 3 cases studies (synthetic biology, information and communication technology (ICT), nanotechnologies)
In what way can inclusive innovation be made possible through the engagement of end-users as innovators?	<ul style="list-style-type: none"> • Best practises • Typology 	Input	National level	2 case studies (from India and South Africa)

GEST – Global Ethics in Science and Technology

The GEST project was carried out in the time span of 2011 to 2014. As a point of departure, the GEST project wanted to explore S&T policies and debates at a global level as well as the role of ethics in such policy-making processes. From a European perspective, S&T policy and S&T sector developments are increasingly taking part in collaboration and competition with the two main global economies of China and India, consequently calling for improved understanding of regional differences in terms of “[e]thical and social implications of S&T” (Ladikas, 2013).

Against this backdrop, “the main objective of GEST was to analyse the concepts and issues surrounding ethics in S&T in Europe and the two main technology-intensive emerging economies of China and India in order to create a robust debate that would directly inform science policy” (Ladikas, 2013). GEST intended to:

1. “explore the state of the art in the debates on ethics in S&T in the three regions with a focus on interdependent scientific developments in the areas of nanotechnologies, food technologies and synthetic biology
2. explore the social determinants of policymaking in the three regions in terms of public perceptions of risks and benefits, and lay morality
3. identify common approaches to ethics analysis that could be applied equally in all three regions
4. promote and support a global debate on the issue of the ethical and social implications of scientific and technological developments with a view to informing national policies
5. create a high level policy advisory network of experts from Europe, China and India in order to promote concrete collaboration in the area amongst the three regions.” (Ladikas, 2013)

The work carried out in the GEST project could be informative for the subsequent indicator design process within the ethics dimension in several ways. In general, the comparative analysis of the current role of ethics in S&T policy debates in Europe, China and India provide relevant contextual knowledge of the characteristics of such debates at a global level. The effort to devise and conceptualise a common framework regarding S&T policy in a global ethics perspective could also provide relevant

knowledge as to the development of general policy guidelines/indicators. Furthermore, the project's specific focus on examining public involvement in policy-making processes across the three regions provides fertile ground for exploring the intersection of the ethics vis-à-vis public engagement dimension.

Table 4.4. Examples of research and innovation ethics indicators retrieved from GEST

Guiding question	Indicator potential	Analytical level (intervention logic model)	Analytical level (aggregation)	Data classification and methods
What is the current role of ethics in S&T policy debates in Europe, China and India?	<ul style="list-style-type: none"> • Topic of debates • Typology - global dynamics of ethics and its role in S&T policies 	Context	Global level	Comparative analysis (Qualitative case studies on nanotechnologies, food technologies and synthetic biology)
Which public perceptions of the risks and benefits of science and the value systems that guide decisions can be identified? How do citizens participate in S&T policy-making?	<ul style="list-style-type: none"> • Attitudes • Typology of Public Engagement (PE) 	Input	Global level	Desk research (existing surveys, etc.)
How can a common methodology/analytical framework for analysing S&T ethics be devised that could set a global standard?	<ul style="list-style-type: none"> • Guidelines 	Output	Global level	Desk research Comparative analysis Discourse analysis

EPOCH – Ethics in Public Policy Making: The Case of Human Enhancement

The EPOCH project (2010-2012) had the objective to explore the role of ethics and ethical expertise in the governance and policies of science and technology, focusing on human enhancement as an example of emerging technologies. Recent tendencies in the governance of ethically controversial issues in science and technology were analysed from a comparative, multidisciplinary and comprehensive perspective.

The multinational project consortium conducted desk research and online surveys, held workshops and a final conference in order to develop a practical guidance and strategic recommendations for “political and societal handling of normative issues of technological and biotechnological innovations” (Boyle, 2014). The project produced several reports about ethics and governance of science and technology, human enhancement and European policymaking, and challenges to regulatory and legal frameworks. Additionally there were other project outcomes such as publications and oral presentations.

The main objectives were:

- “To provide sophisticated, practically relevant, insight into the relationship between normative issues, ethical expertise and science and technology policy making; and
- To develop a framework informed by multi-disciplinary perspectives, that can guide EU policy development in relation to a variety of issues concerning the use of science and technology for the purpose of human enhancement.” (Boyle, 2014)

EPOCH can provide information about ethical advisory bodies, ideas and guidelines on how to govern science and technologies and include the public in the process. Its focus on human enhancement as an example limits some of the findings to this subject, but can still give insight into how an emerging technology is being governed. One report deals with participatory approaches of science and technology governance and could provide indicators for the dimension “citizen engagement and participation of societal actors in research and innovation”.

Table 4.5. Examples of research and innovation ethics indicators retrieved from EPOCH

Guiding question	Indicator potential	Analytical level (intervention logic model)	Analytical level (aggregation)	Data classification and methods
What type of ethical expertise is needed for the development of public policies on ethics?	Typology	Input	Global level	Qualitative data Desk research
How should/can this expertise be included in the governance of new technologies?	Guidelines Best practice model	Output	National level EU level Global level	Qualitative data Desk research
How do ethical advisory bodies arrive at policy recommendations? Which models of functioning exist?	Typology Processes	Input	National level Board level	Qualitative data Desk research
What should be the role of ethics in anticipatory and participatory governance of science and technologies?	Guidelines	Output	Global level	Qualitative data Desk research

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

The objective of MASIS (2010-2012) was to monitor and analyse science in society (SiS) activities and trends, including research, policies, and communication efforts with regards to SiS, in 27 EU and 11 associated countries. To this end, the project set up a network of national expert correspondents and a website including a database. Data on national SiS activities was collected over a period of 21 months. 37 national reports were produced and repeatedly updated. Results and data were presented on an interactive website. The final synthesis report presents a comparison and categorisation.²

The MASIS reports revolve around four central topics:

1. National debates around SiS relationship, trajectories, and policies.
2. Ways of national priority setting, governance, and utilising science in policy-making (formal and informal processes, involved actors).
3. Research on SiS issues and funding structures for such research activities.
4. SiS activities, especially public science communication activities.

² As of March 2015, the website and database are not online anymore, but the MASIS reports are still available from a database produced by a succeeding EC-FP7 project dealing with RRI (<https://rritrends.res-agera.eu/>). Besides a synthesis report and a series of academic papers (including a special issue in *Science and Public Policy*), 37 national reports have been produced by the MASIS project consortium.

Furthermore, the national responses (debate, policies, etc.) to the Fukushima accident were used as cases to illustrate the respective national role of science in relation to other societal issues.

As the analytical report on the dimension of citizen engagement and participation shows, the MASIS results provide a rich knowledge repository for further analysis and indicator development. It provides several models or typologies to capture and categorise SiS issues including public participation or the use of scientific knowledge in (political) decision-making processes, research funding for and research on SiS issues, and public science communication.

With regards to the dimension of ethics, MASIS provides insight into if and how ethical aspects of science and technology are considered in different areas, including public debates, S&T priority setting, S&T governance, research evaluation, and science communication. This includes typologies as well as information on the distribution of such measures across the countries analysed. Thus, the MASIS report could be useful providing context information about a large number of European countries and in identifying actors, institutions, and topics that.

Table 4.6. Examples of research and innovation ethics indicators retrieved from MASIS

Guiding question	Indicator potential	Analytical level (intervention logic model)	Analytical level (aggregation)	Data classification and methods
Are ethical aspects of science and technology considered in public debates? What aspects are considered?	Yes/No; Topics of debates	Context	National level (27 EU and 11 associated countries reports)	Qualitative data Desk research
Are actors involved in priority setting and governance of science and technology that introduce ethical considerations into the decision-making process?	Yes/No; Types of actors concerned with ethics	Input	National level	Qualitative data Desk research
Do research projects exist that deal with ethical aspects of science and technology?	Yes/No; Research topics with regards to ethics	Input	National level Program level	Qualitative data Desk research
Are ethics considered in research evaluation? In which S&T areas?	Yes/No; Typology of different approaches	Input	National level Program level	Qualitative data Desk research
How are ethical issues considered in science communication?	Typology of science communication cultures	Input	National level	Qualitative data Desk research

INES – The Institutionalisation of Ethics in Science Policy; Practices and Impact

The INES project (2004-2007) made an effort to analyse and compare different institutional arrangements to incorporate ethics into policy-making. In that, the researchers identified possible gender issues, best practices regarding the incorporation of ethics into decision-making, and ways to assess the impact of ethics in decision-making processes. The results of each work package were discussed with external experts in thematic workshops.

One focus of the project was on the aspect of framing: the institutionalisation of ethics in science and technology policy and best practices were examined using frame analysis. The project looked at how in historical processes, institutions, and best practices the incorporation of ethics in science and technology policies has been framed. Furthermore, the outcomes of different attempts to integrate ethical considerations into decision-making processes were assessed.

Within the project three case studies were conducted on ethics in medical genetics (pre-employment genetic screening), in food technologies (GMOs), and in forensic genetics (forensic databases).

A result of INES that might be of use for the development of ethics indicators for MoRRI could be their template to assess the framings of best practices and the impacts of these framings. Furthermore, they provide another template to evaluate different institutional approaches vis-à-vis ideal categories (representation, deliberation, efficacy of output, etc.).

Table 4.7. Examples of research and innovation ethics indicators retrieved from INES

Guiding question	Indicator potential	Analytical level (intervention logic model)	Analytical level (aggregation)	Data classification and methods
How do institutions frame the incorporation of ethical considerations in policy-making?	Topics/ Framings; Assessment template	Input	-	Qualitative Data Desk research
Are institutions and best practices complying with ethical ideals (representation, deliberation, permeability, etc.)	Ethics categories; Assessment template	Input	-	Qualitative Data Desk research

4.2 Other empirical studies on the dimension of research and innovation ethics

In addition to the already mentioned EC funded studies identified and reviewed above, a number of other studies offer relevant empirical information on issues related to ethics in research and innovation contexts. In

Table 4.8, three 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 4.8. Main empirical studies on the dimension of research and ethics innovation – for review

Source	Type of source	Analytical level (aggregation)	Key focus
Res-AGoRA	Empirical Study	National level	Non-compulsory research ethics committees at 8 Austrian universities
Res-AGoRA	Empirical study	Single case study	Interdisciplinary collaboration between ethicists and natural scientists
Res-AGoRA (Monitoring Developments and Trends in RRI)	Empirical study	Comparative country case studies	Interdisciplinary collaboration between ethicists and natural scientists
XENO	Empirical study	Single case study	Systematic group discussion between experts and laypeople on the ethics of xenotransplantation

Within **Res-AGoRA**, several cases were of interest for the project:

- First, a comprehensive case study on non-compulsory research ethics committees at eight Austrian Universities has been carried out. The sample includes the universities of Graz, Salzburg, Innsbruck, Vienna, Danube University Krems, Technical University Graz, University of Veterinary Medicine and the University of Natural Resources and Life Sciences. The case study is based on interviews with chair people and focuses on experiences with the establishment of the committees, evaluation processes, furthering and hampering factors and experiences with the newly established committees (www.res-agora.eu).
- Another case study within the Res-AGoRA project dealt with the experiences of interdisciplinary cooperation between natural scientists and ethicists as well as theologians in a bench to bedside project aiming for the clinical application of xenotransplantation.
- RRI Trends is a web application for monitoring and visualising data and information on Responsible Research and Innovation (RRI) in 16 European countries. MoRRI is part of the Res-AGoRA project and provides the opportunity to create custom-made reports on RRI activities in Europe. MoRRI monitors trends and developments in RRI in three waves. The first wave addressed the following questions: What characterises national policies towards RRI in the specific country? What are the most prominent dimensions of RRI that materialise in these documents? Which aspects of RRI are addressed? What major mechanisms exist to support national goals with regards to RRI? The second wave of monitoring focusses on research performing organisations (universities and private companies) as well as on research funding organisations (public and private). The third wave addressed civil society organisations.

Another empirical case originates from the XENO project (www.ihs.ac.at/departments/soc/xeno-pta/project_abst.html) and dealt with a systematic debate of the ethics of xenotransplantation in the early 2000s. The project experimented with the Neo-Socratic Dialogue, a group method to systematically discuss ethical problems. The focus of the study was to find out whether such a group method would be an appropriate instrument for debating ethical problems of science and technology between experts and laypeople (<https://www.ihs.ac.at/departments/soc/xeno-pta/final.pdf>).

Res-AGoRA case studies on xenotransplantation and non-compulsory ethics committees at universities could provide input indicators about the institutionalisation of ethical governance, deliberation and reflection as well as on process quality.

Table 4.9. Examples of research and innovation ethics indicators retrieved from Res-AGorA (MoRRI and Case Studies)

Guiding question	Indicator potential	Analytical level (intervention logic model)	Analytical level (aggregation)	Data classification and methods
Which infrastructures for engagement with ethics exist?	Ethical infrastructure	Input	Local level National level	Quantitative data
What is the impact of ethical infrastructure?	Could address the impact of different ethical infrastructure on various levels	Output	Local level National level	Qualitative data

5. Assessment of data availability on research and innovation ethics

Based on the review and presentation of empirical studies on ethics above, this chapter provides an overall assessment of data availability on ethics 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 ethics 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 ethics as defined in operational terms, (2) the balance and availability of quantitative and qualitative data respectively, (3) the extent to which available information addresses the four analytical levels specified in the intervention logic model, and (4) the availability of data at different levels of aggregation.

The main findings according data availability are:

- In general, most available data relates to context and input; some output indicators are available; there is almost no data on outcome.
- The main aggregation level of available data is individual and country.
- With the exception of attitudes of European citizen towards certain areas of R&I there is little quantitative data.
- Much of the data about process quality (see ideas bank in chapter 8) are incidental findings, which cannot be used for comparative analysis.

Data on ethical governance, deliberation and reflection is available from the following projects: MASIS, EPOCH and Res-AGorA. These projects cover research ethics committees, ethics advisory bodies, bodies responsible for the governance of academic integrity, ethics platforms, ethical TA and research projects dealing with ethics in R&I. Additional information can be expected from the ongoing projects PACITA and SATORI.

STEPE provides information about public attitudes towards ethically contested research areas such as GM food, nanotechnology, animal cloning, research involving human embryos, regenerative medicine and synthetic biology as well as public attitudes towards decision-making in R&I policy. Furthermore, it provides data on the questions on what basis decisions should be made and whether ethics should prevail over science. This data is about individual attitudes can be aggregated.

MASIS provides qualitative data about institutional infrastructure on county level and allows for European comparison.

The EPOCH project provides quantitative and qualitative data on the existence, set-up, operation and public engagement activities of European Ethics Advisory Bodies (EAB). There is quantitative data available from EPOCH and it provides information about context, input, output and outcome of EABs.

The work package “Monitoring Trends and Developments in Responsible Research and Innovation” within the Res-AgorA project (<http://rritrends.res-agera.eu/>) provides general information on RRI in 16 countries in research performing (public and private) and research funding (public and private) organisations. The sample includes Austria, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Lithuania, Netherlands, Poland, Spain, and the UK. It also covers qualitative data on the institutionalisation of ethics in the selected countries. There is qualitative data about input. This data is available on national and European level.

SATORI might deliver information about ethics committees and ethics assessment in member states of the European Union. Qualitative data on national and European level can be expected.

There is almost no quantitative data available on the level of outcomes (except for France and Belgium (Sakkas, 2014)). This data is available on institutional and national level.

5.1 Data availability across research and innovation ethics categories

Table 5.1. Possible indicators from literature review

Guiding question	Indicator potential	Analytical level (intervention logic model)	Analytical level (aggregation)	Data classification and methods
What is the public attitude towards ethics and science?	Indicates whether ethics and science are considered more important.	Context/output?	Individual	Quantitative data Survey

Guiding question	Indicator potential	Analytical level (intervention logic model)	Analytical level (aggregation)	Data classification and methods
What are ethical attitudes towards different areas of R&I?	Indicates ethical attitudes towards different areas of R&I (GMO food, nano-technology, animal cloning, research involving human embryos, mixing human and animal genes, regenerative medicine, synthetic biology).	Context/output?	Individual	Quantitative data Survey
Delegation or democracy in decision-making about synthetic biology	This indicator taps into public perceptions of decision-making in relation to animal cloning, targeting specifically the weight of expert-based and democratic principles respectively in decision-making.	Context	Individual level	Quantitative data Survey
Scientific or moral decision-making regarding animal cloning	This indicator taps into public perceptions of decision-making in relation to animal cloning, targeting specifically the weight of scientific and moral/ethical issues respectively in decision-making.	Context	Individual level	Quantitative data Survey

Guiding question	Indicator potential	Analytical level (intervention logic model)	Analytical level (aggregation)	Data classification and methods
Which institutions exist for governance/deliberation and reflection of ethics in R&I (Brom et al., 2015)?	Indicates existence or lack of institutions.	Input	National level	Qualitative data Desk research
How deeply and in what way is the public involved in these institutions (Brom et al., 2015; Mali et al., 2012; Kiran et al., 2015)?	Indicates process quality. Public involvement could increase validity and legitimacy.	Input	Institutional level National level	Qualitative data Desk research
Are results published (Mali et al., 2012)?	Indicates process quality. (link to public engagement)	Output	Institutional level National level	Qualitative data Desk research
What is the output of ethics advisory bodies (Sakkas, 2014)?	Number of opinions produced indicates at the activity of an organisation.	Output	Institutional level National level	Quantitative data Desk research (websites)

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

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 on the list of promising indicators constructed in chapter 7.

The summary Table 6.1 below, capturing the contents of chapter 7, serves as a basis for assessing the potential to develop new indicators based on existing empirical material.

Table 6.1. Summary table capturing the contents of chapter 7

INDICATOR	ANALYTICAL MODEL (Logic model)		ANALYTICAL LEVEL (aggregation)		UNIT OF ANALYSIS		NUMBER OF OBSERVATIONS	TIME SERIES		YEAR OF DATA, MOST RECENT
	CONTEXT INPUT OUTPUT OUTCOME	(1) (2) (3) (4)	GLOBAL NATIONAL REGIONAL INSTITUTIONAL PROGRAMME/ PROJECT INDIVIDUAL	(1) (2) (3) (4) (5) (6)	COUNTRIES INSTITUTIONS INDIVIDUALS PUBLICATIONS OTHER (PLEASE SPECIFY)	(1) (2) (3) (4) (5)		Y N	(1) (2)	
Ethics 1	3		2		1		33	2		2010
Ethics 2	1		6		3		32.000	2		2010
Ethics 3	1		6		3		32.000	2		2010
Ethics 4	1		6		3		32.000	2		2010
Ethics 5	1		6		3		32.000	2		2010
Ethics 6	1		6		3		32.000	2		2010
Ethics 7	1		6		3		32.000	2		2010
Ethics 8	1		6		3		32.000	2		2010
Ethics 9	1		6		3		32.000	2		2010
Ethics 10	1		6		3		32.000	2		2010
Ethics 11	1		6		3		32.000	2		2010
Ethics 12	1		6		3		32.000	2		2010
Ethics 13	1		6		3		32.000	2		2010
Ethics 14	1		6		3		32.000	2		2010
Ethics 15	1		6		3		32.000	2		2010
Ethics 16	1		6		3		32.000	2		2010
Ethics 17	1		6		3		32.000	2		2010
Ethics 18	1		6		3		32.000	2		2010
Ethics 19	1		6		3		32.000	2		2010
Ethics 20	1		6		3		32.000	2		2010
Ethics 21	1		6		3		32.000	2		2010
Ethics 22	1		6		3		32.000	2		2010
Ethics 23	2		4		2		32	2		2015
Ethics 24	2		4		2		32	2		2015
Ethics 25	2		4		2		32	2		2015
Ethics 26	2		2		1		32	2		2011
Ethics 27	3		2		1		32	2		2011
Ethics 28	3		2		1		23	1		2015

7. Early thoughts on research and innovation ethics indicators

This chapter provides a space for compiling promising indicators based on existing empirical information identified throughout the report. The intention is to prepare the ground for Task 3, in which the selection of existing indicators and the development of new ones will take place.

Table 7.1. Potential indicator for Ethics, no. 1

Information Item	Ethics 1
Name of indicator	A typology of public ethics
Brief description	This indicator is a composite measure building on the following parameters: 1) the percentage of respondents who think that in a disagreement between science and ethics in the context of regenerative medicine, the ethical view should prevail (ethics over science or science over ethics), 2) for GM food, nanotechnology and animal cloning, the average level of concern about distributional fairness – whether “it will benefit some people but put others at risk” and whether “it will help people in developing nations”, which is referred to as distributional fairness, 3) the percentage of respondents who would want to know about the moral and ethical issues involved in synthetic biology if they were deciding how to vote in a referendum, which is referred to as interest in ethics, 4) the percentage of respondents who think that the governance of science, in relation to synthetic biology, and separately, animal cloning, should be based on moral and ethical considerations rather than scientific evidence (moral governance versus scientific governance). The typology is based on the Eurobarometer on biotechnology in 2010, and divides 33 countries into 5 clusters.
Analytical level (logic model)	Output
Analytical level (aggregation)	Country level (aggregated from individual level data)
Qualitative/Quantitative	Quantitative
Source of data	EB 73.1, typology developed in the STEPE project
Date	2010
Time series	No
Measurement level	Nominal
Unit of analysis	Countries
Coverage	33 European countries
Attributes	<ul style="list-style-type: none"> Cluster 1: interest in ethics/science first Cluster 2: Distributional fairness/science first Cluster 3: Science first/low to moderate interest in ethical issues Cluster 4: Distributional fairness/science second Cluster 5: Moral governance/science second

Table 7.2. Data presentation Ethics, no. 1

Cluster	Countries	Profile	Sensitivities and place of science
1	Belgium, Czech Republic, Estonia, France, Slovakia, Sweden, UK	<ul style="list-style-type: none"> • Low concern about distributional fairness • Balanced on governance of science • Moderate interest in ethics • Science over ethics 	Interest in ethics Science 1st
2	Croatia, Finland, Latvia, Luxembourg, Norway, Poland, Portugal, Turkey	<ul style="list-style-type: none"> • Moderate concern about distributional fairness • Balanced on governance of science • Low interest in ethics • Science over ethics 	Distributional fairness Science 1st
3	Hungary, Italy, Lithuania, Romania, Spain	<ul style="list-style-type: none"> • Moderate concern about distributional fairness • Scientific governance • Low interest in ethics • Science over ethics 	Science 1st Low to moderate interest in ethical issues
4	Austria, Bulgaria, Cyprus, Germany, Greece, Slovenia, Switzerland	<ul style="list-style-type: none"> • High concern about distributional fairness • High support for moral governance • Moderate interest in ethics • Ethics over science 	Distributional fairness Science 2nd
5	Denmark, Iceland, Ireland, Netherlands, Malta	<ul style="list-style-type: none"> • Low fairness concerns, particularly for GM food • Moral governance • High interest in ethics • Ethics over science 	Moral governance Science 2nd

Table 7.3. Potential indicator for Ethics, no. 2

Information Item	Ethics 2
Name of indicator	Ethics over science
Brief description	This indicator taps into the relative importance of ethical concerns vis-à-vis scientific evidence. It is based on Eurobarometer data collection, and the specific item reads: "should ethical and scientific viewpoints on regenerative medicine differ, the scientific viewpoint should prevail".
Analytical level (logic model)	Context/output?
Analytical level (aggregation)	Individual level data (could be aggregated)
Qualitative/Quantitative	Quantitative
Source of data	EB 73.1
Date	2010
Time series	No
Measurement level	Ordinal
Unit of analysis	Individual citizens
Coverage	Around 32.000 citizens across 33 countries
Attributes	<ul style="list-style-type: none"> • Totally agree • Tend to agree • Tend to disagree • Totally disagree • Don't know

Table 7.4. Potential indicator for Ethics, no. 3

Information Item	Ethics 3
Name of indicator	GM Food helps people in developing countries
Brief description	This indicator taps into public perceptions of ethics in relation to GM foods. It is based on Eurobarometer data collection, and the specific item reads: "GM food helps people in developing countries".
Analytical level (logic model)	Context
Analytical level (aggregation)	Individual level data (could be aggregated)
Qualitative/Quantitative	Quantitative
Source of data	EB 73.1
Date	2010
Time series	No
Measurement level	Ordinal
Unit of analysis	Individual citizens
Coverage	Around 32.000 citizens across 33 countries
Attributes	<ul style="list-style-type: none"> • Totally agree • Tend to agree • Tend to disagree • Totally disagree • Don't know

Table 7.5. Potential indicator for Ethics, no. 4

Information Item	Ethics 4
Name of indicator	GM Food benefits some people but puts others at risk
Brief description	This indicator taps into public perceptions of ethics in relation to GM foods. It is based on Eurobarometer data collection, and the specific item reads: "GM food benefits some people but puts others at risk".
Analytical level (logic model)	Context
Analytical level (aggregation)	Individual level data (could be aggregated)
Qualitative/Quantitative	Quantitative
Source of data	EB 73.1
Date	2010
Time series	No
Measurement level	Ordinal
Unit of analysis	Individual citizens
Coverage	Around 32.000 citizens across 33 countries
Attributes	<ul style="list-style-type: none"> • Totally agree • Tend to agree • Tend to disagree • Totally disagree • Don't know

Table 7.6. Potential indicator for Ethics, no. 5

Information Item	Ethics 5
Name of indicator	GM Food is fundamentally unnatural
Brief description	This indicator taps into public perceptions of ethics in relation to GM foods. It is based on Eurobarometer data collection, and the specific item reads: "GM food is fundamentally unnatural".
Analytical level (logic model)	Context
Analytical level (aggregation)	Individual level data (could be aggregated)
Qualitative/Quantitative	Quantitative
Source of data	EB 73.1
Date	2010
Time series	No
Measurement level	Ordinal
Unit of analysis	Individual citizens
Coverage	Around 32.000 citizens across 33 countries
Attributes	<ul style="list-style-type: none"> • Totally agree • Tend to agree • Tend to disagree • Totally disagree • Don't know

Table 7.7. Potential indicator for Ethics, no. 6

Information Item	Ethics 6
Name of indicator	Nanotechnology helps people in developing countries
Brief description	This indicator taps into public perceptions of ethics in relation to nanotechnology. It is based on Eurobarometer data collection, and the specific item reads: "Nanotechnology helps people in developing countries".
Analytical level (logic model)	Context
Analytical level (aggregation)	Individual level data (could be aggregated)
Qualitative/Quantitative	Quantitative
Source of data	EB 73.1
Date	2010
Time series	No
Measurement level	Ordinal
Unit of analysis	Individual citizens
Coverage	Around 32.000 citizens across 33 countries
Attributes	<ul style="list-style-type: none"> • Totally agree • Tend to agree • Tend to disagree • Totally disagree • Don't know

Table 7.8. Potential indicator for Ethics, no. 7

Information Item	Ethics 7
Name of indicator	Nanotechnology benefits some people but puts others at risk
Brief description	This indicator taps into public perceptions of ethics in relation to nanotechnology. It is based on Eurobarometer data collection, and the specific item reads: "nanotechnology benefits some people but puts others at risk".
Analytical level (logic model)	Context
Analytical level (aggregation)	Individual level data (could be aggregated)
Qualitative/ Quantitative	Quantitative
Source of data	EB 73.1
Date	2010
Time series	No
Measurement level	Ordinal
Unit of analysis	Individual citizens
Coverage	Around 32.000 citizens across 33 countries
Attributes	<ul style="list-style-type: none"> • Totally agree • Tend to agree • Tend to disagree • Totally disagree • Don't know

Table 7.9. Potential indicator for Ethics, no. 8

Information Item	Ethics 8
Name of indicator	Nanotechnology is fundamentally unnatural
Brief description	This indicator taps into public perceptions of ethics in relation to nanotechnology. It is based on Eurobarometer data collection, and the specific item reads: "nanotechnology is fundamentally unnatural".
Analytical level (logic model)	Context
Analytical level (aggregation)	Individual level data (could be aggregated)
Qualitative/ Quantitative	Quantitative
Source of data	EB 73.1
Date	2010
Time series	No
Measurement level	Ordinal
Unit of analysis	Individual citizens
Coverage	Around 32.000 citizens across 33 countries
Attributes	<ul style="list-style-type: none"> • Totally agree • Tend to agree • Tend to disagree • Totally disagree • Don't know

Table 7.10. Potential indicator for Ethics, no. 9

Information Item	Ethics 9
Name of indicator	Animal cloning in food production helps people in developing countries
Brief description	This indicator taps into public perceptions of ethics in relation to animal cloning for food production. It is based on Eurobarometer data collection, and the specific item reads: "Animal cloning for food production helps people in developing countries".
Analytical level (logic model)	Context
Analytical level (aggregation)	Individual level data (could be aggregated)
Qualitative/Quantitative	Quantitative
Source of data	EB 73.1
Date	2010
Time series	No
Measurement level	Ordinal
Unit of analysis	Individual citizens
Coverage	Around 32.000 citizens across 33 countries
Attributes	<ul style="list-style-type: none"> • Totally agree • Tend to agree • Tend to disagree • Totally disagree • Don't know

Table 7.11. Potential indicator for Ethics, no. 10

Information Item	Ethics 10
Name of indicator	Animal cloning in food production benefits some people but puts others at risk
Brief description	This indicator taps into public perceptions of ethics in relation to animal cloning for food production. It is based on Eurobarometer data collection, and the specific item reads: "Animal cloning for food production benefits some people but puts others at risk".
Analytical level (logic model)	Context
Analytical level (aggregation)	Individual level data (could be aggregated)
Qualitative/Quantitative	Quantitative
Source of data	EB 73.1
Date	2010
Time series	No
Measurement level	Ordinal
Unit of analysis	Individual citizens
Coverage	Around 32.000 citizens across 33 countries
Attributes	<ul style="list-style-type: none"> • Totally agree • Tend to agree • Tend to disagree • Totally disagree • Don't know

Table 7.12. Potential indicator for Ethics, no. 11

Information Item	Ethics 11
Name of indicator	Animal cloning in food production is fundamentally unnatural
Brief description	This indicator taps into public perceptions of ethics in relation to animal cloning for food production. It is based on Eurobarometer data collection, and the specific item reads: "Animal cloning for food production is fundamentally unnatural".
Analytical level (logic model)	Context
Analytical level (aggregation)	Individual level data (could be aggregated)
Qualitative/Quantitative	Quantitative
Source of data	EB 73.1
Date	2010
Time series	No
Measurement level	Ordinal
Unit of analysis	Individual citizens
Coverage	Around 32.000 citizens across 33 countries
Attributes	<ul style="list-style-type: none"> • Totally agree • Tend to agree • Tend to disagree • Totally disagree • Don't know

Table 7.13. Potential indicator for Ethics, no. 12

Information Item	Ethics 12
Name of indicator	Research involving human embryos should be forbidden
Brief description	This indicator taps into public perceptions of ethics in relation to regenerative medicine. It is based on Eurobarometer data collection, and the specific item reads: "Research involving human embryos should be forbidden, even if this means that possible treatments are not made available to ill people".
Analytical level (logic model)	Context
Analytical level (aggregation)	Individual level data (could be aggregated)
Qualitative/Quantitative	Quantitative
Source of data	EB 73.1
Date	2010
Time series	No
Measurement level	Ordinal
Unit of analysis	Individual citizens
Coverage	Around 32.000 citizens across 33 countries
Attributes	<ul style="list-style-type: none"> • Totally agree • Tend to agree • Tend to disagree • Totally disagree • Don't know

Table 7.14. Potential indicator for Ethics, no. 13

Information Item	Ethics 13
Name of indicator	Ethically wrong to use human embryos in research
Brief description	This indicator taps into public perceptions of ethics in relation to regenerative medicine. It is based on Eurobarometer data collection, and the specific item reads: "It is ethically wrong to use human embryos in medical research even if it might offer promising new medical treatments".
Analytical level (logic model)	Context
Analytical level (aggregation)	Individual level data (could be aggregated)
Qualitative/Quantitative	Quantitative
Source of data	EB 73.1
Date	2010
Time series	No
Measurement level	Ordinal
Unit of analysis	Individual citizens
Coverage	Around 32.000 citizens across 33 countries
Attributes	<ul style="list-style-type: none"> • Totally agree • Tend to agree • Tend to disagree • Totally disagree • Don't know

Table 7.15. Potential indicator for Ethics, no. 14

Information Item	Ethics 14
Name of indicator	Research involving human embryos should be allowed
Brief description	This indicator taps into public perceptions of ethics in relation to regenerative medicine. It is based on Eurobarometer data collection, and the specific item reads: "We have a duty to allow research that might lead to important new treatments, even when it involves the creation or use of human embryos".
Analytical level (logic model)	Context
Analytical level (aggregation)	Individual level data (could be aggregated)
Qualitative/Quantitative	Quantitative
Source of data	EB 73.1
Date	2010
Time series	No
Measurement level	Ordinal
Unit of analysis	Individual citizens
Coverage	Around 32.000 citizens across 33 countries
Attributes	<ul style="list-style-type: none"> • Totally agree • Tend to agree • Tend to disagree • Totally disagree • Don't know

Table 7.16. Potential indicator for Ethics, no. 15

Information Item	Ethics 15
Name of indicator	Mixing human and animal genes
Brief description	This indicator taps into public perceptions of ethics in relation to regenerative medicine. It is based on Eurobarometer data collection, and the specific item reads: "Mixing animal and human genes is unacceptable even if it helps medical research for human health".
Analytical level (logic model)	Context
Analytical level (aggregation)	Individual level data (could be aggregated)
Qualitative/Quantitative	Quantitative
Source of data	EB 73.1
Date	2010
Time series	No
Measurement level	Ordinal
Unit of analysis	Individual citizens
Coverage	Around 32.000 citizens across 33 countries
Attributes	<ul style="list-style-type: none"> • Totally agree • Tend to agree • Tend to disagree • Totally disagree • Don't know

Table 7.17. Potential indicator for Ethics, no. 16

Information Item	Ethics 16
Name of indicator	Regenerative medicine and inequality
Brief description	This indicator taps into public perceptions of ethics in relation to regenerative medicine. It is based on Eurobarometer data collection, and the specific item reads: "You do not support developments in regenerative medicine if it only benefits rich people".
Analytical level (logic model)	Context
Analytical level (aggregation)	Individual level data (could be aggregated)
Qualitative/Quantitative	Quantitative
Source of data	EB 73.1
Date	2010
Time series	No
Measurement level	Ordinal
Unit of analysis	Individual citizens
Coverage	Around 32.000 citizens across 33 countries
Attributes	<ul style="list-style-type: none"> • Totally agree • Tend to agree • Tend to disagree • Totally disagree • Don't know

Table 7.18. Potential indicator for Ethics, no. 17

Information Item	Ethics 17
Name of indicator	Regenerative medicine and distributional equality
Brief description	This indicator taps into public perceptions of ethics in relation to regenerative medicine. It is based on Eurobarometer data collection, and the specific item reads: "Research on regenerative medicine should be supported, even though it will benefit only a few people".
Analytical level (logic model)	Context
Analytical level (aggregation)	Individual level data (could be aggregated)
Qualitative/Quantitative	Quantitative
Source of data	EB 73.1
Date	2010
Time series	No
Measurement level	Ordinal
Unit of analysis	Individual citizens
Coverage	Around 32.000 citizens across 33 countries
Attributes	<ul style="list-style-type: none"> • Totally agree • Tend to agree • Tend to disagree • Totally disagree • Don't know

Table 7.19. Potential indicator for Ethics, no. 18

Information Item	Ethics 18
Name of indicator	Regenerative medicine and risks to future generations
Brief description	This indicator taps into public perceptions of ethics in relation to regenerative medicine. It is based on Eurobarometer data collection, and the specific item reads: "Research into regenerative medicine should go ahead, even if there are risks to future generations".
Analytical level (logic model)	Context
Analytical level (aggregation)	Individual level data (could be aggregated)
Qualitative/Quantitative	Quantitative
Source of data	EB 73.1
Date	2010
Time series	No
Measurement level	Ordinal
Unit of analysis	Individual citizens
Coverage	Around 32.000 citizens across 33 countries
Attributes	<ul style="list-style-type: none"> • Totally agree • Tend to agree • Tend to disagree • Totally disagree • Don't know

Table 7.20. Potential indicator for Ethics, no. 19

Information Item	Ethics 19
Name of indicator	Scientific or moral decision-making regarding synthetic biology
Brief description	This indicator taps into public perceptions of decision-making in relation to synthetic biology, targeting specifically the weight of scientific and moral/ethical issues respectively in decision-making. It is based on Eurobarometer data collection, and the specific item reads: "Which of the following views are closest to your own?".
Analytical level (logic model)	Context
Analytical level (aggregation)	Individual level data (could be aggregated)
Qualitative/Quantitative	Quantitative
Source of data	EB 73.1
Date	2010
Time series	No
Measurement level	Nominal
Unit of analysis	Individual citizens
Coverage	Around 32.000 citizens across 33 countries
Attributes	<ul style="list-style-type: none"> Decisions about synthetic biology should be based primarily on scientific evidence Decisions about synthetic biology should be based primarily on the moral and ethical issues Don't know

Table 7.21. Potential indicator for Ethics, no. 20

Information Item	Ethics 20
Name of indicator	Delegation or democracy in decision-making about synthetic biology
Brief description	This indicator taps into public perceptions of decision-making in relation to synthetic biology, targeting specifically the weight of expert-based and democratic principles respectively in decision-making. It is based on Eurobarometer data collection, and the specific item reads: "Which of the following views are closest to your own?".
Analytical level (logic model)	Context
Analytical level (aggregation)	Individual level data (could be aggregated)
Qualitative/Quantitative	Quantitative
Source of data	EB 73.1
Date	2010
Time series	No
Measurement level	Nominal
Unit of analysis	Individual citizens
Coverage	Around 32.000 citizens across 33 countries
Attributes	<ul style="list-style-type: none"> Decisions about synthetic biology should be based mainly on the advice of experts Decisions about synthetic biology should be based mainly on what the majority of people in a country thinks Don't know

Table 7.22. Potential indicator for Ethics, no. 21

Information Item	Ethics 21
Name of indicator	Scientific or moral decision-making regarding animal cloning
Brief description	This indicator taps into public perceptions of decision-making in relation to animal cloning, targeting specifically the weight of scientific and moral/ethical issues respectively in decision-making. It is based on Eurobarometer data collection, and the specific item reads: "Which of the following views are closest to your own?".
Analytical level (logic model)	Context
Analytical level (aggregation)	Individual level data (could be aggregated)
Qualitative/Quantitative	Quantitative
Source of data	EB 73.1
Date	2010
Time series	No
Measurement level	Nominal
Unit of analysis	Individual citizens
Coverage	Around 32.000 citizens across 33 countries
Attributes	<ul style="list-style-type: none"> Decisions about animal cloning should be based primarily on scientific evidence Decisions about animal cloning should be based primarily on the moral and ethical issues Don't know

Table 7.23. Potential indicator for Ethics, no. 22

Information Item	Ethics 22
Name of indicator	Delegation or democracy in decision-making about animal cloning
Brief description	This indicator taps into public perceptions of decision-making in relation to animal cloning, targeting specifically the weight of expert-based and democratic principles respectively in decision-making. It is based on Eurobarometer data collection, and the specific item reads: "Which of the following views are closest to your own?".
Analytical level (logic model)	Context
Analytical level (aggregation)	Individual level data (could be aggregated)
Qualitative/Quantitative	Quantitative
Source of data	EB 73.1
Date	2010
Time series	No
Measurement level	Nominal
Unit of analysis	Individual citizens
Coverage	Around 32.000 citizens across 33 countries
Attributes	<ul style="list-style-type: none"> Decisions about animal cloning should be based mainly on the advice of experts Decisions about animal cloning should be based mainly on what the majority of people in a country thinks Don't know

Table 7.24. Potential indicator for Ethics, no. 23

Information Item	Ethics 23
Name of indicator	Infrastructure of ethical governance
Brief description	Indicates the existence or lack of institutions of ethical governance.
Analytical level (logic model)	Input
Analytical level (aggregation)	Institutional (can be aggregated)
Qualitative/ Quantitative	Quantitative
Source of data	EPOCH, MASIS, SATORI
Date	2010, 2011, 2015
Time series	No
Measurement level	Rational
Unit of analysis	Institutions, countries
Coverage	32 countries
Attributes	<ul style="list-style-type: none"> Existence of bodies governing ethics in R&I

Table 7.25. Potential indicator for Ethics, no. 24

Information Item	Ethics 24
Name of indicator	Infrastructure for Ethical Deliberation
Brief description	Indicates the existence or lack of institutions of ethical deliberation.
Analytical level (logic model)	Input
Analytical level (aggregation)	Institutional (can be aggregated)
Qualitative/ Quantitative	Quantitative
Source of data	MASIS, SATORI, PACITA (?)
Date	2010, 2014, 2015
Time series	No
Measurement level	Rational
Unit of analysis	Institutions, countries
Coverage	32 countries
Attributes	<ul style="list-style-type: none"> Existence of bodies deliberating ethics in R&I

Table 7.26. Potential indicator for Ethics, no. 25

Information Item	Ethics 25
Name of indicator	Infrastructure for Ethical Reflection
Brief description	Indicates the existence or lack of institutions of ethical deliberation.
Analytical level (logic model)	Input
Analytical level (aggregation)	Institutional (can be aggregated)
Qualitative/ Quantitative	Quantitative
Source of data	MASIS, SATORI (?)
Date	2010, 2014, 2015
Time series	No
Measurement level	Rational
Unit of analysis	Institutions, countries
Coverage	32 countries
Attributes	<ul style="list-style-type: none"> Existence of institutions reflecting ethics in R&I

Table 7.27. Potential indicator for Ethics, no. 26

Information Item	Ethics 26
Name of indicator	Public Engagement in Ethical Infrastructure
Brief description	Indicates how deeply and in what way the public is involved in institutions of ethical deliberation. Indicates process quality. Broad inclusion and interdisciplinarity could increase validity and legitimacy.
Analytical level (logic model)	Input
Analytical level (aggregation)	Countries
Qualitative/ Quantitative	Qualitative
Source of data	EPOCH
Date	2010
Time series	No
Measurement level	Qualitative
Unit of analysis	Countries
Coverage	32 countries
Attributes	<ul style="list-style-type: none"> Public discussion (never, sometimes, always) Organising public events (no, presentation of findings, education, dialogue & debate) Specific public participation mechanism Involving particular target groups Public involvement mechanism (communication, consultation, participation)

Table 7.28. Potential indicator for Ethics, no. 27

Information Item	Ethics 27
Name of indicator	Publication
Brief description	Are results published? Indicates process quality. Public involvement could increase validity and legitimacy.
Analytical level (logic model)	Output
Analytical level (aggregation)	Institutional, national
Qualitative/ Quantitative	Qualitative
Source of data	EPOCH, SATORI (?), NEC-Forum
Date	2010, 2015
Time series	No
Measurement level	Qualitative
Unit of analysis	Institutions, countries
Coverage	32 countries
Attributes	<ul style="list-style-type: none"> Publish the work results (always, sometimes)

Table 7.29. Potential indicator for Ethics, no. 28

Information Item	Ethics 28
Name of indicator	Output
Brief description	What is the output of the ethics advisory bodies? Number of opinions produced indicates at the activity of an organisation.
Analytical level (logic model)	Output
Analytical level (aggregation)	Institutional, national
Qualitative/ Quantitative	Quantitative
Source of data	NEC-Forum
Date	2015
Time series	Yes
Measurement level	Qualitative
Unit of analysis	Institutions, countries
Coverage	Members of the NEC Forum
Attributes	<ul style="list-style-type: none"> Numbers of publications

8. Ideas bank

The purpose of this chapter is to provide an outlet for collecting ideas, notes and thoughts on the design of indicators and in particular with regard to the subsequent analysis of RRI benefits. This chapter will not form part of the final deliverable but can be considered as a working document or ideas bank for the ensuing analytical work.

Analysis of the literature shows that there are some context indicators available as well as input indicators; output and outcome indicators are clearly missing. Further work has to focus on the development of these indicators.

The next step should investigate to whether the current projects PACITA and SATORI provide relevant data.

In addition, support from Commission services will be necessary to obtain reports and information about projects which are no longer on the Internet (e.g. INES).

The following table provides an overview on potential indicators for which the literature only provides incidental findings.

Table 8.1. Potential indicator for Ethics for future investigation

Guiding question	Indicator potential	Analytical level (intervention logic model)	Analytical level (aggregation)	Data classification and methods
How interdisciplinary composed are these institutions (Grunwald, 2014; Mali, 2012)? Are stakeholders adequately represented (Sakkas, 2014)?	Indicates process quality. Broad inclusion and interdisciplinaryity could increase validity and legitimacy.	Input	Local level National level	Qualitative data Desk research
What ethical questions can be raised legitimately in these institutions (Felt et al., 2009; Hedlund, 2010)?	Indicates process quality. Broad set of questions addressed could increase validity.	Input	Local level National level	Qualitative data Desk research Qualitative empirical research
How do deliberations in these institutions range in terms of arguing/ bargaining of the participants (Brom et al., 2015; Mali et al., 2012; Sakkas, 2014)?	Indicates process quality. Arguing could increase validity and legitimacy. Bargaining could promote implementation of advice.	Input	Local level National level	Qualitative data Desk research
What approach towards ethics is taken (Felt et al., 2009; Schicktanz et al., 2012; Kiran et al., 2015)	Indicates process quality. Approach taken have an impact on who is involved and what issues are considered as legitimate.	Input	Local level National level	Desk research Qualitative empirical research
Are proceedings in these institutions open and transparent, (Griessler & Littig, 2006; Hedlund, 2010)?	Indicates process quality. Openness and transparency impact have validity and legitimacy.	Input	Local level National level	Desk research Qualitative or quantitative empirical research

Guiding question	Indicator potential	Analytical level (intervention logic model)	Analytical level (aggregation)	Data classification and methods
Is there consensus or dissent in the body about an Opinion (Sakkas, 2014)?	Process quality. This might have an impact on the output and outcome of the process.	Output	Local level National level	Desk research Qualitative or quantitative empirical research
To what extent is the body able to inform and encourage public reflection (Sakkas, 2014)?	Process quality might have an impact on the output and outcome of the process.	Outcome	Local level National level	Desk research Qualitative or quantitative empirical research
What is the impact of governance arrangements of ethics on the level of participants (in participatory settings)? (Griessler & Littig, 2006)	One form of impact of ethical governance is on the individual level, e.g. impact on attitudes.	Outcome	Individual level	Desk research Qualitative or quantitative empirical research
What is the media coverage of instruments of ethical governance?	Indicator for impact of ethical deliberation.	Outcome	National level	Desk research
What was the contribution to the public debate? (Hedlund, 2010; Loeber et al., 2013)	Indicates whether the governance instruments had an impact on public debate.	Outcome	Local level National level International level	Desk research Qualitative or quantitative empirical research
What is the impact of governance arrangement on the practices of researchers and innovators?	Indicator for impact of ethical deliberation and governance.	Outcome	Individual level	Qualitative or quantitative empirical research
What was the impact of governance of ethics on the regulation of a technology or its development (Grunwald, 2014; Sakkas, 2014)?	Indicates the impact of ethics governance on regulation and technology in terms of what difference it does make.	Outcome	Institutional level National level	Qualitative data Desk research

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10. Appendix – literature review

10.1 Review guidelines

MoRRI

Final version / 17.11.2014 (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, once 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 standardised 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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10.2 Review reports

Brom: Institutionalizing Ethical Debates in Science, Technology, and Innovation Policy: A Comparison of Europe, India and China.

Basic information				Document no.:		001			
				(citavi #)					
Reviewer's name		Erich Griessler							
1. Bibliographical information (author/s, year, title, editor/s, journal/book, volume, publisher, place of publication, pages, DOI)		Brom, F. W. A., Chaturvedi, S., Ladikas, M., & Zhang, W. (2015). Institutionalizing Ethical Debates in Science, Technology, and Innovation Policy: A Comparison of Europe, India and China. In M. Ladikas, S. Chaturvedi, Y. Zhao & D. Stermerding (Eds.), <i>Science and Technology Governance and Ethics</i> (pp. 9–23). Cham/Heidelberg/New York/Dordrecht/London: Springer. DOI 10.1007/978-319-14693-5_2							
2. Abstract (copy and paste)		<p>The chapter of the book is concerned with the question “to what extent is there a global ethics in science and technology and innovation policy, and how are ethical debates institutionalized in science, technology and innovation policy” (p. 10)? The common idea in Europe, India and China is that “science and technology are important factors in developing innovative solutions to societal needs, but these solutions might have a profound influence on the moral fabric of society. Questions have been raised with regard to justice, equity, autonomy, human dignity and social harmony. In these ethical debates, however, the tone of the voice differs greatly from region to region. (...) We found that each region has a unique structure of ethics debates involving the institutionalization of three related tasks: <i>ethical governance, ethical deliberation and ethical reflection</i>” (p. 10).</p> <p>Ethical governance is carried out in regulatory frameworks addressing academic integrity, protection of human research subjects or animals. Ethical deliberation in Europe works via expert based advisory systems and lay-based ethical deliberations. In China and India “the general tone of voice of ethics in science, technology and innovation debates (...) is aimed at setting social agendas” (p. 11).</p>							
3. Main focus (key dimensions according to MoRRI)		RRI / RI	<input checked="" type="checkbox"/>	Citizen participation	<input checked="" type="checkbox"/>	Science literacy	<input type="checkbox"/>	Gender equality	<input type="checkbox"/>
		Open access	<input type="checkbox"/>	R&I governance and ethics	<input type="checkbox"/>	Other	<input type="checkbox"/>		
Comment on 3:									
4. Main perspective (multiple entries possible)		Theoretical, conceptual	<input type="checkbox"/>	Methodological	<input type="checkbox"/>	Policy-oriented	<input type="checkbox"/>	Evaluative	<input checked="" type="checkbox"/>
		Other	<input type="checkbox"/>						
Comment on 4:									
5. Type of document		Scientific article	<input type="checkbox"/>	Book chapter	<input checked="" type="checkbox"/>	Book	<input type="checkbox"/>	Report	<input type="checkbox"/>
		Project deliverable	<input type="checkbox"/>	Policy/strategy document	<input type="checkbox"/>	Other	<input type="checkbox"/>		
Comment on 5:									

6. System level (if applicable)	Global	<input checked="" type="checkbox"/>	European	<input type="checkbox"/>	National	<input type="checkbox"/>	Sub-national	<input type="checkbox"/>
Comment on 6:	Comparing Europe, India and China							
7.1 Country focus (if applicable, please specify)	Europe, India, China							
7.2 Country/ies of origin indicated by institutional affiliation of editor(s)/ author(s) (if applicable, please specify)	Netherlands, India, UK, China							
Comments on 7:								
Data and indicator availability								
8.1 Data, indicators, measurements	Document contains data	<input type="checkbox"/>	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	<input type="checkbox"/>	If yes, please list source(s): (URLs, data banks, reports, statistics, etc.)					
Comment on 8.2:								
Guiding questions for review								
<i>- please add page numbers where appropriate -</i>								
9. How is RRI characterised? (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)		RRI is not characterised						
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, ...)		Ethics						
9.3 Which arguments are presented in support or rejection/criticism of RRI?								
9.4 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 characterised 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?	
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)	
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)	In another chapter of the book ethics is defined as: "A common platform for deliberation and discussion of values in society, that is based on perceptions of right and wrong, is influenced by cultural norms, and aims at informing policy making" (Ladikas et al., 2015, p. 3).
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...)?	The paper mentions the importance of participatory practices in ethical deliberation in the European context.
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	<p>The paper was selected because it draws an interesting and useful distinction in the governance of ethics. It delineates</p> <ul style="list-style-type: none"> • ethical governance (which institutionalised mechanisms to monitor compliance in regard to academic integrity, research involving human subjects and research involving animals), • ethical deliberation which deals with the questions how "new emerging issues and the social agenda for science, technology and innovation are debated" (p. 21). In Europe, it mainly works by advisory systems to policy-making, but there are society based ethical deliberations as well (public engagement). In contrast to Europe, China and India institutionalised such advisory committees to a lesser extent, and ethical deliberation happens within "priority settings to solve broad societal issues and improve the life situation of those in need" (p. 17), • ethical reflection (societal and academic).
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)	

Felt et al.: Unruly ethics: on the difficulties of a bottom-up approach to ethics in the field of genomics

Basic information					Document no.: (citavi #)	002		
Reviewer's name	Erich Griessler							
1. Bibliographical information (author/s, year, title, editor/s, journal/book, volume, publisher, place of publication, pages, DOI)	Felt, U., Fochler, M., Müller, A., & Strassnig, M. (2009). Unruly ethics: on the difficulties of a bottom-up approach to ethics in the field of genomics. <i>Public Understanding of Science</i> , 18(3), 354–371. DOI:10.1177/0963662507079902							
2. Abstract (copy and paste)	This paper explores the difficulties of addressing ethical questions of genome research in a public engagement setting where laypeople and scientists met for a longer period of time. While professional ethics mostly ignores public meaning, we aimed at a bottom-up approach to ethics in order to broaden the way in which ethical aspects of genomics can be addressed. However, within this interaction we identified a number of difficulties that constrained an open discussion on ethical issues. Thus, we analyze how ethical issues were approached, framed, debated, displaced or closed. We then elaborate on the possibilities and limits of dealing with ethics in such a participatory setting. We conclude by hinting at what should be taken into consideration when approaching issues of science and ethics more "upstream."							
3. Main focus (key dimensions according to MoRRI)	RRI / RI	<input type="checkbox"/>	Citizen participation	x	Science literacy	<input type="checkbox"/>	Gender equality	<input type="checkbox"/>
	Open access	<input type="checkbox"/>	R&I governance and ethics	x	Other	<input type="checkbox"/>		
Comment on 3:	The paper criticises that "actual public engagement with ethics neither belongs to the repertoire of suggested actions nor is it discussed as a serious alternative or complement to the decision-making by expert committees" (p. 355). The paper investigates in a quasi-experiment how geneticists and laypeople engage in ethical debate in a group setting (Round Table debates, science et cite) and discusses the mechanism which makes such an endeavour to take the ethical debate "upstream" difficult.							
4. Main perspective (multiple entries possible)	Theoretical, conceptual	x	Methodological	x	Policy-oriented	<input type="checkbox"/>	Evaluative	x
	Other	<input type="checkbox"/>						
Comment on 4:	The paper presents empirical findings from a qualitative study.							
5. Type of document	Scientific article	x	Book chapter	<input type="checkbox"/>	Book	<input type="checkbox"/>	Report	<input type="checkbox"/>
	Project deliverable	<input type="checkbox"/>	Policy/strategy document	<input type="checkbox"/>	Other	<input type="checkbox"/>		
Comment on 5:								
6. System level (if applicable)	Global	<input type="checkbox"/>	European	<input type="checkbox"/>	National	x	Sub-national	<input type="checkbox"/>
Comment on 6:	Although the article focuses on Austria the results are also applicable in a wider European context.							
7.1 Country focus (if applicable, please specify)	Austria							
7.2 Country/ies of origin indicated by institutional affiliation of editor(s)/ author(s) (if applicable, please specify)	Austria							
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)	Qualitative data in terms of reference from what was said in a group discussion between geneticists and laypeople.
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				
<i>- please add page numbers where appropriate -</i>				
9. How is RRI characterised? (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)		RRI is not addressed in this paper.		
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, ...)		Ethics		
9.3 Which arguments are presented in support or rejection/criticism of RRI?				
9.4 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, Public Understanding of Science, Participatory Technology Assessment (TA)		
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 characterised 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 being 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?	
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)	
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)	The term ethics is not explained. It is just mentioned that several technologies would "raise fundamental ethical and social questions" (p. 354).
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, constructive TA
Comments on 12:	The authors mention three ways to address ethical questions in science and technology: (1) public engagement exercises, (2) ethics committees, (3) ethical review boards (p. 354).
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	<p>The paper advocates upstream “public engagement on ethics” (p. 356) to make it possible to raise fundamental questions (e.g. do we need a technology, are there alternatives) related to basic values and not being limited to questions of risk and security. The latter happens when ethical questions are only raised when an innovation is already close to the market. The authors perceive that expert ethics committees, just as laypeople, take up many “upstream” questions, but apart from singular public engagement activities are closed, and there are little transparent expert bodies (p. 356). In these committees, expertise of experts is not challenged at all. The paper goes on with discussing several issues which impede public engagement in (bio)ethics. It refers to the debate between ethicists who advocate a principlalist deductive approach and the ones who support an applied ethics approach. It carries on with describing that ethicists criticise efforts to make ethics more participatory because they think that laypersons would lack necessary competencies and training to discuss ethics systematically. Their judgment would be based on moral conviction and not ethical reflection. Moreover, there is a conflict between the social sciences and ethics: ethics were concerned with what society should do and the social sciences with facts, which not necessarily concur with ethical principles (p. 357). The authors carry out a quasi-experiment in which experts discuss the ethics of genetic research of fat metabolism in a round table setting. The authors describe the difficulties of actually engaging in an equal debate of experts and laypeople on an ethical topic because there are a number of mechanisms at place which enable experts to shut down the discussion of ethical issues or declare themselves as not responsible for the issue and assign and transfer the problem to politics or other political actors. Moreover, in the debate “facts”, represented by scientists were considered as superior to “mere values” (p. 368). The asymmetry of (definition) power between experts and laypeople persisted. The paper illustrates the difficulties of public engagement in ethical debates.</p>
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)	

Griessler & Littig: Neosokratische Dialoge zu ethischen Fragen der Xenotransplantation. Ein Beitrag zur Bearbeitung ethischer Probleme in partizipativer Technikfolgenabschätzung

Basic information				Document no.:		003			
Reviewer's name				Erich Griessler					
1. Bibliographical information (author/s, year, title, editor/s, journal/book, volume, publisher, place of publication, pages, DOI)		Griessler, E., & Littig, B. (2006). Neosokratische Dialoge zu ethischen Fragen der Xenotransplantation. Ein Beitrag zur Bearbeitung ethischer Probleme in partizipativer Technikfolgenabschätzung. In E. Buchinger & U. Felt (Eds.), <i>Technik- und Wissenschaftssoziologie in Österreich. Stand und Perspektiven. Österreichische Zeitschrift für Soziologie. Sonderheft 8/2006</i> (pp. 131–157). Wiesbaden: VS Verlag.							
2. Abstract (copy and paste)		Der Beitrag zur Technik- und Wissenschaftssoziologie beschäftigt sich mit der Frage, wie Partizipative Technikfolgeabschätzung (PTA) um die Behandlung ethischer Fragestellungen erweitert werden kann. Die Ausführungen präsentieren Ergebnisse des österreichischen Teils eines Projekts, in dem das Potential des Neosokratischen Dialogs (NSD) zur Bearbeitung technikethischer Fragestellungen am Beispiel der Xenotransplantation (XTP) erprobt wird. Im ersten Teil werden die Konzepte Technikfolgenabschätzung, PTA, und Ethik diskutiert. Ferner wird analysiert, wie in Österreich verwendete Verfahren der Technikbewertung ethische Probleme verhandeln. Ausgehend von den Defiziten dieser Ansätze wird schließlich der NSD vorgestellt. Der zweite Teil führt in die Thematik XTP ein und umreißt die diesbezügliche österreichische Diskussion. Der dritte Teil stellt die beiden NSD zu ethischen Problemen der XTP dar, die im vierten Teil im Kontext österreichischer und internationaler PTA-Erfahrungen diskutiert werden.							
3. Main focus (key dimensions according to MoRRI)		RRI / RI	<input type="checkbox"/>	Citizen participation	x	Science literacy	<input type="checkbox"/>	Gender equality	<input type="checkbox"/>
		Open access	<input type="checkbox"/>	R&I governance and ethics	x	Other	<input type="checkbox"/>		
Comment on 3:		The article takes up the notion of citizen participation and ethics of current biomedicine and experiments with the Neo-Socratic Dialogue as a group method to engage experts and laypeople in a systematic and symmetric discourse on ethical problems of modern technology.							
4. Main perspective (multiple entries possible)		Theoretical, conceptual	<input type="checkbox"/>	Methodological	x	Policy-oriented	<input type="checkbox"/>	Evaluative	x
		Other	<input type="checkbox"/>						
Comment on 4:		The article is both methodological and evaluative by experimenting with and evaluating the transfer of a method practice of applied philosophy to technology assessment.							
5. Type of document		Scientific article	x	Book chapter	<input type="checkbox"/>	Book	<input type="checkbox"/>	Report	<input type="checkbox"/>
		Project deliverable	<input type="checkbox"/>	Policy/strategy document	<input type="checkbox"/>	Other	<input type="checkbox"/>		
Comment on 5:									
6. System level (if applicable)		Global	<input type="checkbox"/>	European	x	National	x	Sub-national	<input type="checkbox"/>
Comment on 6:									
7.1 Country focus (if applicable, please specify)		Austria; however, the project which this article describes also included dialogues in Spain and Germany (https://www.ihs.ac.at/departments/soc/xeno-pta/results.html).							
7.2 Country/ies of origin indicated by institutional affiliation of editor(s)/ author(s) (if applicable, please specify)		Austria							

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)	The article includes evaluative data about the project (questionnaires of small sample of participants).
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.)	Project reports: https://www.ihs.ac.at/departments/soc/xenopta/results.html
Comment on 8.2:				
Guiding questions for review <i>- please add page numbers where appropriate -</i>				
9. How is RRI characterised? (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)		RRI is not defined.		
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, ...)		Ethics and participation		
9.3 Which arguments are presented in support or rejection/criticism of RRI?				
9.4 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, TA, participatory technology assessment.		
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 characterised and what are they aiming at (strategies, funding initiatives, regulation etc.)?		The article relates to the development of participatory Technology Assessment (pTA) which originated from a criticism of expert based TA.		
10.2 Which approaches, instruments are discussed to facilitate the uptake of RRI?		The article discusses the use of the NSD to overcome the participatory deficits of bioethics committees (see also Mali et al., 2012) and the lack of ethical debate in TA (see also Grunwald, 2014). The paper suggests using the Neo-Socratic Dialogue as a systematic group method of ethical investigation to create a dialogue between experts and laypeople about the ethics of modern science and technologies.		

10.3 Which problems, barriers, potential drawbacks for RRI are being discussed, how could they be addressed?	Two dialogues were carried out with a small group of experts in xenotransplantation and laypeople. The first dialogue was evaluated almost unanimously positive, whereas the second dialogue was less successful. The main reasons for this failure were twofold: First, there was a misunderstanding about the characteristics of ethical questions and risk assessment (knowledge). More effort would have been necessary to explain the differences between these types of questions. Second, the group dynamics played an important role because the most outspoken people within the group were rather critical about the method.
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?	Technological controversies are not only about facts and knowledge but intrinsically also conflicts about values and ethics. The paper raises the question how pTA can be broadened to include ethical inquiries.
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)	
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)	Ethics and participation
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...)?	Technological controversies bring together ethical arguments and arguments about facts and knowledge. The article advocates citizen participation in technological controversy and including ethical aspects in technology assessment. Two instruments of dealing with conflicts about science and technology are discussed, bioethics committees and participatory technology assessment. Both are criticised for falling short in one way or another. While bioethics committees deal with ethics, few of them are participatory and come to their conclusion based on "arguing". Instead bargaining is dominant as a modus operandi. Participatory Technology Assessment (pTA) on the other hand, often excludes ethical questions because of various reasons. The article tries to combine a systematic investigation of ethics with participatory efforts.
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, pTA, TA, Neo-Socratic Dialogue

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	<p>Impacts of an RRI governance instrument can be determined on several levels:</p> <ol style="list-style-type: none"> 1. Immediate participants (attitudes) 2. Public discourse (e.g. media) 3. Policies 4. Artefacts and processes of Research and Innovation
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)	

Grunwald: Technology Assessment for Responsible Innovation

Basic information				Document no.: (citavi #)		004			
Reviewer's name		Erich Griessler							
1. Bibliographical information (author/s, year, title, editor/s, journal/book, volume, publisher, place of publication, pages, DOI)		Grunwald, A. (2014). Technology Assessment for Responsible Innovation. In J. van den Hoven, N. Doorn, T. Swierstra, B.-J. Koops & H. Romijn (Eds.), <i>Responsible Innovation I: Innovative solutions for Global Issues</i> (pp. 15–29). Dordrecht: Springer. DOI:10.1007/978-94-017-8956-1_2							
2. Abstract (copy and paste)		The ideas of "responsible development" in the scientific-technological advance and of "responsible innovation" in the field of new products, services and systems have been discussed for some years now with increasing intensity. Some crucial ideas of Technology Assessment (TA) are an essential part of these debates, which leads to the thesis that TA is one of the main roots of Responsible Innovation. This can be seen best in the effort which has recently been spent on early and upstream engagement at the occasion of new and emerging science and technology. However, Responsible Innovation adds explicit ethical reflection to TA and merges both into approaches of shaping technology and innovation. Indeed, the field of ethics of responsibility and its many applications to the scientific and technological advance is the second major root of Responsible Innovation. Responsible Innovation brings together TA with its experiences on assessment procedures, actor involvement, foresighting and evaluation with engineering ethics, in particular under the framework of responsibility. The chapter describes both, TA and engineering ethics, as origins of "Responsible Innovation".							
3. Main focus (key dimensions according to MoRRI)		RRI / RI	<input checked="" type="checkbox"/>	Citizen participation	<input type="checkbox"/>	Science literacy	<input type="checkbox"/>	Gender equality	<input type="checkbox"/>
		Open access	<input type="checkbox"/>	R&I governance and ethics	<input checked="" type="checkbox"/>	Other	<input type="checkbox"/>		
Comment on 3:									
4. Main perspective (multiple entries possible)		Theoretical, conceptual	<input checked="" type="checkbox"/>	Methodological	<input type="checkbox"/>	Policy-oriented	<input type="checkbox"/>	Evaluative	<input type="checkbox"/>
		Other	<input type="checkbox"/>						
Comment on 4:		The paper identifies Technology Assessment and engineering ethics as the roots of responsible innovation and outlines a program for applying Responsible Innovation							
5. Type of document		Scientific article	<input type="checkbox"/>	Book chapter	<input checked="" type="checkbox"/>	Book	<input type="checkbox"/>	Report	<input type="checkbox"/>
		Project deliverable	<input type="checkbox"/>	Policy/strategy document	<input type="checkbox"/>	Other	<input type="checkbox"/>		
Comment on 5:									
6. System level (if applicable)		Global	<input checked="" type="checkbox"/>	European	<input type="checkbox"/>	National	<input type="checkbox"/>	Sub-national	<input type="checkbox"/>
Comment on 6:									
7.1 Country focus (if applicable, please specify)		None							
7.2 Country/ies of origin indicated by institutional affiliation of editor(s)/ author(s) (if applicable, please specify)		Germany							
Comments on 7:		Drawing mostly on European examples							
Data and indicator availability									
8.1 Data, indicators, measurements		Document contains data	<input type="checkbox"/>	If yes, please specify (including page numbers in document)					

Comment on 8.1:	No quantitative or qualitative data is presented		
8.2 Reference made to data, indicators measurements in other sources	Document refers to relevant sources	<input type="checkbox"/>	If yes, please list source(s): (URLs, data banks, reports, statistics, etc.)
Comment on 8.2:			
Guiding questions for review <i>- please add page numbers where appropriate -</i>			
9. How is RRI characterised? (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)	The author provides several definitions of Responsible Innovation. First, he describes responsible development in the context of nanotechnology: "Responsible development of nanotechnology can be characterised as the balancing of efforts to maximise the technology's positive contributions and minimise its negative consequences. Thus, responsible development involves an examination both of applications and of potential implications. It implies a commitment to develop and use technology to help meet the most pressing human and societal needs, while making every reasonable effort to anticipate and mitigate adverse implications or unintended consequences" (National Research Council, 2006, p. 73) Responsible Innovation takes up existing approaches such as Technology Assessment (TA), engineering ethics, Social Shaping of Technology (SST) and Constructive Technology Assessment (CTA). However, it goes beyond them by an effort to "shape innovation", taking "a closer look on societal contexts of new technology and science", a "clear indication for intervention into the development and innovation process", and trying "'to make a difference' (...) in the 'real world'" (p. 25). In this sense, "Responsible Innovation can be regarded as a radicalisation of the well-known post-normal science (...) being even closer to social practice, being prepared for intervention and for taking responsibility for this intervention" (p. 25).		
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, ...)	Ethics		

9.3 Which arguments are presented in support or rejection/criticism of RRI?	<p>The author relates to a number of "unexpected and serious negative impacts of technology" (p. 18) since the 1960s that lead to the emergence of TA. He also mentions new motivations to deal with the consequences of technologies such as "concerns of an emerging technocracy, (...) experiences of technology conflicts and of legitimacy deficits, (...) shaping technology according to social values, (...), innovation issues" surrounding "innovation problems of Western societies" (...) and "a shift in the societal communication on new and emerging science and technology", using a language of promise with regard to technological innovation such as life science and nanotechnologies (p. 19).</p> <p>Finally, he states "Responsible development and innovation might be a new umbrella term with new accentuations which may be characterised by</p> <ul style="list-style-type: none"> • Involving ethical and social issues more directly in the innovation process by integrative approaches to development and innovation, • Bridging the gap between innovation practice, engineering ethics, technology assessment, governance research and social sciences (STS), • Giving new shape to innovation processes and to technology governance according to responsibility reflections in all of its three dimensions mentioned above, • In particular making the distribution of responsibility among the involved actors as transparent as possible, • Supporting 'constructive' paths of the co-evolution of technology and the regulative frameworks of society." (p. 29)
9.4 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, TA, Constructive TA, Social Shaping of Technology
Comments on 9:	The author strives for an approach integrating these lines of reasoning into an interdisciplinary endeavour of responsible development and innovation (see above).
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 characterised and what are they aiming at (strategies, funding initiatives, regulation etc.)?	
10.2 Which approaches, instruments are discussed to facilitate the uptake of RRI?	"Responsible Innovation (...) requires a more intense inter- and trans-disciplinary cooperation between engineering, social sciences, and applied ethics. The major novelty in this interdisciplinary cooperation might be the integration of ethics (normative reflections on responsibilities) and social science such as STS and governance research (empirically dealing with social processes around the attribution of responsibility and their consequences for governance)." (p. 28)

10.3 Which problems, barriers, potential drawbacks for RRI are brining discussed, how could they be addressed?	"The integration (between engineering, social sciences, and applied ethics, EG) is at the heart of Responsible Innovation – and a major obstacle might be that applied ethics and social sciences have to deal with deep ranging controversies and mutual antipathy. It will one of the most exciting challenges in which way these obstacles be overcome. In the field of technology assessment there are some indications that a constructive cooperation is possible" (p. 28)
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 claim that research and innovation would be more socially embedded, more accepted and adverse effects would be avoided by using responsible development and innovation is only made implicitly, but throughout the paper.
11.2 Which arguments are used to support the claim(s)?	None
11.3 What evidence is presented to support the claims? (e.g. data, indicators, research results, case studies, anecdotal evidence)	There is no evidence presented.
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:	There is no indication in the paper about how to determine the impact of approaches such as TA, CTA or SST as well as responsible development and innovation. One possibility would be to look at case studies and to study what difference it made. The paper provides three options in this respect (p. 28): <ul style="list-style-type: none"> • Option 1: In case of "strong, i.e. categorical, ethical arguments against the new technology" it was stopped and prohibited. The author provides the example of reproductive cloning in Europe. • Option 2: Shaping technology specifically according to ethical values or principles, as it stands behind the ideas of CTA and SST. • Option 3: Changing the normative framework "without coming into conflict with the essential ethical principles" (ibid.).
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)	Ethics is defined once very shortly as "normative reflection on responsibilities" (p. 28).
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...)?	No

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, ...)	See above
Comments on 12:	
13. Are other important "dimensions" / aspects of RRI discussed, presented which are so far not covered by MoRRI?	No
14. Anything else deemed relevant?	One example mentioned in the paper for engineering ethics is the VDI (German Engineering Association). This might be a case to study the impact of ethical reflections.
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)	

Hedlund: Democratic Expert Influence Through Bioethical Advisory Committees? The Case of PGD Legislation in Sweden

Basic information				Document no.:		005			
Reviewer's name				Erich Griessler					
1. Bibliographical information (author/s, year, title, editor/s, journal/book, volume, publisher, place of publication, pages, DOI)		Hedlund, M. (2010). Democratic Expert Influence Through Bioethical Advisory Committees? The Case of PGD Legislation in Sweden. In U. Kristofferseon, J. Schmidte & J. J. Cassiman (Eds.), <i>Quality Issues in Clinical Genetic Services</i> (pp. 233–242). Dordrecht: Springer. DOI:233-242. 10.1007/978-90-481-3919-4_4							
2. Abstract (copy and paste)		<ul style="list-style-type: none"> Bioethical government advisory committees have profound influence on political decision-making on gene technology issues, concerning not only patients with genetically related diseases, but also, potentially, the whole society. Decision-making on issues concerning all society should be democratically legitimate in all aspects, including the work of government advisory committees. Democratic legitimacy of expert advice is desirable not only for the democratic values per se, but also for the quality of political decisions. In the case of PGD legislation in Sweden, the national government advisory committee functioned as a bridge between political representatives, specialist civil servants, and scientific experts, but the connection with public opinion was more or less absent. Had the advisory committee worked more openly and allowed a multiplicity of perspectives being heard, the democratic and quality aspects in this legislation process would have been strengthened. 							
3. Main focus (key dimensions according to MoRRI)		RRI / RI	<input checked="" type="checkbox"/>	Citizen participation	<input checked="" type="checkbox"/>	Science literacy	<input type="checkbox"/>	Gender equality	<input type="checkbox"/>
		Open access	<input type="checkbox"/>	R&I governance and ethics	<input checked="" type="checkbox"/>	Other	<input type="checkbox"/>		
Comment on 3:									
4. Main perspective (multiple entries possible)		Theoretical, conceptual	<input checked="" type="checkbox"/>	Methodological	<input type="checkbox"/>	Policy-oriented	<input type="checkbox"/>	Evaluative	<input checked="" type="checkbox"/>
		Other	<input type="checkbox"/>						
Comment on 4:									
5. Type of document		Scientific article	<input type="checkbox"/>	Book chapter	<input checked="" type="checkbox"/>	Book	<input type="checkbox"/>	Report	<input type="checkbox"/>
		Project deliverable	<input type="checkbox"/>	Policy/strategy document	<input type="checkbox"/>	Other	<input type="checkbox"/>		
Comment on 5:									
6. System level (if applicable)		Global	<input type="checkbox"/>	European	<input type="checkbox"/>	National	<input checked="" type="checkbox"/>	Sub-national	<input type="checkbox"/>
Comment on 6:									
7.1 Country focus (if applicable, please specify)		Sweden							
7.2 Country/ies of origin indicated by institutional affiliation of editor(s)/ author(s) (if applicable, please specify)									
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)	No quantitative, but qualitative data is being used. Three case studies on the impact of Swedish Bioethical Advisory Committees on the regulation of PGD, Embryonic Stem Cell Research and Gene Therapy (pp. 236-239).
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				
<i>- please add page numbers where appropriate -</i>				
9. How is RRI characterised? (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)		RRI is not being used. The book chapter deals with the influence of bioethical advisory committees on legislation, the democratic quality of these expert advisory boards and the impact of this process on the quality of legislation.		
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, ...)		Ethics and Citizen Participation. The article addresses ethical issues which are raised by current research in biotechnology (stem cell, PGD, gene-therapy) as well as the democratic quality of closed decision-making bodies that are strictly oriented towards consensus seeking, sworn into confidentiality towards outsiders and involve only experts (partly with conflict of interests) and elected politicians (thus indirectly representing the public).		
9.3 Which arguments are presented in support or rejection/criticism of RRI?		RRI is not addressed in the article. However, the author claims that government advisory organisations should be democratic. "Genetic technology concerns all society and therefore it is important that expert bodies advising political decision-making about regulation of gene technology are democratically legitimate" (p. 234). The connection of the expert body, that is delineated as "deliberating elites" to "public opinion is more or less absent" (p. 241)		
9.4 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: "Democratic qualities like quality, inclusion, and public debate cannot be removed from certain issue areas, but must permeate all society. This is not least important in a field with such all-embracing possible consequences for society as genetics" (p. 234).		
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 characterised 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?	More inclusive debates about bioethics than the sole influence of expert bodies would result in better legislation.
11.2 Which arguments are used to support the claim(s)?	The government used misleading information for regulations which would have been rectified if the advisory process had been more open.
11.3 What evidence is presented to support the claims? (e.g. data, indicators, research results, case studies, anecdotal evidence)	Case study
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)	Participation is only defined as "equality, inclusion, and public debate" (p. 234). Regarding ethics, the author criticises a narrow definition of ethics as "research ethics, omitting a more comprehensive view" (p. 240).
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...)?	The document emphasises the relationship between the openness of the process and the quality of the regulation.
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
Comments on 12:	
13. Are other important "dimensions" / aspects of RRI discussed, presented which are so far not covered by MoRRI?	No
14. Anything else deemed relevant?	

15. General comments and remarks	I have selected this article because the author highlights many of the problems of expert committees, an arrangement that is used very much in politics to address questions of ethics stemming from research and technology. The article emphasises the problems of such expert committees: they frequently involve elite networks and provide a good link between experts and policy-making, however are not so well – if at all – connected to the public; often problems of vested interests and conflict of interests exist; they might have a democratic deficit and, because of lack of scrutiny and because of confidentiality, sometimes produce misleading information. The article, however, provides little information on what is understood by public participation and ethics, and provides only a few criteria how to measure them.
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)	

Kiran: Beyond checklists: toward an ethical-constructive technology assessment

Basic information				Document no.: (citavi #)		006			
Reviewer's name		Erich Griessler							
1. Bibliographical information (author/s, year, title, editor/s, journal/book, volume, publisher, place of publication, pages, DOI)		Kiran, A. H., Oudshoorn, N., & Verbeek, P.-P. (2015). Beyond checklists: toward an ethical-constructive technology assessment. <i>Journal of Responsible Innovation</i> , 2(1), 1–15.							
2. Abstract (copy and paste)		While many technology assessments (TAs) formally conducted by TA organisations in Europe and the USA have examined the implications of new technologies for “quantifiable risks” regarding safety, health or the environment, they have largely ignored the ethical implications of those technologies. Recently, ethicists and philosophers have tried to fill this gap by introducing tools for ethical technology assessment (eTA). The predominant approaches in eTA typically rely on a checklist approach, narrowing down the moral assessment of new technologies to evaluating a list of pre-defined ethical issues. In doing so, they often remain external to processes of technology development. In order to connect the ethics of technology more closely with processes of technology development, this paper introduces a set of principles for an ethical-constructive technology assessment approach (eCTA), reflecting on insights developed in the philosophy of technology and Science and Technology Studies, and drawing on examples of telecare technologies. This approach bases itself on an analysis of the implications of technology processes at the micro-level, particularly for human–technology relations. The eCTA approach augments the current approach of the ethics of new and emerging science and technology at the meso- and macro-levels of institutional practices.							
3. Main focus (key dimensions according to MoRRI)		RRI / RI	<input type="checkbox"/>	Citizen participation	<input type="checkbox"/>	Science literacy	<input type="checkbox"/>	Gender equality	<input type="checkbox"/>
		Open access	<input type="checkbox"/>	R&I governance and ethics	x	Other	<input type="checkbox"/>		
Comment on 3:									
4. Main perspective (multiple entries possible)		Theoretical, conceptual	x	Methodological	<input type="checkbox"/>	Policy-oriented	<input type="checkbox"/>	Evaluative	<input type="checkbox"/>
		Other	<input type="checkbox"/>						
Comment on 4:									
5. Type of document		Scientific article	x	Book chapter	<input type="checkbox"/>	Book	<input type="checkbox"/>	Report	<input type="checkbox"/>
		Project deliverable	<input type="checkbox"/>	Policy/strategy document	<input type="checkbox"/>	Other	<input type="checkbox"/>		
Comment on 5:									
6. System level (if applicable)		Global	x	European	<input type="checkbox"/>	National	<input type="checkbox"/>	Sub-national	<input type="checkbox"/>
Comment on 6:		The article is not specific about the locality it addresses.							
7.1 Country focus (if applicable, please specify)		None							
7.2 Country/ies of origin indicated by institutional affiliation of editor(s)/ author(s) (if applicable, please specify)		Norway, Netherlands							
Comments on 7:									

Data and indicator availability				
8.1 Data, indicators, measurements	Document contains data	<input type="checkbox"/>	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	<input type="checkbox"/>	If yes, please list source(s): (URLs, data banks, reports, statistics, etc.)	
Comment on 8.2:				
Guiding questions for review				
<i>- please add page numbers where appropriate -</i>				
9. How is RRI characterised? (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)		None		
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, ...)		Ethics		
9.3 Which arguments are presented in support or rejection/criticism of RRI?		None		
9.4 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, TA, Constructive Technology Assessment (CTA)		
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 characterised and what are they aiming at (strategies, funding initiatives, regulation etc.)?		No policies are addressed, the article relates to technological development per se, particularly using examples from telecare technologies.		
10.2 Which approaches, instruments are discussed to facilitate the uptake of RRI?		Ethical-constructive technology assessment (eCTA)		
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?	
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)	
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.) Ethics	
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...)?	No.
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, CTA, TA, ethical technology Assessment (eTA)
Comments on 12:	

<p>13. Are other important "dimensions" / aspects of RRI discussed, presented which are so far not covered by MoRRI?</p>	<p>ETA should "serve as a tool for identifying adverse effects of new technologies at an early stage of technological development" (p. 1). ETA should assess and address the social implications of new and emerging technologies while the technology is still in the making. Kiran et al. criticise this approach: first, eTA only focusses on adverse effects of technology and does not consider positive ones; second, they criticise the checklist approach that narrows down "the moral assessment of new technologies (...) to evaluating a list of pre-defined ethical issues" (p. 2). Such an approach which only takes into account established ethical principles would fail to consider the dynamics and change in ethics and "how ethical principles may be affected by new technologies" (p. 1); third, the checklist approach starts from a universal list of ethical principles and fails to recognise differences in technologies and between different actors. The paper wants to go beyond the checklist approach and introduces eCTA. The key feature of eCTA is "that ethical implications of technology are analysed and evaluated in a potentially dynamic way, rather than against a set of unchanging, given ethical principles" (p. 3). Summarising, the eCTA approach developed in this paper includes four principles:</p> <p>First, technologies do not only have implications for moral frameworks and social processes at the macro-level, but also for the everyday lives of their users. This micro-perspective on technologies-in-use is needed to assess how technologies mediate human-world-relations, including moral routines and practices. eCTA studies should include a systematic thinking through and assessment of the various possible forms of mediation in order to make an informed decision about desirable futures of new technologies.</p> <p>Second, eCTA should be framed in terms of technology accompaniment rather than assessment. This change in conceptualisation is important because we can never step out of the mediations that shape our moral frameworks. Consequently, eCTA should start "from within", that is, addressing ethics of technology while they are being developed, implemented and used.</p> <p>Third, eCTA should focus on the accompaniment of both the design and the appropriation of technological medications. This accompaniment should be done in such a way that design practices incorporate openness to situatedness, alternative lifeworlds and changing moral routines.</p> <p>Fourth, eCTA should address practices of subject constitution, not only in terms of how human beings are shaped by technologies but also in terms of the moral responsibility persons have to actively shape their lives in accompaniment with these new technologies. More specifically, eCTA should aim to make visible how this moral responsibility is enacted in daily life, taking into account the different forms of subject constitution, including use, non-use and selective use. These insights can be used as input in eCTA workshops in order to create bridging events between designers, users and non-users (p.12).</p>
<p>14. Anything else deemed relevant?</p>	
<p>15. General comments and remarks</p>	
<p>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)</p>	

Mali et al.: National Ethics Advisory Bodies in the Emerging Landscape of Responsible Research and Innovation.

Basic information				Document no.:		007			
Reviewer's name				Erich Griessler					
1. Bibliographical information (author/s, year, title, editor/s, journal/book, volume, publisher, place of publication, pages, DOI)		Mali, F., Pustovrh, T., Groboljsek, B., & Coenen, C. (2012). National Ethics Advisory Bodies in the Emerging Landscape of Responsible Research and Innovation. <i>Nanotechnologies</i> , 6(3), 167–184. DOI:10.1007/s11569-012-0157							
2. Abstract (copy and paste)		The article examines the role played by policy advisory institutions in the governance of ethically controversial new and emerging science and technology in Europe. The empirical analysis, which aims to help closing a gap in the literature, focuses on the evolution, role and functioning of national ethics advisory bodies (EABs) in Europe. EABs are expert bodies whose remit is to issue recommendations regarding ethical aspects of new and emerging science and technology. Negative experiences with the impacts of science and technology in the past have resulted in calls for increased transparency and broader participation and pluralism in expert advice and policy decision-making. Do national EABs function as inclusive, anticipatory "hybrid forums"? Or do they resemble more "classical" expert-oriented bodies, inspired by technocratic or decisionist approaches? As part of the empirical analysis of the role and functioning of institutional ethical advisory structures in 32 European countries, an extensive analysis of EAB websites and the content of publicly available documents on such institutions has been carried out, supplemented by an online survey of representatives of the EABs. One major finding of the empirical analysis is the very uneven distribution of "hybrid forum" features of EABs across Europe.							
3. Main focus (key dimensions according to MoRRI)		RRI / RI	<input type="checkbox"/>	Citizen participation	x	Science literacy	<input type="checkbox"/>	Gender equality	<input type="checkbox"/>
		Open access	<input type="checkbox"/>	R&I governance and ethics	x	Other	<input type="checkbox"/>		
Comment on 3:									
4. Main perspective (multiple entries possible)		Theoretical, conceptual	<input type="checkbox"/>	Methodological	<input type="checkbox"/>	Policy-oriented	<input type="checkbox"/>	Evaluative	x
		Other	<input type="checkbox"/>						
Comment on 4:									
5. Type of document		Scientific article	x	Book chapter	<input type="checkbox"/>	Book	<input type="checkbox"/>	Report	<input type="checkbox"/>
		Project deliverable	<input type="checkbox"/>	Policy/strategy document	<input type="checkbox"/>	Other	<input type="checkbox"/>		
Comment on 5:									
6. System level (if applicable)		Global	<input type="checkbox"/>	European	x	National	x	Sub-national	<input type="checkbox"/>
Comment on 6:									
7.1 Country focus (if applicable, please specify)		EU member states, Serbia, Iceland, Norway and Switzerland							
7.2 Country/ies of origin indicated by institutional affiliation of editor(s)/ author(s) (if applicable, please specify)		Slovenia							
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)	p. 178
Comment on 8.1:		The article includes a typology based on qualitative data.		
8.2 Reference made to data, indicators measurements in other sources	Document refers to relevant sources	<input type="checkbox"/>	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 characterised? (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)		<p>RRI is characterised as "transparent, participatory and responsive governance processes which make societal actors responsible to one another with respect to the ethical acceptability, sustainability and societal desirability of the progress of science and technology" (p. 168). They refer to:</p> <ul style="list-style-type: none"> • von Schomberg, R. (2011). <i>Towards responsible research and innovation in the information and communication technologies fields, a report from the European Commission Services</i>. Luxembourg: Publication Office of the European Union. • von Schomberg, R. (2012). Prospects for technology assessment in the framework of responsible research and innovation. In M. Dusseldorp & R. Beecroft (Eds.), <i>Technikfolgen abschätzen lehren: Bildungspotenziale transdisziplinärer Methoden</i> (pp. 39–61). Wiesbaden: VS Verlag. 		
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, ...)		<p>The authors emphasise the dimensions of ethics and participation. Given the criticism of expert-oriented and elitists policy advice in the literature – because it would be elitist, biased towards the interests of scientists and would not fit into democracy as a form of political government, because the experts are not elected and don't have a constitutional role (pp. 173ff) – they advocate hybrid fora which should be able to integrate the public into deliberation in ethically sensible technologies. "In accordance with this trend [of RRI; note EG] one may argue that national EABs [Ethics Advisory Bodies; note EG] should be conceived of or designed as open and inclusive, anticipatory 'hybrid forums', rather than as expert bodies whose work is insufficiently transparent" (p. 168).</p>		
9.3 Which arguments are presented in support or rejection/criticism of RRI?		<p>The authors make a connection between the aspects of ethics and participation and claim that they might have an impact on innovation processes. They refer to socially robust knowledge gained in hybrid forums: "Such knowledge may help to balance innovation and precaution and to integrate questions of ethical relevance and societal acceptability and desirability into innovation processes on the basis of broad societal deliberation aimed at achieving consensus or partial agreements." (p. 168)</p>		

9.4 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, TA, anticipatory governance, deliberative democracy
Comments on 9:	The authors strongly use STS literature, e.g. socially robust knowledge. They connect the critique on expert-oriented TA in the past with current criticism of EABs for lack of participation. They use anticipatory governance literature and literature on deliberative democracy to advocate EABs and participation, respectively.
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 characterised and what are they aiming at (strategies, funding initiatives, regulation etc.)?	
10.2 Which approaches, instruments are discussed to facilitate the uptake of RRI?	EABs are discussed as an instrument to promote RRI. They are described as a promising mechanism for furthering RRI if they incorporate participatory elements.
10.3 Which problems, barriers, potential drawbacks for RRI are being discussed, how could they be addressed?	<ul style="list-style-type: none"> • One basic problem is that the majority of EABs are not participatory enough. Most "still function mainly as expert bodies rather than as hybrid forums. There are many deficiencies with regard to public participation in the work of EABs". (p. 181) • The authors recognise a divide between "western" member states and "post-communist" countries. The latter, because of a political culture of closed policy circles, stick to an elitist and non-participatory model of EABs (p. 181). • Many of the topics deliberated in EABs are highly complex. Therefore information would be necessary in order to enable people to act as "scientific citizens". • There is little "hard" impact on policy-making: "political institutions are in most cases not required to take the work results of EABs into account. The impact of most EAB work results should be seen on the context of 'soft' regulatory instruments". (p. 181)

Comments on 10:	<p>Empirical analysis presented in the paper shows that: "five of the 21 surveyed EABs (...) practice the most inclusive approaches of public engagement, involving different stakeholders and members of the general public. (...) Another five (...) employ public consultation mechanisms such as surveys, hearings and public events, though these activities (...) do not include formalised dialogues between different stakeholder groups. The largest group consists of 11 EABs which communicate with the public only by providing information (...) about their work, generally publishing their work results either regularly or occasionally" (p. 179).</p> <p>"If the purpose of public involvement in science and technology (...) is to ensure that 'public values are included into scientific considerations' we must conclude that the current 'participatory turn towards active citizen participation in science and technology' is not yet reflected in the work of the surveyed EABs, as most of them do not employ any specific mechanisms for this purpose" (p. 184).</p>
11. Claims regarding the effects of RRI and / or the key dimension (benefits, costs, disadvantages, trade-offs)	
11.1 What claims are being made?	<ul style="list-style-type: none"> • Crises in trust in experts (e.g. GMO and BSE crises) lead to the demand for more openness, dialogue and transparency of scientific advice; both, expert advice, stakeholder and citizen participation – are needed. • Transparent and inclusive processes which take up the ethical concerns of citizens are not only democratic and recognise on a pragmatic level that research is funded by taxpayer's money, but ultimately might lead to socially robust knowledge and are beneficial for the innovation processes (acceptability).
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)	Empirical data., survey of websites of EABs across Europe, results of a questionnaire with European EABs
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)	Ethics and participation are both not defined.

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...)?	<p>Ethics and Participation are described as complementary and mutually supporting one another. Together they could benefit innovation.</p> <p>"Ideally, such extended institutions and processes would help give rise to scientific and technological innovations that are widely socially acceptable. Given the complexity and uncertainty of the impacts of scientific and technological innovations on society, however, this should not entail a marginalisation of expert knowledge in policy advice on ethically controversial issues in science and technology, but a broadening and enrichment of the advice provided, also by including more academic disciplines and intellectual approaches in the production of knowledge for decision-makers and public discourse on science and technology" (p. 181).</p>
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, constructive TA, anticipatory governance, deliberative democracy
Comments on 12:	
13. Are other important "dimensions" / aspects of RRI discussed, presented which are so far not covered by MoRRI?	No
14. Anything else deemed relevant?	No
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)	

Sakkas: Ethical Expertise facing the public regulation of reproductive biomedical issues. Results from a comparative study between the National Ethics Committee in France and Belgium

Basic information				Document no.:		008			
Reviewer's name				Erich Griessler					
1. Bibliographical information (author/s, year, title, editor/s, journal/book, volume, publisher, place of publication, pages, DOI)		Sakkas, S. (2014). <i>Ethical Expertise facing the public regulation of reproductive biomedical issues. Results from a comparative study between the National Ethics Committee in France and Belgium</i> (unpublished PhD Thesis). Université Catholique de Louvain, Louvain-la-Neuve, Belgium.							
2. Abstract (copy and paste)		National Ethics Committees (NECs) have been dedicated to the specific goal to inform decision-making in the area of bioethics (or the ethics of biomedicine and biotechnologies). The (...) contribution of this thesis is to investigate the use made of the NECs opinions by policy-makers, as an indicator of the ethical experts' influence on the policy-making in the field of reproductive technologies. The objective is so to tackle the following issue: how can we qualify and explain the NECs' influence on the construction of public policies in the sector of reproductive biotechnologies? (p. 1)							
3. Main focus (key dimensions according to MoRRI)		RRI / RI	<input type="checkbox"/>	Citizen participation	x	Science literacy	<input type="checkbox"/>	Gender equality	<input type="checkbox"/>
		Open access	<input type="checkbox"/>	R&I governance and ethics	x	Other	<input type="checkbox"/>		
Comment on 3:		The main focus is on the institutions (National Ethics Committees) that deliberate bioethics and on their impact on actual policy-making. In the last part the paper claims that NECs should become more participatory and inclusive.							
4. Main perspective (multiple entries possible)		Theoretical, conceptual	<input type="checkbox"/>	Methodological	<input type="checkbox"/>	Policy-oriented	<input type="checkbox"/>	Evaluative	x
		Other	<input type="checkbox"/>						
Comment on 4:		The paper evaluates the impact of NECs on policy-making and identifies explaining factors of the influence of these committees on policy-making.							
5. Type of document		Scientific article	<input type="checkbox"/>	Book chapter	<input type="checkbox"/>	Book	<input type="checkbox"/>	Report	<input type="checkbox"/>
		Project deliverable	<input type="checkbox"/>	Policy/strategy document	<input type="checkbox"/>	Other	x	English summary of Ph.D thesis	
Comment on 5:									
6. System level (if applicable)		Global	<input type="checkbox"/>	European	x	National	<input type="checkbox"/>	Sub-national	<input type="checkbox"/>
Comment on 6:									
7.1 Country focus (if applicable, please specify)		France and Belgium							
7.2 Country/ies of origin indicated by institutional affiliation of editor(s)/ author(s) (if applicable, please specify)		Belgium							
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)		The impact of ethics committees is measured by whether they are transcribed into law.			

Comment on 8.1:	"In the case of Belgium, the opinions are not collectively used by policy-makers. Indeed, only fourteen out of thirty-nine issues were influenced by elements presented in the CCBB's opinions (41.02%). Actually, only three opinions out of twelve seem to have a real impact on the content of the three laws. The divergent opinions released by the CCBB allow policy makers to choose between different positions in order to reinforce their own positions, as it is the case in other NECs. Nevertheless, the CCBB is still considered a legitimate experts' committee. The quality of its opinions is never challenged by the policy-makers. In the case of the CCNE, opinions released by the committee have a direct impact on decision-makers, even if its influence is decreasing since mid-2000. The comparison between the CCNE's opinions and the French legislations on ART revealed that 28 out of 37 issues were influenced by elements presented in the CCNE opinions (75.60%). Moreover, 21 opinions out of 32 seem to have a real impact on the content of the French law and are used during the legislatives debates. But since the laws adopted in 2004, the opinions of the CCNE are less used and less requested by the decision-makers." (p.11) NECs have an impact through two mechanisms: (1) the opinions they produce and (2) personal relations to policy-makers.			
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.)	
Comment on 8.2:	The document mentions several indicators which might be further elaborated to specify and determine the impact of NECs on policy-making: Moreover, the paper summarises eight indicators to determine the success of NECs from a great number of papers: <ul style="list-style-type: none">• Influence on decision-making,• Popular media coverage,• Scholarly integrity,• Consensus,• Adequate representation,• Ability to address public concerns,• Ability to engage public ways of moral decision-making,• Its capacity to inform and encourage public reflection (p. 4).			
Guiding questions for review <i>- please add page numbers where appropriate -</i>				
9. How is RRI characterised? (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)	There is no definition of RRI because this is not the scope of the paper.			
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, ...)	The paper deals with the governance of ethics in national ethics committees and their impact on policy-making as well as factors explaining the impact.			
9.3 Which arguments are presented in support or rejection/criticism of RRI?	This is not addressed in the paper.			

9.4 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 characterised 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 being 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?	
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)	
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)	Ethics is not defined in the paper.
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...)?	The paper discusses ethics in its last part, the need for participatory practices within ethics committees to involve the public. "Actually, it seems important to take the public understanding of ethical issues into account and to develop inclusive forms of public participation. In order to include the public into the ethical debate, framing and advisory NECs have to play the role of "facilitator of debate" (p. 13).
12.3 To which concepts, theories,	STS

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)	

Wilms: The Assumption of Scientific Responsibility by Ethical Codes – An European Dilemma of Fundamental Rights

Basic information				Document no.:		009			
				(citavi #)					
Reviewer's name		Erich Griessler							
1. Bibliographical information (author/s, year, title, editor/s, journal/book, volume, publisher, place of publication, pages, DOI)		Wilms, H. C. (2014). The Assumption of Scientific Responsibility by Ethical Codes – An European Dilemma of Fundamental Rights. In J. van den Hoven, N. Doorn, T. Swierstra, B.-J. Koops & H. Romijn (Eds.), <i>Responsible Innovation I: Innovative solutions for Global Issues</i> (pp. 89–96). Dordrecht: Springer. DOI:10.1007/987-94-017-8956-1_6							
2. Abstract (copy and paste)		The latest efforts by research institutions and the European Union to steer scientists into the direction of scientific responsibility are subject to this article. Ethical codes as a mean to achieve this goal are interesting for legal sciences in two aspects. They both stress the concept of normativity and raise questions of fundamental rights. By disclaiming legal validity they could be classified as extra-legal or non-binding norms at first glance. But the non-binding character of these ethical codes put the concept of normativity in question as they are able to interfere with the legal guarantee of freedom of science. It will be shown that the sensitivity of the mechanisms of science demands a consideration of this fundamental right, even if the effects are rather indirect and caused by non-binding measures. The final resolution of ethical conflicts in science is thus not to be found in voluntary ethical codes or recommendations when these norms factually influence their addressees' behaviour in a manner which is contrary to constitutional guarantees.							
3. Main focus (key dimensions according to MoRRI)		RRI / RI	<input type="checkbox"/>	Citizen participation	<input type="checkbox"/>	Science literacy	<input type="checkbox"/>	Gender equality	<input type="checkbox"/>
		Open access	<input type="checkbox"/>	R&I governance and ethics	x	Other	<input type="checkbox"/>		
Comment on 3:									
4. Main perspective (multiple entries possible)		Theoretical, conceptual	x	Methodological	<input type="checkbox"/>	Policy-oriented	<input type="checkbox"/>	Evaluative	<input type="checkbox"/>
		Other	<input type="checkbox"/>						
Comment on 4:									
5. Type of document		Scientific article	x	Book chapter	<input type="checkbox"/>	Book	<input type="checkbox"/>	Report	<input type="checkbox"/>
		Project deliverable	<input type="checkbox"/>	Policy/strategy document	<input type="checkbox"/>	Other	<input type="checkbox"/>		
Comment on 5:									
6. System level (if applicable)		Global	<input type="checkbox"/>	European	x	National	<input type="checkbox"/>	Sub-national	<input type="checkbox"/>
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)		Germany							
Comments on 7:									
Data and indicator availability									
8.1 Data, indicators, measurements		Document contains data	<input type="checkbox"/>	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	<input type="checkbox"/>	If yes, please list source(s): (URLs, data banks, reports, statistics, etc.)	
Comment on 8.2:				
Guiding questions for review				
<i>- please add page numbers where appropriate -</i>				
9. How is RRI characterised? (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)		Responsibility is not defined, but broadly addressed as "responsibility for the outcomes of research" (p. 89).		
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, ...)		Ethics: The article addresses the question whether ethical codes as form of soft law are suited to promote responsibility in research. However, the author is critical about the notion of responsibility because it could conflict with the freedom of science, which is guaranteed by constitution (p. 90). He argues: "A profession of science that would consider each impact of its research would be very welcome and from an ethical point of view it would be also highly recommendable. An obligation to remain accountable for all the impacts science may have, would on the other hand interfere with the actual essence of the freedom of science. Hence, scientific freedom wouldn't be valued as equivalent to other fundamental rights, an unacceptable result from the perspective of The Charter (European Charter of Fundamental Rights)" (pp. 94ff).		
9.3 Which arguments are presented in support or rejection/criticism of RRI?		The author argues that the European Commission, which issued a non-binding "European Code of Conduct for Responsible Nano-Science and Nanotechnologies Research" should not continue to use non-binding instruments or soft regulation in the area of responsible research and innovation. Soft regulation is used in many areas to "achieve voluntary compliance and to avoid actual legislative measures", however, this is mainly done in "private bodies like companies or institutions". The European Commission should not do that. The Commission should choose a cooperative approach, involving various actors in a "specific ethical discourse" to adopt "a more definite and detailed regulatory instrument (...) which would nevertheless would comply with fundamental guarantees of the European Union like freedom of science and the principle of proportionality, if a harmonious European regulation is aspired" (p. 95). If this is impossible, the question of responsible innovation should be tackled by member states.		
9.4 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 characterised and what are they aiming at (strategies, funding initiatives, regulation etc.)?	European Code of Conduct for Responsible Nanoscience and Nanotechnologies Research
10.2 Which approaches, instruments are discussed to facilitate the uptake of RRI?	Ethical Codes, soft-law, non-binding instruments
10.3 Which problems, barriers, potential drawbacks for RRI are being discussed, how could they be addressed?	Ethical Codes which try to promote RRI might conflict with the freedom of science as guaranteed in The Charter of Fundamental Rights.
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?	Soft law and ethical codes might work well because "they facilitate the setting of norms by horizontal cooperation instead of hierarchical regulation. (...) Especially when sensitive issues like ethics are at stake, the inclusion of the addressed actors can on the one hand augment acceptance of norms and on the other hand turn to account the variety of faculties of the addressees to increase the quality of norms" (p. 91). The author refers to ethical codes towards "scientific misconduct and best practices for laboratory security" which have been developed in the US and Europe. Also research organisations such as the Max-Planck-Society adopted such regulation and the European Commission adopted a code of conduct for responsible nanoscience and nanotechnology research. The author is critical about the EC adopting such an approach because it would be in conflict with The Charter of Fundamental Rights.
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)	
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)	Ethics
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...)?	No

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, ...)	Law
Comments on 12:	
13. Are other important "dimensions" / aspects of RRI discussed, presented which are so far not covered by MoRRI?	No
14. Anything else deemed relevant?	The paper does only address the normative question about whether the approach of soft law is suitable to promote RRI on a European level. The article does not deal with the question about the impact of soft law on practicing RRI and its broader impact in democratic, social and economic terms.
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)	