



Global Model and Observatory for International  
Responsible Research and Innovation Coordination

## Deliverable 2.1: Network of Networks









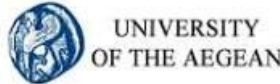






**"This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 321489"**

## Deliverable 2.1: Network of Networks

Document No.			
Workpackage No.	WP2	Workpackage Title	Network
Start Date:		Revision Date:	03/072014
Author(s)		John Pearson (FUNDP)	
Editor		Zaharya Menevidis (Fraunhofer)	
Contributors		All	
Status		R, PU	
Date		<u>03/09/2014</u>	

\* **R = Report**, P = Prototype, D = Demonstrator, O = Other **PU = Public**, PP = Restricted to other programme participants (including the Commission Services), RE = Restricted to a group specified by the consortium (including the Commission Services), CO = Confidential, only for members of the consortium (including the Commission Services).

No.	Partner Name	Logo
1	Fraunhofer IPK	
2	Signosis Spri	
3	De Montfort University	
4	University of Namur	
5	Technical University of Berlin	
6	University of Oxford	
7	Geolmaging Ltd	
8	University Sienna	
9	University of the Aegean	
10	University Malaysia Sarawak	
11	Universidad de Chile	
12	Kyushu Institute of Technology	
13	Arbeiter Samariter Bund Wien Gesundheits und Soziale Dienste Gemeinnutzige GmbH	

## Table of Contents

Figures .....	6
Tables.....	7
Abbreviations .....	8
Executive Summary .....	9
1 Introduction .....	10
2 Theoretical Approach of the document.....	12
2.1 Role of Deliverable in the Overall Project .....	12
2.2 Structure of the Deliverable .....	13
3 Section One: Key Responsible Research and Innovation Actors.....	17
3.1 Overview .....	17
3.2 Business.....	18
3.3 National Governments .....	19
3.4 Civil Society Actors .....	20
3.5 Trans-national Governance (European Union) .....	23
3.6 International Governmental Organisations .....	28
3.7 Scientific Research Projects .....	30
3.8 Policy Research Community .....	31
3.9 Summary of Section One.....	32
4 Section Two: Existing Theoretical Approaches to RRI.....	34
4.1 Overview Theoretical Landscape .....	34
4.2 Attempts to provide definitions of RRI .....	34
4.3 Summary of Section Two .....	36
5 Section Three: RRI Funding Structures.....	37
5.1 Main Funding Sources.....	37
5.2 Sustainability and Credibility.....	37
5.3 Summary of Section Three .....	38
6 Section Four: RRI Dissemination Structures.....	39
6.1 Funding Networks .....	39
6.2 Online Tools.....	39
6.3 Conferences .....	40
6.4 Academic Journal .....	40
6.5 RRI Codes of Conduct and Guidelines .....	40
6.6 Mainstream Media.....	40
6.7 Summary of Section Four .....	41
7 Section Five: Beyond the European Context.....	42
7.1 Equivalent Structures .....	42
7.2 Potential Issues of Concern.....	42
7.3 Summary of Section Five.....	43
8 Online Network of Stakeholders for the Forum and the Observatory .....	44
8.1 Applying Stakeholder Analysis in RESPONSIBILITY.....	44
8.2 Selecting stakeholders in the context of RRI.....	44
8.3 Application of the concept of stakeholder.....	45
8.3.1 RRI Stakeholders and Project Stakeholders – Representativity.....	45
8.3.2 Broad versus Narrow Conceptions of Stakeholders .....	46
8.4 Stakeholder analysis adapted to the project .....	47
8.4.1 Understand Context: Institutional Background .....	47
8.4.2 Identify Issue: RRI Issues.....	48
8.4.3 Identify Stakeholders .....	49

---

8.4.4	Gather Data on Stakeholder Views, Interests etc.....	53
8.5	Template to use when suggesting stakeholders.....	54
8.6	Data Gathering Discussion: Creative Ways to Deal with Representativity Problems...	55
8.7	Contribution to the stakeholder selection process.....	57
9	BIBLIOGRAPHY.....	58

## Figures

Figure 1: Main RRI networking structures.....	13
Figure 2: Main RRI actors in a governance structure .....	17
Figure 3: RRI Networks & Stakeholders in RRI .....	48
Figure 4: Online Stakeholder Network list that can be only accessed with permission .....	57

## Tables

Table 1: Completed FP 7 RRI relevant Co-ordination and Support Action Projects.....	24
Table 3: Running FP 7 RRI relevant Research Projects.....	24
Table 2: Running FP 7 RRI relevant Co-ordination and Support Action Projects .....	25
Table 4: RRI Policy Alternatives .....	27
Table 5: Existing RRI Theories.....	35
Table 6: Areas to which RRI has been or could be applied. ....	49
Table 7: Business networks Stakeholders registration.....	50
Table 8: Research Stakeholders registration.....	50
Table 9: Civil Society Stakeholders registration .....	51
Table 10: Regional Governments Stakeholders registration.....	51
Table 11: National Governments Stakeholders registration .....	51
Table 12: International Governmental Organisations Stakeholders registration.....	52
Table 13: Scientific Projects Stakeholders registration .....	52
Table 14: Gathering Stakeholders views and interests .....	53
Table 15: Stakeholder Selection Template.....	55
Table 16: Stakeholder Representativity Check.....	56

## Abbreviations

Term	Explanation
ICT	Information and communication technology
IGF	Internet Governance Forum, International Governance Institution Funding (e.g. UN or other International Governmental Organisation)
MVI	Maatschappelijk Verantwoord Innoveren (Socially Responsible Innovation)
NGF	National Government Funding (e.g. government or national research council funded project)
NGO	Non-Governmental Organization
NWO	Nederlands Organisatie voor Wetenschappelijk Onderzoek
RGF	Regional Government Funding (e.g. EU FP7 or other regional funding source)
RRI	Responsible Research and Innovation



## Executive Summary

This deliverable describes the methodological approach for the network and stakeholder selection for setting up an online network of networks for the Forum and Observatory. The names of the stakeholders are on a protected online registry and can only be accessed by project partners with permission.

The report examines five main features of RRI networks: the main actors, the theoretical structures, the funding sources, the dissemination structures, and the possibility of expanding RRI beyond the European context. Six main actor groups in RRI networks are distinguished: national governments; regional governments; international governmental organisations; civil society actors; businesses, scientific research projects, and policy researchers.

Although RRI has emerged recently as a theoretical approach, the number of definitions of the concept has proliferated quite rapidly – as is shown in the discussion of RRI theories later in this deliverable. In terms of constructing a network, this raises something of a dilemma. At present, the main sources of funding for RRI networks and projects have been regional (i.e. EU) and national government funding bodies with some extra support from independent research bodies and foundations. Some RRI projects have succeeded in obtaining funding from businesses and private sources – obtaining such funding seems vital for the long term sustainability of the Forum and Observatory.

Existing dissemination structures for RRI are the funding streams for RRI, in addition to online sources such as blogs and forums, and conferences. It is argued that such structures are potentially effective but need more co-ordination and a focus in an overarching structure to avoid fragmentation.

Increasing attention is being paid to the possibility of expanding RRI beyond the European context – for example, through governance structures at the global level in the Progress project. Given that RRI is still an emergent concept and is not clearly defined [1] there is currently room to address a range of different conceptions from both within and beyond the European context – this is something that may need to be taken into account in the design of the forum.

# 1 Introduction

This deliverable examines five main features of RRI networks:

- the main actors,
- the theoretical structures,
- the funding sources,
- the dissemination structures,
- and the possibility of expanding RRI beyond the European context.

## RRI Actors

The initial investigation has distinguished six main actor groups in RRI networks: national governments; regional government (in this deliverable, the EU is the main focus because until now it has been the most important regional actor in the development of RRI); international governmental organisations; civil society actors; businesses, scientific research projects (those carrying out research relevant to RRI, regardless of whether they are aware of RRI), and policy researchers (those researching RRI as a policy tool, or those with an interest in similar concepts).

## RRI Theories

RRI emerged recently as a theoretical approach but the number of definitions of the concept has proliferated quite rapidly – as is shown in the discussion of RRI theories later in this deliverable. In terms of constructing a network, this raises something of a dilemma. We want RRI as a concept to remain flexible enough to deal with a range of cases and address unforeseen issues, yet coherent enough to form a focal point for debate. This problem might be addressed by stressing the fact that RRI theory consists of procedural, substantive and practical elements: debate could be focused on these elements while leaving their precise content quite open at this early stage.

## Funding Sources

At present, the main sources of funding for RRI networks and projects have been regional and national governments, with some extra support from independent research bodies and foundations. Some RRI projects have succeeded in obtaining funding from businesses and private sources – obtaining such funding seems vital for the long term sustainability of the Forum and Observatory. However, business based funding raises a dilemma between sustainability and credibility: relying too heavily on businesses may undermine the credibility of the forum and observatory in particular. Some projects seem to have addressed this dilemma by relying on a range of different sources of funding and by being very open about their funding sources. Relying on different sources increases the credibility of the Forum and Observatory because it reduces dependency on a single donor that might use its position to exert influence. It also helps avoid the perception that the Forum and Observatory are merely the tools of a single actor. Increased transparency adds to credibility by making it easier for outside observers to raise questions and criticisms that can then be addressed in public if necessary.

## Dissemination Structures

Existing dissemination structures for RRI are the funding streams for RRI, online sources such as blogs and forums, and conferences. It is argued that such structures are potentially effective but need more co-ordination and a focus in an overarching structure to avoid fragmentation. One concrete suggestion is to develop 'dynamic coalitions' on the model of the Internet Governance Forum as a tool to strengthen the RRI Forum or Observatory.

## **RRI Beyond Europe**

Increasing attention is being paid to the possibility of expanding RRI beyond the European context. This aspiration is in fact included in the aims of this project. It is worth examining whether similar dissemination channels to those that exist in Europe can be found in other contexts – in non-European contexts, it is not always clear what the equivalents to institutions such as national research councils or regional research structures might be. Some channels are identified by examining Chile, Japan and especially the Malaysian context. RRI has not yet been disseminated through these channels so it is necessary to consider possible competing networks and concepts – this again raises the issue of distinguishing RRI from other concepts. In very poor countries, the concrete institutional channels referred to may not exist at all (even if some basic infrastructure such as internet access exists). Disseminating RRI through existing channels may only further isolate the least developed countries. Two strategies to address this problem could be developed. First, RRI could be mainstreamed in development discourse, so that, for example, spreading research and innovation to developing countries becomes a part of corporate social responsibility. A second strategy is to focus on how to integrate RRI concerns into the construction of research and innovation infrastructure in places where such infrastructure does not yet exist.

## 2 Theoretical Approach of the document

### 2.1 Role of Deliverable in the Overall Project

The following is the statement of the overall aim of the Responsibility project taken from the description of work:

The RESPONSIBILITY project aims to create a network of stakeholders that would adopt and diffuse a common understanding in Responsible Research and Innovation between different actors in Europe and around the globe. In doing so it will develop a model and provide a tool for international cooperation, the RESPONSIBILITY Observatory, involving the societal, policy and research stakeholders to these activities. It intends to provide practical means and structure a crucial interaction between society and research, providing a set of recommendations and tools to policy makers and active RRI stakeholders in order to take the necessary measures to nest responsible research and innovation into products and services from the very beginning ("efficient RRI by design").

This overall statement of aims can be interpreted as meaning that the main aim of the project is neither provide direct theoretical reflection on the meaning and definition of Responsible Research and Innovation, nor to provide direct empirical research into the use and application of the concept. Rather, the aim of the project is to provide a Forum and Observatory for other actors working in the field of RRI to discuss, develop and disseminate RRI as a concept. The aim of the project is to enable others to construct and implement recommendations, rather than to construct such recommendations directly. Within this overall framework, the role of this 'Report on Network of Networks' deliverable is to provide an overview of both the existing work that has been done to build RRI collaborations and networks, and to provide potential routes for further development of such networks. This contributes to the overall aims of the project by enabling the project partners to see what has already been done in the existing RRI field, to identify particularly important potential partners and stakeholders, and to identify gaps in existing approaches that the Forum and Observatory might contribute to filling.

This task raises something of a dilemma in terms of the appropriate scope. On the one hand, it is unsatisfactory to restrict ourselves to just those projects that explicitly deal with RRI. This is problematic because the RRI concept is still not clearly defined, because there are a number of other theories and practical approaches that overlap considerably with RRI, and because the aim of the Forum and Observatory is (eventually) to disseminate RRI beyond the existing core networks. On the other hand, including all possible projects, theories and approaches that have some potential overlap with RRI would quickly lead to an unmanageable deliverable and even an unmanageable project. The approach taken in this deliverable has been to try to provide an overview of the core structure of existing RRI networks, while drawing on the expertise and contributions of project partners who have suggested possible routes for the expansion of the RRI network. Nevertheless, it is important to be aware of other possibilities for expansion of the network that arise during the development of the project.

The use of the term 'network' is interpreted as broadly as possible, with a rough working definition of 'an extended group of horizontally and vertically connected actors with similar interests or concerns who interact and remain in formal or informal contact to investigate and develop possible mutual interests'. The definition was kept deliberately broad to try to avoid prematurely excluding potential candidates for investigation. For example, 'actors' can include institutions as well as individuals. Similarly, 'formal and informal contacts' can

include organized, structured contacts such as conferences and collaborations on projects, as well as more informal interactions such as blog posts. The reference to ‘horizontal and vertical’ connections is also included to recognize that some RRI networks (such as the Netherlands’ Maatschappelijk Verantwoord Innoveren programme [2]) are already quite structured, with priorities being set by actors and disseminated to other actors in a possibly hierarchical way. Other RRI networks may be less structured.

## 2.2 Structure of the Deliverable

The deliverable consists of five main sections, which address different features of possible RRI networks and a last section (Chapter 8) that describes the methodology of structuring the stakeholders. Where necessary, these sections are further divided into sub-sections. The main sections are shown in Figure 1.

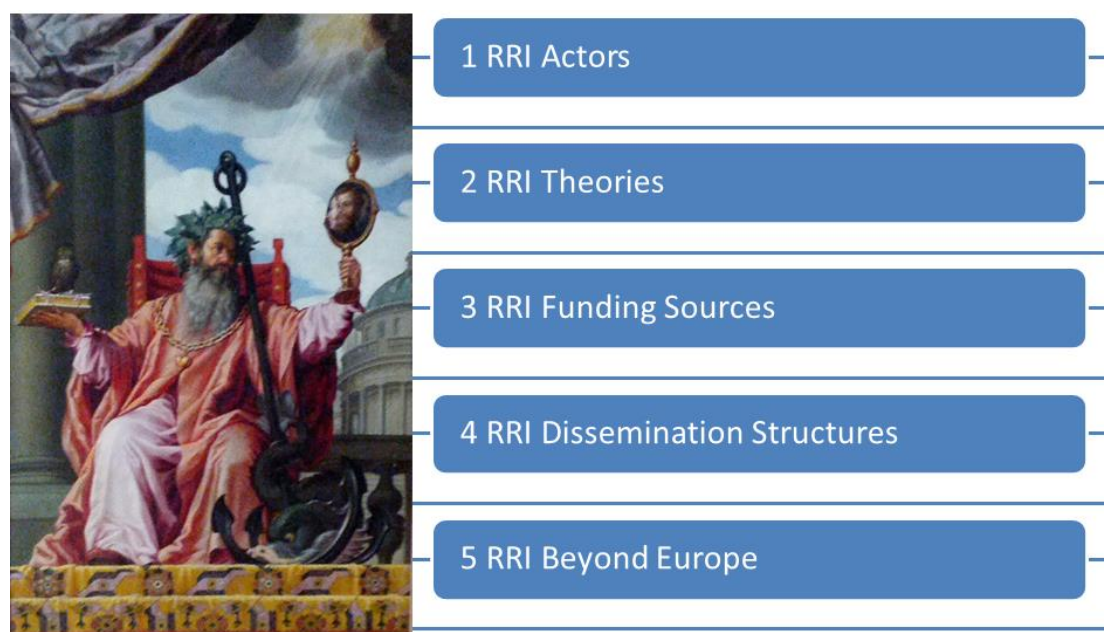


Figure 1: Main RRI networking structures

### Section One: RRI Actors

In order to structure the analysis from the outset, it is worth distinguishing six main actor groups in RRI networks: national governments; regional governments; international governmental organisations; civil society actors; businesses, scientific research projects (those carrying out research relevant to RRI, regardless of whether they are aware of RRI), and policy researchers (those researching RRI as a policy tool, or those with an interest in similar concepts). This set of groups is not intended to be exhaustive, and neither is it intended to exclude the possibility of making further distinctions within the main categories. It is merely intended to organize the discussion at this stage, and hopefully to prompt further reflection on the categories of actors to be included in the Forum and Observatory.

Two main issues emerged from the analysis: first, awareness of RRI among civil society actors seems low on the basis of the research so far; business actors also have a low level of awareness: some businesses use terms such as Responsible Research and Innovation and related terms such as Responsible Innovation. However, the usage of these terms seems much less widespread than influential concepts such as corporate social responsibility. The most prominent actors are thus still national and regional governments and policy and scientific researchers. Inclusion beyond the core group of actors is therefore a priority if we want to avoid RRI becoming a specialised research area rather than an approach with a wide

influence. A further urgent problem is the need to distinguish RRI from similar concepts such as Corporate Social Responsibility, not least because we need to show that it is worthwhile researching what extra value a new concept such as RRI can bring to research ethics and governance.

## **Section Two: RRI Theories**

Although RRI has emerged recently as a theoretical approach; the number of definitions of the concept has proliferated quite rapidly. In terms of constructing a network, this raises something of a dilemma. Given that the stated aim of the Responsibility project is to provide a framework for discussing and evolving the RRI concept, it seems important that RRI as a concept should at this stage remain flexible enough to deal with a range of cases and address unforeseen issues, yet coherent enough to form a focal point for debate. This problem might be addressed by stressing the fact that RRI theory consists of procedural, substantive and practical elements: debate could be focused on these elements while leaving their precise content quite open at this early stage. It is argued that at present RRI theories neglect practical concerns such as the construction of norms in specific contexts and the incentives of actors to engage in constructing norms. One important complexity of discussing RRI is the problem of the scope of our field. There is a dilemma between a narrow focus (restricting our attention to projects that explicitly deal with RRI) and a broad focus (focus on projects that have relevance to RRI but do not explicitly use or refer to RRI concepts). Focusing narrowly on RRI alone is potentially problematic precisely because at least some of the core concerns of RRI theories (rejection of top down governance approaches, a focus on integrating ethical concerns throughout the life of projects, concerns with the social acceptability and relevance of research) are also addressed in previous initiatives, or in parallel projects. Kathy Sykes and Phil Macnaghten provide a useful overview of the way RRI has emerged from other initiatives, particularly those focused on public dialogue [3]. Focusing broadly on a wider range of projects is problematic because it could be argued that an extremely wide range of approaches are relevant to RRI. Investigating related approaches such as Responsible Development (a forerunner to RRI in the USA, according to Fisher & Rip, [4]) or constructive technology assessment [5] would enrich the project. However, including too many different approaches would make the project unmanageable, and would risk losing focus on what (if anything) makes RRI a distinctive and valuable approach. There is therefore a difficult trade-off between a narrow focus and a broad focus.

## **Section Three: Funding Sources**

At present, the main sources of funding for RRI networks and projects have been regional (i.e. EU) and national government funding bodies with some extra support from independent research bodies and foundations. Some RRI projects have succeeded in obtaining funding from businesses and private sources – obtaining such funding seems vital for the long term sustainability of the Forum and Observatory. If the Forum and Observatory are to be sustainable beyond the duration of the current funding, they will presumably need to secure funding from outside sources, including funding from private enterprise. However, business based funding raises a dilemma between sustainability and credibility: relying too heavily on businesses may undermine the credibility of the forum and observatory in particular. As an example of a similar problem at the UN level, many civil society groups are openly hostile or critical of private enterprise: linking the Forum or Observatory to particular private enterprises via funding sources may alienate such groups if they feel they are risk of being co-opted to the interests of the enterprise in question [6]. In general, over-reliance on private funding can potentially hurt both the image of the project (the perception that the Forum and Observatory are vulnerable to co-option, which may discourage some



participants), and the actual running of the project (dependency on private funding may lead to actual cases of undue influence and unfair access if funders use their position to exert influence). Some projects seem to have addressed this dilemma by relying on a range of different sources of funding and by being very open about their funding sources [7]. The first strategy helps reduce reliance on a single source of funding, and thus reduces the chance that dependency could lead to undue influence. The second strategy increases the transparency of the Forum and Observatory. It may also create incentives to enhance credibility: private enterprises may not want to be openly associated with a Forum and Observatory that are perceived as lacking credibility.

#### **Section Four: Dissemination Structures**

Existing dissemination structures for RRI are the funding streams for RRI, online sources such as blogs and forums, and conferences. It is argued that such structures are potentially effective but need more co-ordination and a focus in an overarching structure to avoid fragmentation. One concrete suggestion is to develop 'dynamic coalitions' on the model of the Internet Governance Forum as a tool to strengthen the RRI Forum or Observatory.

The Internet Governance Forum (IGF) is a useful model because it is an attempt to implement some of the recommendations of the Cardoso report on civil society [8]. The IGF project thus attempts to construct a governance model that is appropriate for trans-national, multi-stakeholder governance, and thus is a source of useful lessons for constructing RRI in the European context. More specifically, the 'dynamic coalitions' model is a useful potential approach because it allows stakeholders to raise their own concerns and issues, but to do so in a structured way, and requires them to get support from other stakeholders when they do so [9]. A discussion of the relationship between the IGF and the Cardoso report can be found in [10]

Alternative dissemination channels could include an RRI journal (although a publication strategy for RRI articles might be more effective), procedures such as public procurement processes (into which RRI requirements could be inserted, as van den Hoven proposes [11]), and mainstream media. Of these latter three channels, mainstream media seems most important in order to raise the public profile of RRI. If we want members of the public to visit and use the Forum and Observatory, we will need to raise awareness of the concept and its potential. Mainstream media may be a useful way of reaching a wider audience who are not yet aware of RRI, and thus could not be expected to actively search for it. An example of a mainstream media outlet to raise awareness of RRI is the BBC Future website, which focuses on new technologies and on emerging problems and their solutions, including sometimes addressing ethical issues [12].

#### **Section Five RRI Beyond Europe**

Increasing attention is being paid to the possibility of expanding RRI beyond the European context – for example, through governance structures at the global level in the PROGRESS [13] project. Given that RRI is still an emergent concept and is not clearly defined [1] there is currently room to address a range of different conceptions from both within and beyond the European context – this is something that may need to be taken into account in the design of the forum. This aspiration is in fact included in the aims of this project. There are three main considerations here. First, it is worth examining whether similar dissemination channels to those that exist in Europe can be found in other contexts – channels are mainly understood here as institutional structures (again, the clearest examples are the various funding and research councils existing in different countries, but others would be universities themselves and businesses carrying out research and development) through which RRI might be disseminated or at least discussed. It is nowhere supposed that such

channels are free of resistance and dispute – we will have to take account of the possibility of differences of interpretation and motivation. Nevertheless, we have to be aware of the institutional possibilities for spreading RRI, or at least debate about RRI – RRI as a governance concept cannot exist in an institutional vacuum. Some channels are identified by examining the Malaysian context [14].. However, this leads to three further issues. First, RRI has not yet been disseminated through these channels so it is necessary to consider possible competing networks and concepts – this again raises the issue of distinguishing RRI from other concepts. Second, in very poor countries, the channels referred to may not exist at all. Disseminating RRI through existing channels may only further isolate such very poor countries. Three strategies to address this problem could be developed. First, we could take a creative approach to tailoring RRI to whatever dissemination channels exist in the countries in question, including looking for parallel dissemination channels that have worked for other issues. Second, RRI could be mainstreamed in development discourse, so that, for example, spreading research and innovation to developing countries becomes a part of corporate social responsibility. A third strategy is to focus on how to integrate RRI concerns into the construction of research and innovation infrastructure (once again, where infrastructure is taken to mean a broad range institutional structures dealing with research, from universities and research councils to private organisations and businesses carrying out research and design) in places where such infrastructure does not yet exist.



## 3 Section One: Key Responsible Research and Innovation Actors

### 3.1 Overview

As with other policy domains in modern societies, Responsible Research and Innovation (RRI) is embedded in complex institutional structures: it both emerges from and is intended to guide a wide range of institutional actors. It is also important to stress that the project aims to develop governance structures – on some views, governance is a broad concept that is not merely interchangeable or a cognate of government. Rather, on this view governance covers a broad spectrum of different modes of steering or guiding different types of actors. For example, producing non-binding guidelines can be seen as a particular mode of governance that is especially relevant in situations where a single source of authority (such as a Hobbesian sovereign) is absent (as an example of this type of approach, Jacques Lenoble and Marc Maesschalck discuss a range of different modes of governance, stretching beyond binding rules to other normative structures: [15]. It is also quite clear from our initial distinction between some of the main groups of actors that the various actors have an unequal influence over the emergence of a possible RRI regime. We start by providing an overview of our distinctions between the main institutional actors in contemporary societies, and then proceed to assess which of these have been most influential in the emergence of RRI up to now.

The following Figure 2 shows an initial list of the main actors in a complex governance structure.



Figure 2: Main RRI actors in a governance structure

This list is intended to be a starting point for further analysis: at this point in the project, it is mainly intended to help us identify the main categories of actors involved in constructing RRI norms, as well as actors who have been excluded or who have not participated in these processes. The list can be further sub-divided in order to provide a more fine-grained analysis at a later point. Any attempt at classification raises a dilemma: an excessively broad categorization can result in dissimilar cases being categorized together. On the other hand, an excessively narrow classification can result in overlaps or problems in deciding where to place a particular item. In the case of this project, an attempt to address this problem has been made by using broad categories and narrower sub-divisions within those categories: this allows us to move between different levels as appropriate.

The above classification also differs from van den Hoven's [16] classification of RRI affected actors into research funders, research and development institutions, European citizens, and legislators and regulators. Although useful in the European context, van den Hoven's classification is rather narrow and does not make room for the expansion of RRI beyond the European context. Using this initial taxonomy of governance actors and our overview of existing RRI actors, we can start to assess which types of actors have played the most significant roles in the development of RRI.

### 3.2 Business

Compared to the level of support and interest from the research and policy communities, support and awareness by businesses in regard to RRI has up to now been relatively low. While tracing the histories of concepts is a slippery task, it can be argued that RRI only began to gather momentum and be distinguished from related approaches to ethics as recently as 2003-2004, through initiatives such as the US Nanotechnology Research and Development Act [17], which led to the setting up of the Centre for Nanotechnology and Society at Arizona State University (CNS-ASU, 2003). The short history of RRI can be compared with business ethics (which some authors trace back to the early 1970s; De George, 2012 [18]) and corporate social responsibility (which, for some authors is as old as commercial activity itself (Carroll, 2008 [19])).

Compared to the level of interest in other forms of ethical governance (including corporate social responsibility, human rights obligations for business, international framework agreements etc), few businesses have shown explicit interest in RRI and there have not been many attempts by businesses to develop their own RRI codes. There are some notable exceptions to this: major business enterprises such as Siemens [20], L'Oreal [21], IBM [22] Groupe SEB [23], Glaxo SmithKline [24], Corin [25] and Shell [26] make some reference to 'responsible innovation' on their websites, although it is not yet clear if these references are inspired by the concept of RRI emerging from the European governance context.

Business has also played a limited role in funding RRI projects, with the notable exception of the 'Walking with Stakeholders' run by the MATTER think tank [27]. The following businesses provided funding for the project: AstraZeneca, College Hill Communications, GSK, Leatherhead Food Research, Marks and Spencer, Nestle and Unilever.

Initiatives with a specific focus on Small and Medium Enterprises are also rather difficult to find: an exception is the KARIM (Knowledge Acceleration and Responsible Innovation Meta-Network) Low Carbon Observatory, which has an explicit focus on SMEs [28].

## Analysis

There are several possible considerations that arise from what -according to the investigation so far - is a low level of adoption of RRI among businesses.

One reason for this low level of uptake may simply be that RRI is a relatively new concept, has not been widely disseminated, and even lacks a clear, widely accepted definition. As yet, there have been relatively few initiatives that could be compared to the UN's Business and Human Rights agenda [29] or the OECD's guidelines for business and human rights [30] – this may also explain the limited level of interest in RRI among businesses. However, the very existence of these and similar initiatives raises the problem that RRI will have to distinguish itself clearly from more established business ethics norms and practices (particularly given that RRI itself has roots in previous approaches, as noted above – it is therefore important to reflect on strategies of dissemination if we want RRI to reach the business community. Part of this process includes providing a space for stakeholders to reflect on and ultimately clarify the RRI concept, distinguishing it from other concepts and clarifying what it adds to those concepts.

One possibility would be to focus on RRI as a specific tool for business in its interaction with research – RRI norms for business would address the specific problems that arise when businesses take up innovations from scientific research from different sources, including government funded research, public private partnerships, and their own research and development programmes, rather than attempting to formulate an alternative to existing business ethics approaches. This strategy would give RRI a more specific function that sets it apart from the kinds of initiatives referred to above.

## 3.3 National Governments

The primary contribution that national governments have made to promoting and disseminating RRI is through national scientific research funding bodies. Two of the most prominent examples of national government funding for RRI are the Netherlands' Maatschappelijk Verantwoord Innoveren (MVI – Socially Responsible Innovation) programme [31], funded by the Dutch Nederlands Organisatie voor Wetenschappelijk Onderzoek (NWO) and the UK Engineering and Physical Sciences Research Council's (EPSRC) support for Responsible Research and Innovation projects [32]. These two different programmes reflect both differences in the countries' research cultures (e.g. in the Netherlands, academic research is funded by a single body whereas in the UK funding is distributed by research councils divided according to different academic disciplines). However, the different programmes arguably also reflect somewhat different strategies for integrating RRI into research through funding programmes.

The Netherlands MVI programme sponsors small and medium scale interdisciplinary projects which are chosen on the basis of research themes (themes for the 2012 round of funding included 'The Observation Society' and 'The Healthcare Sector on the Move'). Around 30 projects were sponsored in the 2012 round of funding.

In the UK, the EPSRC has sponsored projects on Nanotech [33], Geo-Engineering [34] and ICT [32] as pilot studies for an RRI framework. The Nuffield Council (an independent, non-governmental agency) has sponsored a similar study in the field of synthetic biology, with the similar aim of producing an RRI framework [35]. It should be stressed that at present, the EPSRC's sponsorship of RRI projects remains rather ad hoc and does not constitute a fully integrated RRI programme.

Besides these existing programmes, a number of possible future partnerships could be developed with government agencies that deal with ethical issues in research, even if these agencies may not yet have taken up the RRI concept. Examples of such agencies in Europe and beyond include: [36], [37], [38], [39], [40], [41], [42], as well as the Malaysian government departments mentioned above.

### Analysis

The approaches of the Netherlands' MVI programme and the EPSRC's approach can be contrasted in terms of their overall structures. The MVI programme involves sponsoring interdisciplinary projects from a wide range of research fields. This has the advantage of broadening the potential scope of RRI, and of ensuring that it is focused on applications of the RRI concept. However, the MVI programme does not seem to include measures designed to formulate an overall conception of RRI from the diverse projects that are sponsored. An MVI conference was held in 2012, but not all the projects were represented and there did not seem to be a clear or explicit attempt to draw out an overall theoretical conception of RRI<sup>1</sup>. It could be argued that the MVI programme thus lacks an adequate structure for providing an overview of RRI - it would of course be unwise for the Now to adopt a single rigid definition of RRI given that the concept is still emerging, but the apparent lack of a dedicated space for reflection on the way the concept is used by different actors seems problematic. Two further concerns with the MVI programme are the following. First, that (given the lack of a string attempt to generate an overarching concept of RRI), there is a danger that RRI could become synonymous with interdisciplinary research. Second, it is not clear from the current investigation how the areas of priority for funding were arrived at – the MVI programme might be seen as a 'grand social challenges' approach to RRI, but it is not clear if this is the same as making research responsive to public concerns and allowing for public participation in setting research priorities.

In contrast to the MVI programme, the EPSRC's projects are focused on slightly broader issue areas (e.g. nanotech or geo-engineering in general, as opposed to more specific applications of research) and make a more explicit effort to develop a normative framework for RRI that might eventually be generalised. Although the EPSRC's support for RRI (and support from other bodies such as the Nuffield Council) does not yet constitute a fully-fledged RRI research programme, it could be argued that the focus on an overarching RRI concept is more likely to contribute to the construction of an RRI network, since it gives a common focus for present and subsequent projects.

## 3.4 Civil Society Actors

Civil society is another widely used but not always clearly defined concept. A useful starting definition for the purposes of further discussion comes from van Rooy, who defines civil society broadly as 'the population of groups formed for collective purposes primarily outside of the state and marketplace' [43]. The focus is thus clearly on collective forms of action. Two further debates within the literature add further complexity to this basic definition. First, there is some controversy between 'good governance' and 'resistance' concepts of civil society. The former conception argues that civil society has a delicate relationship of mutual support with the state and with markets, generating trust that upholds these institutions

---

<sup>1</sup> The Science in Dialogue conference held in Denmark in 2012 contrasted with this approach, in that attempts were made to contribute to an overall RRI framework. The Science in Dialogue conference could thus be seen as exemplary as an approach to bringing together researchers from a range of disciplines to construct an overall conception of RRI.

and providing goods that they cannot provide, while at the same time depending on states and markets. The latter conception - drawing on Gramsci - stresses that civil society is also a site for resistance to hegemony and of challenges to the existing order. A second controversy is between those who see the civil society concept as having a direct practical role in constructing and sustaining 'good government' and those who see the concept as too abstract for direct practical application. The latter argue that the concept should play a less direct role, serving as an 'analytical hat stand' on which to hang different ideas about politics, organization, citizenship, activism and self-help. The complexity of the civil society concept in fact makes it potentially very useful: the complexity reflects the sophistication of the concept and its breadth of application to different problems. Nevertheless, it is important not to give the false impression that the concept is a homogenous one, and also perhaps important to signal which (if any) of the different uses of the concept are being applied.

Based on the investigation so far, there is limited evidence of direct involvement of civil society actors in Responsible Research and Innovation. Of course, civil society actors such as trade unions, NGO campaign groups, or religious organisations all have a potentially very strong interest in specific RRI issues. Furthermore, the (often underestimated) power of these groups to block innovations using campaigns and protests is one of the main reasons for the present interest in RRI. Nevertheless, it is hard to find evidence of involvement or even awareness in RRI among these groups. This may be because RRI is still a new approach, but we still need to reflect on how to include civil society actors.

It is also questionable whether some of the major existing RRI initiatives have adequately addressed the problem of including civil society groups. Some RRI initiatives (Debating Innovation and KARIM, for example) do not seem to mention the problems and possibilities relating to civil society participation and inclusion. Some exceptions to this problem are UK projects on nanotechnology (Nano and Me) and the Nuffield Council on Bioethics project on emerging biotechnologies, as well as the CONSIDER and PROGRESS projects. The former includes a forum for NGO involvement, although this was under construction and not active at the time of writing. The Nuffield Council's approach includes a more thoroughly elaborated theoretical approach to public engagement, with particular emphasis on the social (rather than technical) construction of solutions to problems, and on the need for a range of perspectives when addressing complex problems. However, it could be argued that this framework remains theoretical in nature at the moment and does not directly address the specific problems of civil society inclusion.

## Analysis

Civil society inclusion in policy making raises a number of problems that are relevant to RRI. From the investigation so far, it can be argued that civil society actors have four main features that raise issues regarding their inclusion in policy making. First, as already noted, they have an often underestimated degree of power and influence in certain policy fields. Second, they enjoy a high degree of public respect, being more trusted than either business or governments according to surveys – although this trust is often based on their aid and social assistance work rather than their political campaigning [44]. Third, and in contrast to the second feature, civil society actors raise problems of democratic legitimacy, because their claim to speak on behalf of those they represent often lacks a clear democratic foundation. A fourth feature is that civil society is not itself homogeneous. A common mistake, for example, is to use terms such as 'NGO' and civil society as interchangeable concepts. However, this ignores the fact that there are many civil society organisations – such as trade unions or new social movements – that do not perceive themselves to be NGOs, and may even be hostile to being categorized as such (one explanation for this is that



‘NGOs’ are particularly associated with Western, liberal countries, and different forms of organization exist in other contexts [45]. Taken together, these features force us to address the complexity of the problem of including civil society actors in RRI.

One distinctive feature of RRI in comparison to similar approaches such as corporate social responsibility is the involvement of states and trans-national government bodies: both states and the EU have been actively involved in formulating RRI. This is potentially attractive to NGOs and similar actors because it gives RRI greater legitimacy than corporate social responsibility (which tends to be formulated unilaterally by corporations) - although Willetts’ comments on the UN’s approach to civil society should give us cause for concern that some forms of civil society participation, such as corporatist approaches, may serve to exclude certain groups, particularly those that are less organized and have less access to resources [6]. RRI tools may also be attractive to NGOs as additional channels for influence and information on emerging issues. Finally, many NGOs have a dual role, providing both services (such as health care) as well as political campaigning. Access to emerging technologies and innovations may be particularly interesting to NGOs who take up such social roles, and may be a channel for ensuring that innovations are used to address social problems as well as to generate profits and economic benefits. Indeed, this latter route may be the most attractive path for integrating civil society actors into RRI processes: that is, by giving them earlier access to innovations that can help them in their service-provision roles.

A very important factor to consider when discussing civil society participation is the background justification for such participation. The UN’s Cardoso report [46] addresses relevant issues, justifying civil society and NGO participation on the grounds that it will improve UN decision making processes. However, in a critique of the Cardoso Report, Peter Willetts [6] points out that there are three conceptions of civil society participation implicit, and that these are in conflict, meaning we have to choose between them. Willetts identifies three rationales for civil society participation:

- Functionalism: Civil society actors provide a variety of forms of apolitical expertise and enhance the quality of the UN’s policymaking
- Neo-corporatism: Civil society actors can represent various sections of society and ensure that their voices are heard in the policy debates
- Global democracy: Civil society actors can be the voice of public opinion and engage the UN in a more democratic policymaking system [6]

Willetts argues that the three approaches are incompatible in the following ways. According to functionalist logic, participation in policy making is decided only in terms of expertise. This can become antidemocratic if political controversies are thereby suppressed, and access to policy making is ‘depoliticized’. A neocorporatist approach is antidemocratic to the extent that neocorporatists actively seek out organized sectional interests to the exclusion of the poor, the weak and those who might defend general (rather than sectional) interests.

Willetts proposes several mechanisms that could be used to increase the democratic participation of NGOs and civil society organisations:

- A participation fund (as adopted by the Cardoso Panel) will help cover costs for poorer NGOs, including (for example) travel costs
- However, this approach could be deepened by providing training in areas such as documentation and procedures, interpretation of documents, lists of contacts and so on. This would help inexperienced civil society groups to participate effectively in decision making
- Civil society organisations could also be accredited according to their genuinely trans-national or global status. This could be done by classifying them according to whether

they have membership in several countries or regions, for example. Accrediting organisations in this way would give a stronger voice to organisations that speak for a wide range of constituencies, and may give organisations an incentive to seek out a broader, trans-national membership base

As Willetts (and others, including contributors to this project) points out, a deeper conceptual problem can be found in the use of the concept of 'civil society'. These conceptual problems arise at two levels. First, there have been problems in the UN system with distinguishing civil society from private enterprise. This issue has been addressed by distinguishing between different 'constituencies' – civil society, private enterprise, and the state. However, Willetts notes how this distinction in terms of constituencies has caused its own problems because civil society groups feel they are still treated as being formally equal to private enterprises and state, when their situation may be very different in reality.

A different problem is the tendency to treat 'civil society' as a homogeneous category. As an example, Willetts observes the tendency to treat terms 'NGO' and 'civil society' as interchangeable in some UN documents and practices. This is misleading because many civil society organisations, particularly in the global south, see NGOs as a specifically Western type of civil society organization. Other types of civil society organization include social movements, community based organisations, and trade unions. Each of these may have their own distinctive organizational and practical problems with access to policy making and decision making.

This analysis of civil society organisations is relevant to the Responsibility project because of the conceptual issues it raises. The distinction between functionalist, corporatist and democratic conceptions of civil society raises the issue of what kind of approach to inclusion the project should take: should we focus only on experts and organized interest groups (among whom networks often already exist or may be easier to construct), or will the project take on the more difficult task of attempting to be more inclusive? The discussion of the concept of civil society and the contrast with other concepts raises further questions. The concept of civil society is useful to the extent that it picks out forms of organization that are neither private enterprises nor state based organisations, but how do we avoid treating civil society as 'merely' formally equal to private enterprises and states? And how do we avoid an overly homogenous conception of civil society – one that does not ignore the more specific practical problems faced by different types of civil society organisations?

### 3.5 Trans-national Governance (European Union)

The European Union has been instrumental in driving the development and adoption of Responsible Research and Innovation as a key part of the Union's science policy and strategy. This is reflected in the change from 'Science and Society' to 'Science in Society' in the adoption of the 7th Framework Programme for Research and Technical Development, and the specific focus on Responsible Research and Innovation since 2010 [47]. Three key contributions to RRI by the European Commission can be identified. First, the Commission has produced its own outline framework for Responsible Innovation [47]. Second, the commission has supported several Responsible Research and Innovation projects (see table below), with the general aim of formulating and disseminating a more detailed model of RRI. Finally, the Commission has produced a report on policy options relating to Responsible Research and Innovation – the report is co-ordinated by Jeroen Van den Hoven [48].

The following tables give an overview of two exemplary finished and the officially announced running FP7 funded projects (by March 2014).

**Table 1: Completed FP 7 RRI relevant Co-ordination and Support Action Projects**

NANOCODE		Implementing the European Commission Code of Conduct for Responsible Nanotechnologies
	January 2010 – November 2011	Support action
	<a href="http://www.nanocode.eu/">http://www.nanocode.eu/</a>	
	A multistakeholder dialogue providing inputs to implement the European Code of Conduct for Nanosciences & Nanotechnologies (N&N) research.	
ETHICAL		Promoting International Debate on Ethical Implications of Data collection, use and retention for Biometric and Medical Applications
	January 2009 – December 2010	Co-ordination and Support Action
	<a href="http://www.ethical-fp7.eu/">http://www.ethical-fp7.eu/</a>	
	Enhancing a debate on ethical implications of data collection, use and retention in medical and biometric applications, in order to create a consensus, a roadmap and code of conduct for researchers towards a secure environment.	

**Table 2: Running FP 7 RRI relevant Research Projects**

CONSIDER		Civil Society Organisations in Designing Research Governance
	February 2012-January 2015	Collaborative Research Project
	<a href="http://www.consider-project.eu/">http://www.consider-project.eu/</a>	
	To develop a model of CSO participation that will allow for the development of recommendations for policy makers, researchers, CSOs, and other stakeholders	
EPINET		Epistemic Networks
	May 2012 – April 2015	Small or Medium Scale Focused Research Project
	<a href="http://epinet.no/#/EpinetProject">http://epinet.no/#/EpinetProject</a>	
	To develop methods and criteria to be used for more socially robust and efficient practices on the interfaces between TA and the world of policy makers and innovators	
GREAT		Governance for Responsible Innovation
	February 2013- February 2016	Collaborative Research Project
	<a href="http://www.great-project.eu/">http://www.great-project.eu/</a>	
	To develop an empirically based and theoretically sound model of the role of responsible research and innovation governance	
RES_AGORA		RRI in a Distributed Anticipatory Governance Frame. A Constructive Socio-normative Approach
	February 2013-January 2016	Small or medium-scale focused research project
	<a href="http://res-agera.eu/about/">http://res-agera.eu/about/</a>	
	To develop a normative and comprehensive governance framework for Responsible Research and Innovation (RRI).	
RRI-Tools		RRI Tools: building a better relationship between science and society
	January 2014 - December 2017	Collaborative and inclusive project
	<a href="http://www.rri-tools.eu/">http://www.rri-tools.eu/</a>	
	Develop an innovative and creative set of tools comprising practical digital resources and actions aimed at raising awareness, training, disseminating and implementing RRI. Tools will be based in collective reflection and built on good RRI existing practices.	



**Table 3: Running FP 7 RRI relevant Co-ordination and Support Action Projects**

<b>NERRI</b>	<b>Neuro-Enhancement, Responsible Research and Innovation</b>	
	<b>March 2013-February 2016</b>	<b>Support action</b>
	<a href="http://www.pavconhecimento.pt/home/">http://www.pavconhecimento.pt/home/</a>	
	Contribute to the introduction of RRI in neuro-enhancement in the ERA and to the shaping of a normative framework underpinning the governance of NE technologies	
<b>PROGRESS</b>	<b>Promoting Global Responsible Research and Social and Scientific Innovation</b>	
	<b>February 2013 - January 2016</b>	<b>Co-ordination and Support Action</b>
	<a href="http://www.progressproject.eu/">http://www.progressproject.eu/</a>	
	Develop a strategy for fostering the convergence of regional innovation systems at the global level	
<b>RESPONSIBILITY</b>	<b>Global Model and Observatory for International RRI</b>	
	<b>February 2013-February 2016</b>	<b>Co-ordination and Support Action</b>
	<a href="http://responsibility-rri.eu/">http://responsibility-rri.eu/</a>	
	Create a network of stakeholders that would adopt and diffuse a common understanding in RRI between different actors in Europe and around the globe.	
<b>SYN-ENERGENE</b>	<b>Synthetic biology Engaging with New and Emerging Science and Technology</b>	
	<b>July 2013-June 2017</b>	<b>Support Action</b>
	<a href="http://www.kit.edu/index.php">http://www.kit.edu/index.php</a>	
	Open dialogue between stakeholders concerning SynBios potential benefits and risks and to explore possibilities for its collaborative shaping on the basis of public participation	
<b>Responsible Industry</b>	<b>Exemplar Implementation Plan of Responsible Research and Innovation (RRI) in Industry</b>	
	<b>February 2014 - June 2017</b>	<b>Co-ordination and Support Action</b>
	<a href="http://www.responsible-industry.eu/">http://www.responsible-industry.eu/</a>	
	Exemplar Implementation Plan of RRI in Industry to demonstrate how industry can work productively together with societal actors and integrate RRI principles and methodologies	
<b>Satori</b>	<b>Stakeholders Acting Together On the -ethical impact assessment of -Research and Innovation</b>	
	<b>January 2014-August 2017</b>	<b>Coordination and Support Actions</b>
	<a href="http://satoriproject.eu/">http://satoriproject.eu/</a>	
	Platform for the consolidation and advancement of ethical assessment in research and innovation, aiming to develop a common framework of ethical principles and practical approaches so as to strengthen shared understandings among actors involved in the design and implementation of research ethics.	

The frameworks and definitions of RRI found in the documents referred to will be outlined later. This section will address the existing and envisaged structure for RRI governance that emerges from the projects referred to. Van den Hoven's report (Directorate General for Research and Innovation, 2013) provides a useful overview of four main policy options for the promotion and development of RRI – these policy options can be seen as reflecting the possible steps the European Commission might take in actively building an RRI network across the whole European Union. The following are the four options described in the report:

- a) *Business as Usual*: Under this approach, the existing funding tools for RRI would continue, without additional funding in the upcoming Horizon 2020 programme, or any other additional measures to support RRI. In terms of building an RRI network across Europe, this approach is problematic for several reasons. First, it does not address the current low levels of awareness of RRI among researchers, civil society and businesses outside the existing RRI community. Second, without co-ordination, member states, businesses and other actors may continue to develop their own conceptions of RRI, which could lead to the concept becoming increasingly fragmented. Thirdly, attempting to co-ordinate member states' divergent conceptions of RRI at a later stage will be more costly and difficult than constructing an RRI network at this early phase of the concept's emergence.
- b) *Improved Business as Usual*: This approach aims to consolidate existing European level support for RRI with three possible alternative measures: 'mainstreaming' RRI by requiring application of RRI criteria across all EU funding programmes; increasing opportunities for inter- and trans-disciplinary research to make research more responsive to societal needs; or developing a specific funding line for research into RRI. The first option would improve RRI co-ordination at the EU level but would not directly contribute to member states' efforts to develop RRI. It would also have limited effects on the inclusion of civil society in research. The second option has more potential to improve inclusion of a wider range of stakeholders in research, including civil society, because trans- and inter-disciplinary approaches imply that a wider range of actors should be included. However, the possibilities for overall co-ordination are otherwise limited because the funding would be directed to a relatively narrow range of projects. Also, this approach does not explicitly require inclusion of RRI as a criteria for funding (responsibility considerations would instead be indirectly included via the focus on addressing problems that require an interdisciplinary approach). The third option would be to focus on RRI as a specific field of research in order to better understand its conceptual basis, and to better address potential objections to implementing RRI. The contribution of this approach to the construction of an RRI network is limited in the short run, because it focuses on supporting the existing RRI community rather than expanding it. There is a risk that RRI would become a separate academic sub-discipline rather than a means of co-ordinating research. Also, the existing RRI programmes of different member states would continue in an uncoordinated manner while this research proceeds, raising further co-ordination problems.
- c) *Improved Co-ordination*: Under this option, a wider range of initiatives to co-ordinate RRI would be developed at European level. These include: a voluntary scheme for member states to report on their approaches to RRI; improving funding for RRI within member states; setting incentives for RRI by prioritising RRI products in public procurement; developing RRI training activities; and developing either (more localised) codes of conduct or (Europe wide) standards on RRI. Improved co-ordination seems much more likely than the previous options to contribute to the construction of a

Europe-wide RRI network – all of the options have the potential to make RRI more visible and a subject of active discussion at the member-state and European levels.

- d) *Improved Co-ordination with a Legally Binding Initiative*: In this final alternative, the options outlined in the previous option would be adopted, but would have legally binding status – so member states would be legally obliged to report on their RRI policies, for example. This policy option would involve more costs at various levels: it would require the adoption into legislation of the RRI regulations and standards; it would face potential opposition from member states, businesses and other lobbies, and it would impose administration and implementation costs. If adopted too quickly, it would also prevent testing to address objections such as the concern that RRI might hinder competitiveness. It thus seems highly unlikely that this fourth option would be adopted in the near future.

**Table 4: RRI Policy Alternatives**

Policy Approach	Policy Measure	Contribution from RESPONSIBILITY	Role for Forum (F) or Observatory (O)
<b>Business as Usual</b>	Funding based on current EU approach	Continued development of RRI concept	F
		Development of central reference point for RRI in Europe	F and O
	Member state projects on RRI	Reference point for member states' projects	O
		Mitigating fragmentation of RRI projects	F and O
<b>Improved Business as Usual</b>	Mainstreaming RRI	Provide model for funding applications that addresses RRI	F and O
		Develop overall RRI framework	F and O
	Increased funding for trans- and inter-disciplinary research	Ensure clarity about connection between RRI and trans- and inter-disciplinary research	F
	Specific funding for RRI research	Providing common reference point for all RRI researchers and existing RRI community	F and O
<b>Improved Co-ordination among member states</b>	RRI Checklist	Development of RRI criteria and checklist	F
	Funding of RRI by Member States	Development of RRI funding guidelines	F
		Case studies of MS funding programmes	O
	Incentives	Setting criteria for public procurement based on RRI	F and O
	Training Activities	Establishing demand for RRI training	F
		Pilot training activities in RRI	O
	Code of Conduct	Providing overview of existing codes of conduct (e.g. nanocode)	O
		Development of new codes	F
	Voluntary RRI Standards	Developing RRI standards based on previous codes and conceptual definition of RRI	F and O

## Analysis

The Directorate General's report on RRI provides a useful overview of some of the most likely policy approaches to promoting RRI in the European Union context. Because of the

range of possibilities that the report provides - and the possibility of yet more alternatives that have not been identified - it is worth taking the opportunity to assess how the RESPONSIBILITY project might contribute to the development of RRI under the most likely scenarios.

The list of policy options in the Directorate General's report thus provides various opportunities to develop the role of the Forum and Observatory as sites for the further elaboration of the RRI concept and the development of tools for the dissemination and implementation of the RRI concept, and to co-operate with the other projects running parallel to RESPONSIBILITY (GREAT, CONSIDER and PROGRESS). At a more general level, it is also reflecting on the most appropriate strategy given the existence of the above policy options: since we don't know which of them will be adopted, we need to avoid becoming overly committed to constructing a Forum and Observatory that only fits with one of the above policy directions. The following are two suggestions to deal with this problem:

- a) Build the Forum and Observatory around aspects that are common to most of the policy options: for example, developing a common conception of RRI that unifies the existing approaches is a concern that applies in all the policy scenarios above, so this seems a sensible priority
- b) Use the different policy options as questions to structure the Forum and Observatory. For example, we could set up the Forum and Observatory so they contain working groups to explore different aspects of the policy options suggested above. Given our resource limitations, we could start with just a few working groups, but it would be important to ensure that further working groups be added later. The point is therefore not to restrict the Forum and Observatory only to the policy option mentioned, but rather to use these in two ways: first, to ensure that the debate that occurs in the Forum and the tools that the Observatory develops have a clear focus, and second, to use the policy options as a basis for testing whether the Forum and Observatory are effective. This proposal is open to the addition of other policy options once it has been shown that the Forum and Observatory can function effectively - some mechanism for putting emerging issues in reserve for later discussion may therefore be useful - the 'dynamic coalition' model from the IGF is a possible example of this.

In summary, the Directorate General's report provides a useful view of the existing contributions the European Union has made to RRI (through existing funding and projects), but also provides an insight into the most likely policy options for the further development of RRI. At present, the main concerns are a lack of awareness of RRI, and a worry that RRI policies will become fragmented without EU level co-ordination. Various policy scenarios have been suggested to address these problems – these can contribute to the construction of an RRI network in various ways, from publicising the RRI concept to generating formal standards for RRI. It has been suggested that the RESPONSIBILITY project should take these possible policy directions into account when constructing the Forum and Observatory.

### **3.6 International Governmental Organisations**

To date, the most important step towards constructing a global - as opposed to a European – RRI network has been the PROGRESS project, funded jointly by UNESCO and FP7. The distinctive theoretical framework of the PROGRESS project will be discussed in more detail below: this section will focus on the strategy for constructing a global RRI network.

The main strategy for constructing a global RRI network in the PROGRESS project is to examine and compare science funding strategies and policies in Europe, the US, China, Japan, India, Australia and South Africa, with a view to fostering the convergence of regional innovation systems at the global level [49]The approach taken in PROGRESS may thus lead to

similar policy options to those found in the Directorate General's report described above. That is, the options for developing and promoting an RRI network could follow one of two paths: first, existing international science funding and co-ordination could be used as a focus – this is equivalent to using the EU's funding frameworks, and thus rather resembles the 'improved business as usual' scenario from the directorate general's report (perhaps with UN bodies such as UNESCO taking the EU's place). Second, co-ordination could instead be focused on regional research networks, to allow for development of RRI at a more local level (this is somewhat similar to the Improved Co-ordination model in the report discussed above, although with regional bodies in place of member states). Of course, co-ordination might focus on individual states as well, particularly in regions where co-ordination of science and research policy is weak.

It should be stressed that this is rather speculative: the PROGRESS project is in an early phase, and it is not clear which path it will follow. However, the approach to constructing a global RRI network described in the available documents is very similar to the EU approach in that it is focused on research funding and co-ordination bodies at the regional level. It is thus at least possible that the EU's approach to constructing an RRI network (based mainly on local and regional research funding bodies) will also be influential at the global level, although this influence may be restricted to policy focused research (rather than actual policy making) at this stage.

### Analysis

At present, the construction of a global RRI network is at an even earlier stage than the construction of a European network. Problems that are obvious at the European level – such as lack of awareness of RRI and lack of a common framework for RRI – are presumably more pronounced at the global level. A couple of further observations are worth making in regard to the possible construction of a global RRI network:

- One possible obstacle to the expansion of RRI to the global level is the emergence of equivalent projects in other regional and international research and funding regimes. Once again, it is important to show that RRI adds some value to the governance or guidance of research and innovation, and this makes it important to distinguish it from other approaches, either those that have emerged previously or those that are emerging now. Furthermore, it is also possible that projects that use very similar concepts to RRI (particularly the concept of 'responsible development' used in some US projects) might emerge. In such cases, the functionalities of the Forum and Observatory may be the most important factor in distinguishing RRI from other approaches.
- Construction of RRI networks in Europe proceeds on the basis of a pre-existing culture and set of institutions for scientific and research co-operation. It is not clear that we can assume a similar situation as a background at the global level – the construction of a global RRI network may in some cases involve the construction of research co-operation and co-ordination itself, and even potentially the re-construction of the RRI concept by the actors who begin to use it, rather than simply integrating a new concept into an existing structure (as in the EU case)
- A particular problem in this respect is that co-ordination and co-operation may proceed very rapidly between developed countries with existing frameworks, and in rapidly developing countries with ambitions to integrate into such frameworks. This may be helpful if it provides channels through which RRI can be disseminated, but it is also risky because it may lead to further marginalisation of poorer developing countries which may not have the capacity to integrate into the networks that emerge.

In summary, some early steps are being taken towards the construction of a global RRI network [50]. At present, this process of construction is at a very early stage. The process is focused on the UN (via UNESCO) and via regional science funding and co-ordination bodies. This seems a plausible approach given that it mirrors the EU approach to some extent. However, it is important to be aware that an attempt to construct a global RRI network may face competition from rival approaches to research ethics, and that it is potentially dangerous to assume too many similarities to the EU (where research co-ordination and co-operation are quite advanced) and the global situation (where co-ordination and co-operation may be unevenly developed).

### 3.7 Scientific Research Projects

Two funding programmes for RRI research projects were discussed above: the NWO's Maatschappelijk Verantwoord Innoveren programme and the UK's various projects on RRI. In this section, some different European and international level projects will be examined. These projects differ from the MVI and UK cases because they involve a greater share of private and business-led finance, rather than government funding - many of the projects are organized by private enterprises<sup>2</sup>. The projects cover a range of different issue areas (mainly related to information and communication technologies), and are financed and organised in a range of different ways - through private companies alone, through public-private partnerships, or through associations of businesses or professionals.

Many of these projects raise ethical issues, particularly in three main areas: intellectual property, privacy and security, and environmental issues and sustainability. These issues are considered in particular in relation to ICT. For example, the internet has raised intellectual property concerns through problems about media content usage [51]. Both cloud based services and social networking raise privacy and security concerns, as do smart grids [52] [53] [54] [55] [56] [57]. In the area of sustainability, the issue of 'green ICT' is a particularly important ethical concern, and given the possibilities for new approaches to addressing the environmental impacts of ICT, it seems an important area for RRI to consider [58] [59] [60] [61]. Several of the projects make explicit references to ethical issues and attempt to address them. There are few, if any, direct references to Responsible Research and Innovation, however. Given this point, it seems important to include projects whose approaches overlap with some of the main RRI concerns, in order to ensure a sufficiently broad perspective (although this proposal itself raises the problem of what exactly the core of RRI consists of - is it a distinctive ethical approach, or is it a different way of understanding governance, for example). This inclusion could either take the form of persuading existing projects to adopt RRI, or (perhaps a more realistic approach) including representatives of the project in a consulting role.

#### Analysis

A brief study of the projects referred to in this section reveals two main points in relation to the construction of an RRI network.

First, the overview of the projects referred to again reveals that there seems to be a low level of awareness of RRI, and that few if any of these projects have made direct attempts to incorporate RRI into their programmes. Because these projects are already running, it may be a considerable challenge to persuade those involved to incorporate RRI at this stage. Indeed, it may be better to use the input of the people working on the projects as 'outsiders' to the RRI concept, providing a critical outside perspective, looking for overlaps in interest

---

<sup>2</sup> Thanks to Giovanni Giambene for the overview of research projects on which this section is based.



between RRI and the different projects, and if possible incorporating parts of the RRI approach into their projects.

Second, the organisation of these projects provides an important alternative set of pathways for the development of an RRI network. Besides direct government research funding, there are also possibilities to disseminate RRI via the public private partnerships (PPPs) and the business and professional associations that have developed these projects. Therefore, even if it proves too ambitious to actually integrate RRI into these projects, it still seems fruitful to study their organisational structures as possible frameworks for the construction of an RRI network.

### 3.8 Policy Research Community

A final factor to consider in this section is the contribution of the emerging RRI research community to the construction of an RRI network. Although there are some concerns about the risks of RRI becoming a separate academic discipline (rather than an approach to research ethics that is distributed throughout academic disciplines), there is nevertheless an emerging community of RRI specialists with interests in the theoretical underpinnings and general practical implications of RRI. This community may have its own distinctive contributions to make to the construction of RRI networks.

Examples of these emerging RRI research networks include the Framework for Responsible Research and Innovation in ICT (FRRRICT) project [32] Debating Innovation [7] the 3tu Centre for Ethics and Technology [62] and Matter for All [27] Rene Von Schomberg's Responsible Innovation blog [63] as well as the GREAT, CONSIDER and PROGRESS projects.

These various projects have used (or plan to use) three main methods that can contribute to the construction of an RRI network. First, they make use of blogs and internet forums as spaces for discussing RRI issues. Second, they organise conferences with a specific RRI focus. Third, they make use of observatories as repositories for information on RRI.

The three tools referred to are well-established and useful. However, there are two main concerns that RRI policy specialists should be alert to when constructing an RRI network.

The first is the worry that RRI might become a separate academic enclave or sub-discipline rather than a widely applied set of tools for research governance. One way to avoid this might be to ensure that the networks and sites are embedded in or linked to other projects. To some extent, this approach is reflected in the 3tu Ethics and Technology and Matter For All sites, which are not exclusively focused on RRI, but instead include RRI as a significant part of projects with a broader focus. It might be possible to include links to RRI in other sites with a broadly ethical focus, or with a science governance role, to ensure that RRI reaches a wider audience.

A second concern is the worry that RRI might become further fragmented, with different conceptions evolving separately in different member states or among different communities. Of course, the more abstract components of the RRI concept will need application in specific contexts and from particular perspectives, but it is important to both give and receive feedback on such applications to see how far core RRI concerns are actually being implemented effectively. This tendency might be counteracted by ensuring that the RESPONSIBILITY Forum and Observatory provide a proper overview and mapping of other RRI sites and resources.

### 3.9 Summary of Section One

This section summarises the main points that have arisen from the above discussion of the contributions of the different types of actors to the construction of an RRI network. There are eight main points that can be summarised:

- **Overview:** The main actors that have contributed to the construction of RRI networks so far are national governments (mainly through funding of RRI projects), the European Union (again mainly through funding of RRI projects), scientific projects (which, particularly in the Netherlands, have been carried out with specific funding), and policy research. There has been some involvement in RRI from international governmental organisations (most significantly, UNESCO) and from business. Most worryingly, awareness and involvement in RRI from civil society seems to be low
- **Business:** Businesses have made some contributions to funding RRI networks, and a few businesses have taken up the RRI concept as part of their approach to ethics. However, awareness seems to be low. One problem is that RRI has to compete with other business ethics concepts. One way to make RRI more appealing to businesses would be to emphasise that RRI is a specific tool for research, distinguishing it from other corporate social responsibility measures.
- **National Governments:** National governments have played an important role in developing RRI up to now. Projects that support the development of an overall conception of RRI help to focus attention on RRI and create a sense of a common purpose that contributes to the development of an RRI network. Support for interdisciplinary projects is an important factor in RRI, but it seems important to avoid a situation where RRI simply becomes synonymous with interdisciplinary research. Nevertheless, using the proposed Forum and Observatory as portals for those wanting to develop interdisciplinary projects could be a good way to draw people into using these platforms. Conferences that bring together different RRI actors (such as the Science in Dialogue conference) seem an important tool for generating a sense of community in the RRI network.
- **Civil Society:** Civil society awareness and inclusion seems to be a problem for RRI networks at present. Although multi-stakeholder approaches are an important element of RRI, it is hard to find widespread evidence of civil society inclusion. It is possible that the involvement of states in RRI (in contrast to corporate social responsibility) may make it interesting to civil society and NGO groups. It is also possible that involvement in RRI may be attractive to NGO and civil society groups that provide social services, since it allows them access to potentially useful innovations, and may eventually increase the social benefits of research and innovation.
- **Trans-national Governance:** The EU has been a major driving force in constructing an RRI community. The EU's recent policy documents on RRI provide a set of policy options for developing RRI. Arguably, these could be used to structure the Forum and Observatory. Using the proposed policy options as a structure for discussion about RRI has a number of advantages. First, it is more focused and practical than a wholly abstract theoretical discussion of RRI. Second, it may be more effective in attracting a broad range of stakeholders than a focus on specific issues (an approach that might discourage stakeholders with more limited interests in narrow issues).
- **International Governmental Organisations:** As mentioned, the priority of IGOs has been to expand the RRI concept beyond the European context. One potential issue here is the difficulty of ensuring developing countries are properly included. Less developed countries may lack the funds and infrastructure to integrate into an emerging global RRI network, a situation that could consolidate their existing disadvantages.



- **Research Projects:** Besides pure government funded research, industry contributes to research either by directly funding its own research or by co-operating with governments. Such projects often raise ethical issues, although the overview above again suggests awareness of RRI is fairly low. Public Private Partnerships, Procurement schemes and business and industry associations are all channels through which an RRI network could be constructed, although these potential channels seem rather under-used at present.
- **Policy Research:** A number of policy-based research networks in RRI are emerging. These have mainly been supported by governments (or by independent research bodies such as the Nuffield council). The main tools for developing these networks have been the use of websites and blogs; the organisation of conferences; and the foundation of observatories in the RRI field. These networks raise two main concerns. First, there is a worry that RRI might become fragmented as the different networks pursue RRI in different directions – this emphasises the need for co-ordination and some sort of common reference point for RRI. Second, there is the worry that RRI might evolve into a separate academic sub-discipline. This presses us to focus on the application and policy orientation of RRI so that it remains relevant and interesting to decision makers.

## **4 Section Two: Existing Theoretical Approaches to RRI**

### **4.1 Overview Theoretical Landscape**

This section summarises the main existing theoretical approaches to RRI, as found in the various available texts and documents. The purpose is to provide a basis for the theoretical landscape by giving an overview of existing theories and some points for discussion relating to those theories.

### **4.2 Attempts to provide definitions of RRI**

#### **Analysis**

A number of points arise from an examination of these various attempts to provide a clear definition of RRI:

- There is some discussion about whether it is necessary to formulate a single definition of RRI, or whether it is perhaps better to see RRI as a focal point for a number of interrelated debates. In terms of creating an RRI network, the absence of a single clear definition of RRI does not necessarily have to be a problem - and indeed, an overly rigid single definition could itself be problematic. The very discussion about the formulation of RRI can contribute to the construction of a network, as the debate around Sutcliffe's different attempted definitions shows. However, it does seem important that the debate has at least some clear focal points. It would be helpful to focus on some shared terminology that can be discussed, even if precise definitions of the terms at stake are not given in advance. It also seems vital that this shared terminology should avoid overly obscure or technical language so that non-expert groups are not discouraged from participating. For example, it would be helpful to try to translate concepts such as 'reflexivity' into more accessible language while keeping the spirit of the technical term
- Several of the definitions discussed above have (explicitly or implicitly) dropped the term 'research' from the core concept of responsible research and innovation. Hilary Sutcliffe justifies this move by arguing that 'responsible innovation' allows us to extend our attention to the whole chain of innovation, from early research phases to implementation and assessment. This is a plausible move, but it does perhaps risk losing something distinctive from the specific RRI concept – responsible innovation may be harder to distinguish from rival concepts such as corporate social responsibility. There is also a potential risk that 'responsible innovation' might lead to too much focus on economic benefits, rather than on research that explores the possible wider implications of a particular innovation.

**Table 5: Existing RRI Theories**

<b>Approach</b>	<b>'Interactive Process' Model of RRI</b>		<b>Von Schomberg</b>
<b>Key Concepts</b>	Transparent; interactive; mutual responsiveness; acceptability; sustainability; social desirability; embedding		
<b>Criticisms</b>	Possibly leads to focus on social acceptance rather than acceptability (Sutcliffe)		
<b>Brief Comments</b>	Contains a lot of terms that need further definition or explanation; main aim was to go beyond acceptance and participation as sole criteria and have normative baseline		
<b>Approach</b>	<b>'Interactive Process' Model of RRI – new variant Von</b>		<b>Von Schomberg</b>
<b>Key Concepts</b>	Similar to above but grounds theory in European values derived from treaties and other documents		
<b>Criticisms / Brief Comments</b>	Fills out previous definition in some detail; use of European values needs more justification and is problematic for extension beyond Europe		
<b>Approach</b>	<b>'Taking care of the future' model</b>		<b>Stilgoe, Owen and MacNaghten</b>
<b>Key Concepts</b>	Collective care, stewardship		
<b>Criticisms</b>	Arguably fails to address benefits as well as risks of innovation		
<b>Brief Comments</b>	Stewardship might imply top down control of innovation; focus on future generations is potentially useful		
<b>Approach</b>	<b>Sutcliffe: Original Definition</b>		<b>Sutcliffe</b>
<b>Key Concepts</b>	Social and environmental benefit; impacts, risk and opportunities; oversight and adaptation; consistent involvement of society; openness and transparency		
<b>Criticisms</b>	Doesn't say we should aim to benefit future generations (Groves)		
<b>Brief Comments</b>	Covers most of the key ambitions of RRI up to now in a clear way; possibly still some questions about how to operationalise		
<b>Approach</b>	<b>'Modified Brundtland' model</b>		<b>Sutcliffe</b>
<b>Key Concepts</b>	'Ability to fulfil needs and hopes without compromising the ability of others, now and in the future, to fulfil their own'		
<b>Criticisms</b>	Too vague to provide practical guarantees – danger that it will regulate intentions rather than actions (Santillo)		
<b>Brief Comments</b>	Loses much of the precision of the previous definition		
<b>Approach</b>	<b>Directorate General's Report</b>		<b>Van den Hoven (claims to be derived from Stilgoe 2012)</b>
<b>Key Concepts</b>	Ethical acceptability; orientation to societal needs; anticipatory; inclusive; reflexive; responsive		
<b>Criticisms / Brief Comments</b>	One of few definitions to actually discuss theory of responsibility; covers some major aims of the concept; defines key concepts in more detail		
<b>Approach</b>	<b>RRI as Interdisciplinarity</b>		<b>None but implicit in MVI programme and Van den Hoven</b>
<b>Key Concepts</b>	Main focus should be on promoting interdisciplinary research, from which other responsibility considerations will (should) flow automatically		
<b>Criticisms / Brief Comments</b>	Has the benefit of elegance, simplicity, and ease of implementation. Would need a lot more justification for the argument that simply promoting inter-disciplinary research is enough to promote responsibility		
<b>Approach</b>	<b>'Grand Social Challenge' Model</b>		<b>None but implicit in some other approaches</b>
<b>Key Concepts</b>	Responsible research is research that focuses on major social issues		
<b>Criticisms</b>	May lead to closing of ethical frames regarding issues in question		
<b>Brief Comments</b>	Not always clear how the issue areas are generated: who sets the priorities for issues to be addressed?		
<b>Approach</b>	<b>Public Ethics Approach</b>		<b>Nuffield Council on Bioethics – Synthetic Biology Project</b>
<b>Key Concepts</b>	Key values: Equity, solidarity, sustainability. Procedural virtues: openness and inclusion; accountability; public reasoning; candour; enablement; caution		
<b>Criticisms / Brief Comments</b>	Key values are arguably more understandable to public. Long list of virtues, but these are described in detail and well theorised. Arguably, openness of framework itself is a virtue		
<b>Approach</b>	<b>Sustainability Approach</b>		<b>Nuffield Council on Bioethics: Biofuels Project</b>
<b>Key Concepts</b>	Developments not at expense of essential rights Environmentally sustainable; Net environmental benefit – not a contribution to environmental degradation; Fair trade principles Equitable distribution of costs and benefits; Duty to undertake development if other principles are met		
<b>Brief Comments</b>	A more substantive and much less deliberative-procedural conception of RRI than most of the others.		
<b>Approach</b>	<b>Pro-poor Innovation</b>		<b>Schroeder</b>
<b>Key Concepts</b>	Innovations should also be targeted at meeting needs of global poor		
<b>Criticisms / Brief Comments</b>	Possibly in conflict with other RRI models – would need work to integrate it. Presumes internationalisation of RRI concept, which has not yet been achieved. Not clear if Pro-poor Innovation fully exhausts the concerns and priorities of existing RRI approaches		

- Despite the increasingly thoughtful and interesting conceptions of RRI that have emerged from the debate, the objections from some representatives of industry to the concept are (rather depressingly) familiar: it is argued that it is simply not in companies' commercial interests to concern themselves with RRI considerations. Whether they are sincere or not, some representatives of the commercial world raise the standard objection that RRI will impose excessive costs that will undermine their competitiveness. It seems important to consider whether and how we can embed a clear response to these objections into the RRI concept itself. There also seems to be an assumption in some of the discussion that (rational) businesses will never adopt or pursue irresponsible innovations – but this is a rather untested assumption, and it is worth reflecting on what it means for companies to act irresponsibly, as well as what to do when they do so
- There is a debate between those who seem to prefer a short, 'snappy' RRI definition and those who prefer a more detailed definition that provides more specification of what can be practically expected. There is a danger that, in the case of the shorter definitions, we end up regulating intentions rather than regulating actions – we provide concepts that define a rather vague set of aspirations. On the other hand, more detailed definitions tend not to be so memorable and may be more difficult to put onto the agenda of public debate. Perhaps a remedy for this would be to embed responsibilities to actually implement RRI into the short definitions, to encourage thinking about actions as well as aspirations. In any case, it seems clear that one thing we definitely want to avoid is definitions that simply string together obscurely defined buzzwords. The Nuffield Council's report on synthetic biology is exemplary in this respect: although its conception of public ethics is quite sophisticated, it is nevertheless worded in an accessible way.

### 4.3 Summary of Section Two

The theories examined in this section involve (implicitly or explicitly) three dimensions: procedural, substantive and practical. The procedural dimension concerns the processes through which decisions are made, including issues such as the types of stakeholders that should be involved. The substantive dimension concerns the specific issues RRI should address, and principles that should be applied (e.g. equity and fairness). The practical dimension relates to how institutions are constructed, but also to how ethical norms are constructed in a context. The different theories place different emphasis on these three different elements (e.g. the Nuffield Council on Bioethics' approach emphasises mainly procedural elements, whereas a Pro-poor approach is more substantive. One blind spot for most of the theories discussed above is that they do not directly address the broadly practical concern of constructing norms in context, which has implications for the choice of institutional structures. A fully adequate conception of RRI therefore needs to pay more attention to this third, practical aspect of the concept.

## 5 Section Three: RRI Funding Structures

### 5.1 Main Funding Sources

This section examines the main funding sources for existing RRI networks. Some examples of comparable projects.

We can distinguish five main sources of funding for RRI networks and projects: government funding (including regional support); university-based funding (either alone or in consortium); private (including business) funding; and charitable foundations. Examples of projects with direct government funding include the Dutch MVI programme, the KARIM network, the Centre for Science, Society and Citizenship, and the FARINN network, as well as the projects funded under Framework 7. An example of a project funded by a university is the Observatory for Responsible Innovation, which is supported by the F13M Foundation of MINES ParisTech. An example of a project that has succeeded in attracting private funding is the MATTER project, which has attracted funding from a consortium of businesses for some of its activities. The Bassetti Foundation is an example of a charitable foundation that has a specific interest in RRI; the Nuffield Council on Bio-Ethics has funding from two charitable foundations, alongside government support

In general, it appears that the large majority of existing RRI projects has been supported by government funding, either at the local or regional level. The only clear example of a project supported by an international organisation is PROGRESS, which has funding from UNESCO (jointly with FP7).

The main concern regarding the current situation with RRI funding is that relatively few projects have succeeded in attracting support from businesses or other private contributors. This raises some concerns about the sustainability of RRI as a research concept, although it should be stressed again that this may reflect the fact that RRI is a relatively new concept. The MATTER project is an example of a project that has succeeded in attracting private support. It is important to note that this funding was for a highly focused project of specific interest to business (dealing with the extent to which businesses should be obliged to share the outcomes of research and innovation that they fund). MATTER has also succeeded in obtaining funding from charitable foundations. It is also significant that RRI has attracted support from independent foundations such as the Bassetti Foundation and the Nuffield Foundation. This arguably reflects the rising profile of RRI.

Some non-RRI projects have attempted to raise funding through direct appeals to individual members of the public. This has the potential advantage of allowing the projects to maintain a high degree of independence from both governments and commercial concerns, and to increase their credibility in the eyes of the general public. However, it is not clear how successful such appeals have been in raising funds.

### 5.2 Sustainability and Credibility

#### Analysis

In terms of constructing an ongoing, long term RRI network with a functioning Forum and Observatory, the problem of funding sources raises a dilemma between sustainability and credibility. Sustainability in the long run depends on securing funding from non-governmental sources, particularly businesses. However, in order to obtain such funding, it seems necessary to focus on projects that businesses perceive as relevant to their needs and interests. However, an exclusive focus on the needs of businesses may diminish the credibility of the Forum and Observatory in the eyes of the public. The approach taken by

the MATTER think tank may offer a way of mitigating this problem: by obtaining funding from a range of different sources, MATTER seems able to sustain itself while retaining a significant degree of independence.

### **5.3 Summary of Section Three**

The majority of RRI funding at present comes from governments, either at the national level or at the EU level. Some charitable foundations have also begun to support RRI. However, support from RRI from private sources is generally quite limited – although this may be due to the fact that RRI is a relatively new concept. Attracting funding may thus depend on using the existing networks to raise the profile of the concept. Attracting private funding raises a dilemma between sustainability and credibility, although the MATTER think tank has partly addressed this problem both by obtaining funding from a range of different sources, and by being open and transparent about those sources.

## 6 Section Four: RRI Dissemination Structures

This section analyses the main dissemination structures that exist for RRI. Both existing structures that are currently used to disseminate RRI and potential alternative structures are discussed.

### 6.1 Funding Networks

As suggested (for example in the Directorate General's report), funding networks are a potentially powerful tool for disseminating RRI both at the regional and national levels. RRI can be disseminated either by 'mainstreaming' the concept (e.g. by requiring all research projects to address RRI as part of the application process) or by developing specialised RRI funding streams (as in the case of the Netherlands MVI programme).

#### Analysis

The main shortcoming of this dissemination channel is that its broader impact outside the research community may be limited: it is not clear how this channel would raise the broader public profile of RRI.

### 6.2 Online Tools

Several of the existing RRI networks (e.g. MATTER, the Responsible Innovation Observatory) have set up – or are setting up – online forums for debating RRI issues. This is in principle a relatively low-cost way to disseminate RRI, although it may become more costly if the forums need to be moderated. There is no evidence of an online repository for information on RRI – we should also perhaps be careful not to frame the concept of the Observatory in terms of a simple database before examining alternative conceptions of the Observatory. There are already quite a wide range of RRI sources online [7] [63] [64], so there is a concern that the concept might become further fragmented without better steering or guidance. Given that most of the forums are at an early stage, it is hard to tell if they are widely used. However, a concern about internet forums in general may be that they are not seen as sites for accessing decision makers, but rather as chat rooms or talking shops for general discussion. In general, the problem of incentives to participate needs to be taken seriously, as does the problem of the form such incentives might take.

#### Analysis

Although online tools are a seemingly cheap way to reach a wide audience for RRI, there are reasons to be cautious about relying too heavily on these tools. It seems important to have some kind of meta-forum or overarching RRI source, and this seems a valuable target for this project to aim at. Other considerations for online tools include the range of languages supported, and the issues of ensuring the Forum and Observatory are well moderated and secure. A concern is the worry that discussion forums are not taken seriously enough. A valuable example for dealing with this is the Internet Governance Forum, which has a 'dynamic coalitions' structure, allowing participants to set up coalitions to deal with specific issues – this might encourage a stronger, more decision-oriented form of participation. Finally, another incentive to use the Forum and/or Observatory could be to focus on seeking research collaborators – this could follow the model of the CORDIS site, which allows for searches for potential project partners.

## 6.3 Conferences

There have been several RRI conferences in the past couple of years [65] [66] [67]. The highest profile of these was the Science in Dialogue Conference, and the 3TU Research Centre's RRI conference. Conferences have the advantage of contributing to a stronger sense of community and allowing for networking opportunities both within and outside formal structures. The Science in Dialogue conference is particularly useful as an example of how to ensure the conference is focused and that the outcomes are made widely available.

### Analysis

The biggest problem with conferences is arguably that of sustained impact: it is not clear if people will feel the need to return to a conference website after the event has concluded, for example. To some extent, the Science in Dialogue conference addressed this problem by adding conclusions and summaries of the various sessions after the event. Adding conference papers after the event is also an option, as is recording presentations and making the recordings available as media files. However, a more sustained impact might be achieved by embedding the conference in a more general RRI website, as well as holding more periodic events rather than one-off conferences.

## 6.4 Academic Journal

Although the Observatory for Responsible Innovation has an online journal [7], it is not clear if this has a high impact or is widely disseminated. It seems worth investigating whether there is sufficient demand for an RRI journal, or for a journal that gathers articles relevant to RRI themes. Another alternative would be to look at publication strategies for RRI articles – for example, it is often more difficult to get interdisciplinary work published.

### Analysis

An academic RRI journal might be useful as a focal point for those with an interest in RRI. However, there is a worry that its impact outside the RRI community would be limited. Perhaps a better approach would be to consider an overall strategy for publishing RRI relevant work in more mainstream outlets.

## 6.5 RRI Codes of Conduct and Guidelines

A set of formal (but not enforceable) guidelines for RRI could be a powerful way to raise the profile of the RRI concept. The process of developing and defining the guidelines could be a focal point for attention on RRI. However, such a process might need approval and support from a governmental or intergovernmental body if it is to attract sufficient attention.

### Analysis

Codes of conduct and guidelines are widely used to disseminate new normative concepts and structures (see for example the proliferation of human rights-related instruments). Such codes are potentially a useful focus for attention. However, they raise two significant problems. First, such codes raise the demands of legitimacy much higher. Formalising RRI concepts in a written code raises arguably stronger demands to include a full range of stakeholder if such codes are to have democratic legitimacy. Another problem is that formalising RRI concepts in a fixed code may lead to an excessively rigid framing of the RRI concept.

## 6.6 Mainstream Media

It is not entirely clear if RRI has attracted much attention in mainstream media. However, if the Forum and Observatory are to attract individual citizens as well as organisations, it



seems vital to find ways to raise the profile of the RRI concept via mainstream media. An example of a possible outlet is the BBC Future webpage, which addresses new technologies and (sometimes) ethical issues [12].

### **Analysis**

Constructing a strategy for attracting media attention to RRI is an important but difficult task. RRI itself may be a rather too abstract concept to attract a lot of mainstream media attention. It may be more effective to focus on specific salient issues as part of this strategy, and to find ways of including prominent RRI figures and projects in more mainstream debates.

## **6.7 Summary of Section Four**

This section considered six main dissemination channels for RRI. It was argued that the main established channels (research funding, online tools and conferences) are potentially effective but need greater co-ordination. Some alternative tools that might be considered are: setting up an RRI journal or an RRI publication strategy; developing RRI codes of conduct and guidelines, and disseminating RRI through mainstream media. Of these, the mainstream media strategy seems the most urgent but perhaps also the most difficult.

## 7 Section Five: Beyond the European Context

### 7.1 Equivalent Structures

Although RRI arguably originated in the USA (early US projects on nanotechnology used terms such as ‘responsible development’ which seem to have evolved into RRI over time [3], [4] discussions of RRI outside the European context have so far been quite limited – there is a lot of (currently unfulfilled) potential for constructing an RRI network that expands the concept beyond its current Euro-centric focus. As stressed in previous sections, the only RRI project with a genuinely international profile is the PROGRESS project.

Using the contributions from UNIMAS as an example, it is clear that there are some equivalent structures for the development and dissemination of RRI concepts outside the European context, and in the case of developing countries in particular. In the European context, RRI has been disseminated in two main ways: through government funded research programmes, both at regional and national level, and through independent and quasi-independent think tanks. Taking Malaysia as an example, it appears that there are at least some equivalents to this dissemination infrastructure available in some developing countries. Malaysia has government agencies with a specific innovation focus, such as Special Innovation Unit of the Prime Minister’s Office [68] and the National Innovation Council [69]. Other government agencies, such as the National Green Technology Council [70], may have a specific interest in RRI themes. Similarly, Malaysia also has some civil society organisations with potential interests in RRI themes – these include Malaysia Garage Innovators [71] and the Malaysia Nanotechnology Association [72]. Given the wide range of commercial enterprises with interests in biotech in Malaysia, and given that many of these organisations appear to have some kind of government links or government support, biotech may be a particularly well-developed channel for the dissemination of RRI. Finally, regional and trans-national organisations could potentially play a similar role to the EU in pushing forward RRI concepts – possible examples could include the Organisation for Economic Co-operation and Development [73] the Association of South East Asian Nations [74] and the World Economic Forum [75]. In the EU, the main role played regional governance has been to offer support to RRI through funding for research projects. An alternative approach could be for regional governance structures to develop guidelines on RRI for different types of actors – an example of this type of governance tool is the OECD guidelines for multi-national corporations.

#### Analysis

Malaysia is a case where there exist some channels for RRI dissemination that mirror those that have been used in Europe. There exist government funding agencies at regional and national levels, and there are also some civil society actors with potential interests in RRI. However, there is not any evidence that any of these channels have actually been used to disseminate RRI as yet. A more difficult task is to identify alternative channels that are more specific to this particular context. In this respect, the local knowledge of stakeholders and project partners will be very valuable.

### 7.2 Potential Issues of Concern

There are also a couple of potential issues of concern regarding disseminating RRI beyond the European context. First, there is the possibility that there are other competing concepts that are already emerging. The ‘technoprogressive’ approach of the Institute for Ethics and Emerging Technologies [76] is an example of a fairly high profile international rival to RRI. Corporate Social Responsibility is also a more mainstream concept that needs to be more

carefully distinguished from RRI if RRI is to be shown to generate added value for potential international stakeholders.

At a more fundamental level, it is important to think about ways of disseminating RRI through alternative channels when the kind of infrastructure described above is (partly or wholly) absent. Malaysia is a relatively rapidly developing country. If we rely on the kind of infrastructure that is equivalent to the types found in the European context, we may risk isolating countries that lack such infrastructure and excluding them from the potential benefits that RRI might bring. In the worst case scenario, we might end up consolidating the weak position of the poorest countries that are neither able to benefit from innovations nor to develop their own innovation infrastructure.

Given these concerns, it seems worth reflecting on strategies for RRI in relation to the poorest countries. It is possible to sketch two main strategies.

- a) Raising RRI on the development agenda. This strategy could include several different approaches. First, one could aim at disseminating RRI concepts among development NGOs. This could increase pressure on companies to share knowledge and innovations with developing countries as a part of their broader Corporate Social Responsibility strategies. Second, governments could also be encouraged to include a development element in their approaches to RRI. A start could be made here by including development concerns in the kinds of overall definitions of RRI set out in the theoretical section above (indeed, the Nuffield Council on biofuels is a potential example of this).
- b) RRI as Developing Research Infrastructure. An alternative (but not necessarily mutually exclusive) approach would be to focus on RRI in connection to the development of research and innovation infrastructure in the poorest countries. If such countries are to escape from poverty, it is presumably necessary for them to build their own research and innovation networks if they are to benefit from their own advantages. In this strategy, the aim would be to examine whether and how RRI could be built into domestic, local and regional level research and innovation structures that could be constructed in the poorest developing countries. The aim would be to ensure that domestic level research and innovation serves the needs of the citizens of poorer countries, for example by ensuring that domestic level research and innovation is addressed to specific local needs and that the benefits of innovations flow back to local people.

### 7.3 Summary of Section Five

The analysis in this section suggests that there are four main concerns with regard to internationalising the RRI concept. The first is that we need to identify equivalent or alternative channels for the dissemination of RRI where these exist (as in the Malaysia example). The second is that we need to be aware of concepts such as corporate social responsibility that might compete with RRI. The third is that one strategy for disseminating RRI would be to tie it more closely to development through existing research – the aim would be to make sure that research and innovation helps developing countries by ‘mainstreaming’ development concerns in the RRI agenda in developed countries. Finally, an alternative would be to integrate RRI into the development of research and innovation infrastructure in developing countries themselves. The aim here would be to ensure that the emerging research and innovation structures in developing countries serve to help poor people in those countries.

## 8 Online Network of Stakeholders for the Forum and the Observatory

### 8.1 Applying Stakeholder Analysis in RESPONSIBILITY

This chapter describes the recommended approach for selecting RRI stakeholders in the RESPONSIBILITY project. The chapter consists of six sections.

In **section One**, an outline of the problem of selecting stakeholders in the context of RRI is provided. It is argued that the scope of RRI stakeholders is very broad, but that the resources of the RESPONSIBILITY project are limited <sup>3</sup>. It is argued that we need to confront this problem head on and a general strategy for doing so is outlined.

In **section Two**, issues with the application of the concept of stakeholder in the RESPONSIBILITY project are addressed. The main points are:

- First, a clarification of the distinction between RRI stakeholders and stakeholders in the RESPONSIBILITY project.
- Second, a discussion of the scope of the concept of stakeholders in relation to this project.

In **section Three**, a conventional structure for carrying out stakeholder analysis is adapted to the Responsibility project. This structure involves defining the context, identifying the issue to be addressed, drawing up a list of stakeholders, gathering data on stakeholders' views, and studying the social interactions between stakeholders.

In **section Four**, a template for partners to use when suggesting stakeholders is provided,

In **section Five**, there is a data gathering discussion, like creative ways to Deal with Representativity Problems and some mechanisms to address the inherent limitations of the RESPONSIBILITY project are presented. These are mechanisms that are intended to address the problem that we can only include a limited range of stakeholders during the construction of the Forum and Observatory.

In **section Six**, the contribution of the stakeholder selection process to the overall project and the expected contributions of the project partners are outlined.

### 8.2 Selecting stakeholders in the context of RRI

Any survey of Responsible Research and Innovation will reveal that the scope of the concept and its applications are very broad indeed. The normative priorities of RRI - publicity, inclusiveness, transparency, democracy, legitimacy and so on - demonstrate a concern with including a wider range of stakeholders in research and innovation. Similarly, the range of issues to which RRI has been (or could be) applied is broad, and is expanding - Sutcliffe, for example, list around forty different issues to which RRI has been or could be applied. Furthermore, it can also be noted that the original description of work for RESPONSIBILITY proposes that RRI be expanded beyond the European context.

From the perspective of the RESPONSIBILITY project, this broad scope is a problem because the project has limited time and resources with which to survey and identify stakeholders. While it might be possible to scale back the scope of the project, this approach would carry two risks. First, it might exacerbate the problem that existing definitions of RRI are becoming fragmented and diverse. It is the aim of the project to provide an overarching definition of

---

<sup>3</sup> The discussion of stakeholders in this document draws mainly on the following documents: Hubacek et al [76]; 'How (not) to do a stakeholder analysis', Health and Policy Planning; Ott [99]; 'Stakeholders Involvement in Social Inclusion Policies' Stakeholders-Social Inclusion.eu; European Commission [132]; Freeman et al [118] Stakeholder Theory

RRI, and this will be difficult if the scope of the project is inherently limited. Second, limiting the scope of the project could result in an approach to RRI that is at odds with the general debate on the subject, which, as noted, is expansive in character.

An alternative strategy to scaling back the project is to acknowledge the broad scope of RRI and to reflect on mechanisms to compensate for the limitations of the RESPONSIBILITY project. In following this strategy, we would aim to build tools and mechanisms for eventual expansion of the project in wherever possible to address limitations in scope.

This strategy is followed in the proposed approach to stakeholder selection in the following ways. As a first stage, we identify as broad a range of potential stakeholders as possible - this is reflected in the table listing potential stakeholders below. The template provides an initial list of criteria for classifying stakeholders - although these criteria are rather subjective, they are intended to allow for some narrowing of the initial list of stakeholders to make it more manageable. Furthermore, by basing our list on agreed and consistent criteria, we are at least able to critically assess our choices at a later date to identify problems such as gaps in the coverage. After that, the potential stakeholders will be approached for consultation and/or studied on the basis of secondary sources. Finally, the list of stakeholders involved in the project will be critically examined in order to identify possible strategies for eventual expansion, and to assess which categories of stakeholders might be missing - this final part is reflected in the list of proposed mechanisms to address limitations of data gathering set out below.

In summary: first, we generate a 'long list' of potential stakeholders. This allows us to show we have selected from a broad range of potential stakeholders, and provides us with a resource that maps the overall range of RRI stakeholders. Second, we reduce this list based on the responses in the template: we might reduce the list by avoiding approaching too many members of categories of stakeholders that are over-represented, for example. Third, during and after the consultation of stakeholders, we apply mechanisms designed to compensate for initial limitations in the range of stakeholders selected.

## **8.3 Application of the concept of stakeholder**

### **8.3.1 RRI Stakeholders and Project Stakeholders – Representativity**

Since the aim of the project is to ensure that the Forum and Observatory meet the needs of RRI stakeholders, it seems important that the stakeholders we consult are representative of the broader RRI community. As a working definition, representativeness is understood to mean that the sample population we study has characteristics that are present in the general population. For example, we already know that many researchers are hostile or opposed to research ethics initiatives. Knowing this, it is important that our sample includes some researchers who share this attitude if we want to understand and address it.

A first important clarification to make is to distinguish between two types of stakeholders in this project – but also to stress that the two groups are very closely connected. On the one hand, we have Responsible Research and Innovation stakeholders in a broad sense – we can call this group 'primary stakeholders'. This group includes all people and organisations with a stake in RRI (which as we will see below is a potentially very large category). On the other, we have those with a more direct stake in the RESPONSIBILITY project: those who will be directly involved in the construction, evaluation and dissemination of the forum and observatory – this group will be called 'secondary stakeholders'. The connection between the two groups is that the primary stakeholders should be as representative as possible of the broader RRI stakeholder community – the advice and feedback we receive from the direct stakeholders should be reflective of the positions of the eventual users of the forum and observatory. Given the wide scope of the project (which aspires to spread RRI concepts beyond the European context), we face the difficult task of ensuring that our initial selection

of the secondary project stakeholders provides a basis for further expansion of the forum and observatory we will construct. We therefore need to find ways to ensure that the secondary stakeholders are representative of the broad RRI stakeholder community. The distinction between primary and secondary stakeholders is intended to reflect the fact that – although it would be normatively desirable – we cannot include the full range of stakeholders from the outset, and will thus need to identify strategies to identify representative stakeholders or to compensate for inevitable compromises in representation. The first section of this discussion addresses the problem of the scope of the concept of stakeholder in this project. The second section identifies a standard procedure for carrying out stakeholder analysis and interprets it on the basis of the decision about the scope of the stakeholder definition in the first section. Subsequent sections develop the standard stakeholder analysis procedure in relation to the RESPONSIBILITY project.

### **8.3.2 Broad versus Narrow Conceptions of Stakeholders**

The following is a widespread definition of the term ‘stakeholder’:

A stakeholder can be defined as one who: (a) is affected by or affects a particular problem or issue and/or (b) is responsible for problems or issues and/or (c) has perspectives or knowledge needed to develop good solutions or strategies, and/or (d) has the power and resources to block or implement solutions or strategies

The various components of this definition need further elaboration in order to be useful. Given that RESPONSIBILITY is a project that is intended to develop a participatory approach to Responsible Research and Innovation, we can elaborate on the concept of ‘stakeholder’ using established justifications for participatory governance. It will be argued that these justifications push in the direction of using an inclusive conception of stakeholders in the RESPONSIBILITY project – this will raise problems for the further analysis of stakeholders in this project that we will need to address.

There are three main justifications for participatory approaches to stakeholder inclusion (Hubacek et al) [77]:

**Substantive:** It is argued that the perspectives of a broader range of participants help improve the quality of judgments and decisions. This is particularly relevant to part c of the above definition. Including a broader range of actors helps to break open otherwise rigid framings of problems, and allows for construction of solutions that are sensitive to contexts. It has been claimed that these arguments are just as relevant to Responsible Research and Innovation as to other areas – for example, broader stakeholder inclusion helps break down the a focus on scientific excellence that tends to reinforce the divide between scientific experts and ‘lay’ people (Nuffield, van den Hoven).

**Normative:** Considerations of democratic legitimacy suggest we should reject top-down models of governance: top-down governance violates the principle that those affected by decisions should give consent to the decisions that affect them. This is relevant to part b of the above definition of stakeholders. The ‘all affected’ principle is widely defended in democratic theory: put briefly, the principle holds that all those affected by a particular problem have a claim to a democratic voice in decisions about that problem. In the case of Responsible Research and Innovation, the ‘all affected’ principle has extremely broad scope. The large scale nature of many of the issues RRI addresses (e.g. nanotechnology, geo-engineering, responsible finance) means that a very wide range of people are either actually or potentially affected. Furthermore, the fact that many research programmes are (directly or indirectly) funded through tax-payers’ provides another argument for broadening the scope of the all affected principle in relation to RRI.

Yet another normative consideration relates to point c above. If, as just argued, a wide range of people are affected by issues relevant to RRI, this suggests that they also bear some



responsibility for decisions in this area (a view of this type is defended in Young, 2011 [78]). Given the apparent ability of the public to disrupt certain types of projects (most notably research into Genetically Modified Organisms), it could be argued that the public bears some collective responsibility for such projects. Finally, it may even be positively desirable that more people bear responsibility for RRI relevant decisions if this improves the quality of such decisions (as argued in the discussion of substantive arguments).

**Pragmatic:** Pragmatic arguments hold that allowing affected stakeholders to participate will increase the likelihood that decisions will be implemented effectively, efficiently and sustainably. In order to ensure that implementation occurs, it is often necessary to gain access to those governed by decisions in order to respond to their objections and motivations. This pragmatic approach aims to avoid situations in which those with the power to act are able to block decisions. Again, there is a case to be made for inclusiveness in RRI on this pragmatic basis. Cases such as the objections to Genetically Modified Organisms and (more recently) Carbon Capture and Storage and Smart Metering have confronted broad-based public opposition – in order to address such opposition, broad-based participation seems necessary in order to ensure that concerns and objections can be addressed more effectively (see van den Hoven for other examples of controversial innovations).

The pragmatic approach outlined is largely based on strategic considerations: the main concern is how to manage stakeholders with the power to block or disrupt projects. However, a more critical approach to such problems would ask how these stakeholders come to have such power in the first place, whether it is legitimate, and how to share power with groups that would otherwise be excluded. This critical perspective again pushes in a more inclusive direction, asking us to consider how to deal with groups that are excluded or marginalized, and how to balance existing inequalities of power.

Of course, insisting on these demands for an inclusive approach to participation in Responsible Research and Innovation raises its own problems. The nature of the project means that we cannot pursue the optimal level of inclusion during the construction of the forum or the observatory (our resources are too limited to carry out very broad based surveys and interviews, for example). Furthermore, we will have to consider the more general problem of the legitimacy of the forum and observatory once they are up and running: how do we assess whether participation is sufficiently broadly based?

## **8.4 Stakeholder analysis adapted to the project**

Hubacek et al [77] propose the following five stage framework for carrying out a stakeholder analysis:

- Understand Context
- Identify Problem
- Identify Stakeholders
- Gather data on Stakeholder views, interests etc
- Study Social Interactions Between Stakeholders

The following analysis will follow this framework as a rough overall guide to developing parameters for identifying stakeholders.

### **8.4.1 Understand Context: Institutional Background**

In the case of Responsible Research and Innovation, it is important to try to analyse the broad institutional context in which research and innovation take place. RRI has emerged as an issue of governance of research and innovation in a broad European context: it is therefore appropriate to consider the full range of potential actors, a range which extends across the whole EU, and beyond. While we cannot ignore the fact that a wide range of



stakeholders are potentially affected by (and able to affect) research and innovation, we can at least analyse the institutional background as a first step to a systematic identification of RRI stakeholders.

The following chart attempts to provide an overview of the institutional background to RRI. The main institutional actors are identified and sub-divided into smaller groups of actors to provide a more fine-grained analysis. It is essential in order to provide at least a minimally representative sample of the main actors that the main sub-groups (Civil Society, Business, Research, National Governments, Regional Governance, International Governmental Organisations and Scientific Projects) have at least one stakeholder representative in the project. It would be preferable if all the narrower sub-groups (e.g. business associations, policy makers from different states, consumer groups) were all represented as well.

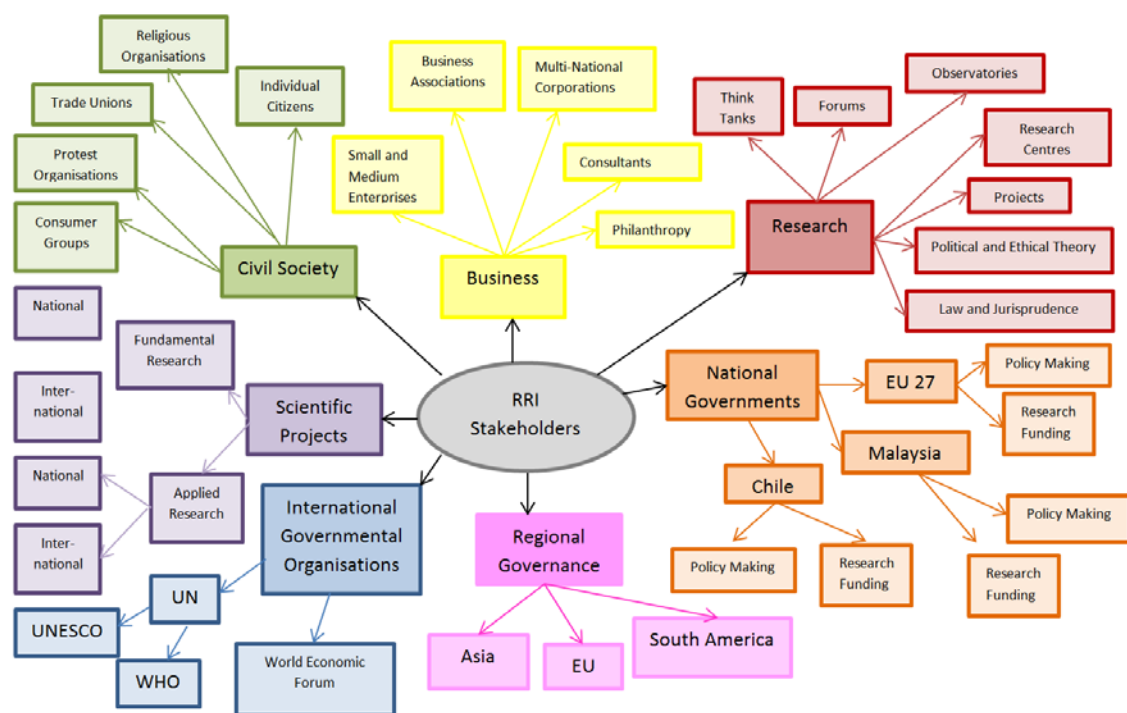


Figure 3: RRI Networks & Stakeholders in RRI

## 8.4.2 Identify Issue: RRI Issues

A second step is to identify the general issue we want to address. In the case of RRI, we in fact face a cluster of issues because RRI has already been applied to different issues. Our main problem is to ensure that the forum and observatory are able to address a wide range of issues and provide an overarching approach to RRI, rather than replicating narrower applications to specific fields. The range of issues to which RRI concepts have been applied is very broad and is continually expanding. Sutcliffe, for example, lists around 40 different issues to which RRI has been or could be applied, while van den Hoven refers to still further issues that could be added to the list. We cannot cover all the possible applications of RRI, but if we want the forum and observatory to have a broad reach, we need to ensure that our initial focus is not too narrow or restrictive. With this concern in mind, we should identify some broad categories for the application of RRI to ensure that we are at least able to demonstrate the applicability of RRI concepts outside a narrow field, and to be aware of the problems of applying RRI across different fields and across academic disciplines.

The following chart is a set of broad issue areas to which RRI has been or could be applied. Again, a representative approach will attempt to include stakeholders that are relevant to all these broad issue areas – it would also be preferable to have a broad range of stakeholders from each issue area if possible. Some examples of more specific issues and potential stakeholders have been added for illustration:

**Table 6: Areas to which RRI has been or could be applied.**

Area 1: <b>ICT</b>	Sub area: Sustainable ICT Examples: ENVIROFI; SAFECITY; FINSINY
Area 2: <b>ECONOMIC CHALLENGES</b>	Sub area: Responsible finance Examples: Debating Innovation
Area 3: <b>SOCIAL CHALLENGES</b>	Sub area: Health Care in Changing Societies Examples: Electronic Patient Record; Alzheimer's Diagnosis
Area 4: <b>NEW SCIENTIFIC PRODUCTS</b>	Sub area: Nanotech Examples: Responsible Nanocode; Nano and You

### 8.4.3 Identify Stakeholders

The third stage in the analysis is to identify the relevant RRI stakeholders. This process is normally carried out using a range of different methodologies such as snowball sampling, interviews, analysis of secondary sources and so on [77]. In the case of RESPONSIBILITY, both time and resource limitations and the broad scope of the project limit our ability to use these methodologies. We will instead need to rely on the existing expertise of the project partners in order to build an initial list of potential primary stakeholders which can subsequently be narrowed to produce a list of secondary stakeholders. In order to broaden the initial list, existing RRI networks can be studied as a way to identify stakeholders with an existing interest in RRI. We will also need to identify potential stakeholders that do not yet have an explicit interest in RRI – this is necessary both to ensure that the project is representative and to ensure that the ambition of internationalising RRI is fulfilled. Based on contributions from project partners up to now, we have the following list of potential stakeholders, categorised according to the institutional schema above

**Table 7: Business networks Stakeholders registration**

<b>Business</b>	Institution /Organisation /Company	Nationality	Funding Source	Membership	Contact Person	Mail / Website	Register in the networking tool
Multi-national Corporations							
Small-Medium Enterprises							
Business Associations							
Consultants							
Philanthropy							

**Table 8: Research Stakeholders registration**

<b>Research</b>	Institution /Organisation /Company	Nationality	Funding Source	Membership	Contact Person	Mail / Website	Register in the networking tool
Think Tanks							
Forums							
Observatories- Research Centers							
Law and Jurisprudence							
Political and Ethical Theory							
Projects							
Working Groups							
Research Groups							
xxxx							

**Table 9: Civil Society Stakeholders registration**

<b>Civil Society</b>	Institution /Organisation /Company	Nationality	Funding Source	Membership	Contact Person	Mail / Website	Register in the networking tool
Private Individuals							
Religious Organisations							
Foundations and Charities							
Trade Unions							
Protest Groups							
Consumer Groups							
Network							
xxxx							

**Table 10: Regional Governments Stakeholders registration**

<b>Regional Governments</b>	Institution /Organisation /Company	Nationality	Funding Source	Membership	Contact Person	Mail / Website	Register in the networking tool
EU							
Asia							
South America							
xxxx							

**Table 11: National Governments Stakeholders registration**

<b>National Governments</b>	Institution /Organisation /Company	Nationality	Funding Source	Membership	Contact Person	Mail / Website	Register in the networking tool
Policy Makers							
Research Funders							
xxxxx							

**Table 12: International Governmental Organisations Stakeholders registration**

<b>International Governmental Organisations</b>	<b>Institution /Organisation /Company</b>	<b>Nationality</b>	<b>Funding Source</b>	<b>Membership</b>	<b>Contact Person</b>	<b>Mail / Website</b>	<b>Register in the networking tool</b>
UN							
UNESCO							
WHO							
Council on Social Innovation							
EU misc.							
CoE							
xxxx							

**Table 13: Scientific Projects Stakeholders registration**

<b>Scientific Projects</b>	<b>Institution /Organisation /Company</b>	<b>Nationality</b>	<b>Funding Source</b>	<b>Membership</b>	<b>Contact Person</b>	<b>Mail / Website</b>	<b>Register in the networking tool</b>
NOW MVZ Projects (53 in total)							
Future Internet Projects (10 in total)							
Green Communications							
Smart Grids							
Xxxx							
Xxx							
xxxx							

#### 8.4.4 Gather Data on Stakeholder Views, Interests etc

After producing an initial list of stakeholders, further analysis will be necessary in order to identify a representative list of secondary stakeholders. Information on the views and interests of stakeholders is important in order to ensure that our selection of stakeholders is as representative as possible of the problems and issues that participants in an inclusive RRI forum and observatory may face. Data on interests, attitudes, opinions and so on can be gathered either through primary interviews with the stakeholders themselves, or through analysis of secondary sources. In the case of RESPONSIBILITY, an approach based on partners' own knowledge and on secondary sources is most appropriate – again, this is due to the scale of the project and to the constraints imposed by the time and resources available. In order to provide consistent and structured analysis of the interests and views of the potential secondary stakeholders, it is proposed that the following parameters are used to provide an initial categorization of their relationship to RRI: Interest in the RRI Issue; Ability to Affect Decisions; Attitude to RRI; Impact of RRI Issue on Actor; Motivation. Although these parameters are rather subjective, they are intended to enable us to categorise the potential stakeholders to some extent, in order to make the initial list more manageable. They also provide a warning that some groups (particularly those with an existing interest in RRI) are over-represented. Furthermore, they motivate the project partners to think about including a wider range of stakeholders, for example those with low motivation. These parameters can be rated in the following ways:

- Interest in Issue: What is the nature of the stakeholder's interest in the specific RRI issue?
- Ability to Affect Decisions: Is the actor's ability to affect decisions (policy choices, standard setting, regulation etc) relating to the RRI issue high, moderate, or low?
- Attitude to RRI: Is the stakeholder aware of RRI principles? If so, are they supportive, neutral, or opposed to the use of RRI as a governance tool?
- Impact of RRI Issue on Actor: Does the RRI issue in question have a high, moderate or low impact on the actor in question?
- Motivation: Does the stakeholder have a high, moderate or low level of motivation to contribute to the Forum and/or Observatory

**Table 14: Gathering Stakeholders views and interests**

Stakeholder	Interest in Issue	Ability to Affect Decisions	Attitude to RRI	Impact of RRI Issue on Stakeholder	Motivation
	-High -Moderate -Low	-High -Moderate -Low	-Supportive -Neutral -Opposed -Unaware	-High -Moderate -Low	-High -Moderate -Low

The aim behind classifying stakeholders in this way is to help us to identify stakeholders who are particularly difficult to include in the proposed forum and observatory, either because of low awareness of RRI, opposition to RRI as a governance approach, or low motivation to participate. These stakeholders will require particular attention in order to address the obstacles to their participation. When proposing stakeholders, partners should use their knowledge of the particular stakeholders to rate them according to the parameters outlined. The scheme is neither intended to classify stakeholders ex ante, nor to ignore differences within groups of stakeholders. Rather, it intended to identify 'hard cases' among stakeholder groups – i.e., those groups on whom we might want to focus if we want our proposed Forum and Observatory to make a difference to existing modes of technology governance. For

example, some citizens may have both low motivation and low ability to affect decision making processes, but also be strongly affected by the outcome of the project. In this 'hard case', we will want to think about how to motivate such citizens so they have an incentive to participate, how to engage them over the long run of an innovation's development, and how to construct (reflexive) tools through which they can participate.

### 3.5) Social Network Analysis

A final step in the analysis Hubacek et al [77] propose is to analyse possible social networks between different stakeholders. This is a particularly important stage for the RESPONSIBILITY project given that the aim of the project is to develop a meta-network of those involved in RRI and to consolidate existing connections into a sustainable and coherent RRI community. As with the other steps in the process, it will be necessary to make use of partners' own knowledge and analysis of secondary sources. This is again a result of the limited opportunities to directly interview potential stakeholders at this stage. It is proposed that suggestions for stakeholders include some analysis of possible connections between suggested stakeholders by answering the following questions:

- 1) Are you aware of any communication between this stakeholder and others with possible interests in RRI (up to 5 others)?
- 2) Are you aware of how often this stakeholder communicates with others?
- 3) Would you say this person communicates only with others who share similar views of RRI?

## 8.5 Template to use when suggesting stakeholders

The following template is designed to allow for consistent feedback from partners on potential RRI stakeholders. The intention is to provide parameters that will enable basic initial comparisons between proposed stakeholders and allow for the construction of a representative set of RRI stakeholders.



**Table 15: Stakeholder Selection Template**

<b>Partner:</b>	
<b>Stakeholder Name and URL:</b>	
<b>INSTITUTIONAL TYPE:</b> [Business, Civil Society etc] <b>SUB-TYPE:</b> [MNC, SME, Individual, etc]	<b>RRI ISSUE:</b> <b>SUB-ISSUE:</b>
<b>STAKEHOLDER RELATIONSHIP TO RRI</b> <b>Interest in Issue:</b> [H, M, L] <b>Ability to Affect Decisions:</b> [H, M, L] <b>Attitude to RRI:</b> [S, N, O, U] <b>Impact of Issue:</b> [H, M, L] <b>Motivation:</b> [H, M, L]	<b>STAKEHOLDER SOCIAL NETWORKS</b> <b>Other Actors Communicated With (up to 5):</b> <b>Frequency of Communication:</b> <b>Communication: with those sharing views?</b>

## 8.6 Data Gathering Discussion: Creative Ways to Deal with Representativity Problems

Although the above process and template are intended to provide the basis for a representative set of secondary stakeholders (those involved in contributing to the construction of the Forum and Observatory), there are clear risks in the approach. Among these are the following problems:

- Partners are not able to provide a fully representative set of stakeholders within the criteria proposed
- The criteria themselves are not sufficiently thorough (parameters may be missing, not sufficiently fine-grained etc)
- The Forum and Observatory may initially be representative but may become unbalanced over time
- There is a lack of attention to the problems of particular groups that consolidates their inclusion in the forum and observatory

With these kinds of problems in mind, it is proposed that we identify mechanisms that anticipate these and similar problems and that can hopefully correct for them during the development, implementation and running of the forum and observatory. The main aim is to build in an iterative and long term approach to stakeholder selection so that the initial framing of the forum and observatory do not lead to restriction to either limited groups of stakeholders or a restricted range of issues. It is not envisaged that all these mechanisms would be implemented – we would have to select the most effective and feasible, and possible add alternatives if those proposed below are not appropriate.

**Table 16: Stakeholder Representativity Check**

PROPOSED MECHANISM	PROBLEM	SOLUTION	IMPLEMENTATION
Label stakeholders according to institutional affiliation	Possible imbalance between different stakeholder groups	Enables monitoring of participation of different groups	Ask stakeholders to say which group they belong to when signing into Forum/Observatory
Ensure high visibility for Forum and Observatory	Lack of awareness among those outside existing RRI community	Enables awareness of Forum and Observatory	Press releases, connections with other stakeholders; social media
Ensure accessible language in Forum and Observatory	Some groups may be discouraged by language that is hard to understand	Peer review of materials by non specialists to ensure excessive use of technical language is avoided	Peer review by partners/possible stakeholders
'Snowball' list of stakeholders	Initial list of stakeholders restricts later expansion	Enables continual additions to list of stakeholders	New participants asked/required to suggest other participants when joining forum
Periodic reflection on stakeholders, range of issues, problems	Initial list of stakeholders and parameters has danger of being too limited	Allows for iterative approach so that problems that emerge can be acknowledged	Specified periodic points of reflection/review built into process of developing Forum and Observatory
Periodic reflection on expansion to other fields/issue areas	Initial set of issue areas becomes a rigid frame for later Forum and Observatory	Allows for consideration of problems of expansion to other fields	Peer review and comparisons made between those working on different sub-fields (e.g. is one area better than another at bringing in new stakeholders?)
Qualitative Review of Forum/Discussions	Unforeseen problems with stakeholders are not addressed	Allows for identification of unforeseen problems	Review by partners of selected discussions, events etc to identify problem areas
Fellowship for participants in Forum/Observatory	Marginalised groups not able to afford to participate	Enables groups to be able to afford to contribute, gives voice to otherwise marginalized groups	Funded fellowships to take part in events or take part in relevant research regarding RRI
Ask existing stakeholders to speculate on problems of similar groups	Lack of access to marginalized groups, list of stakeholders too limited	Allows 'local expertise' of different categories of stakeholders to be used	Periodic discussions/contributions from participants

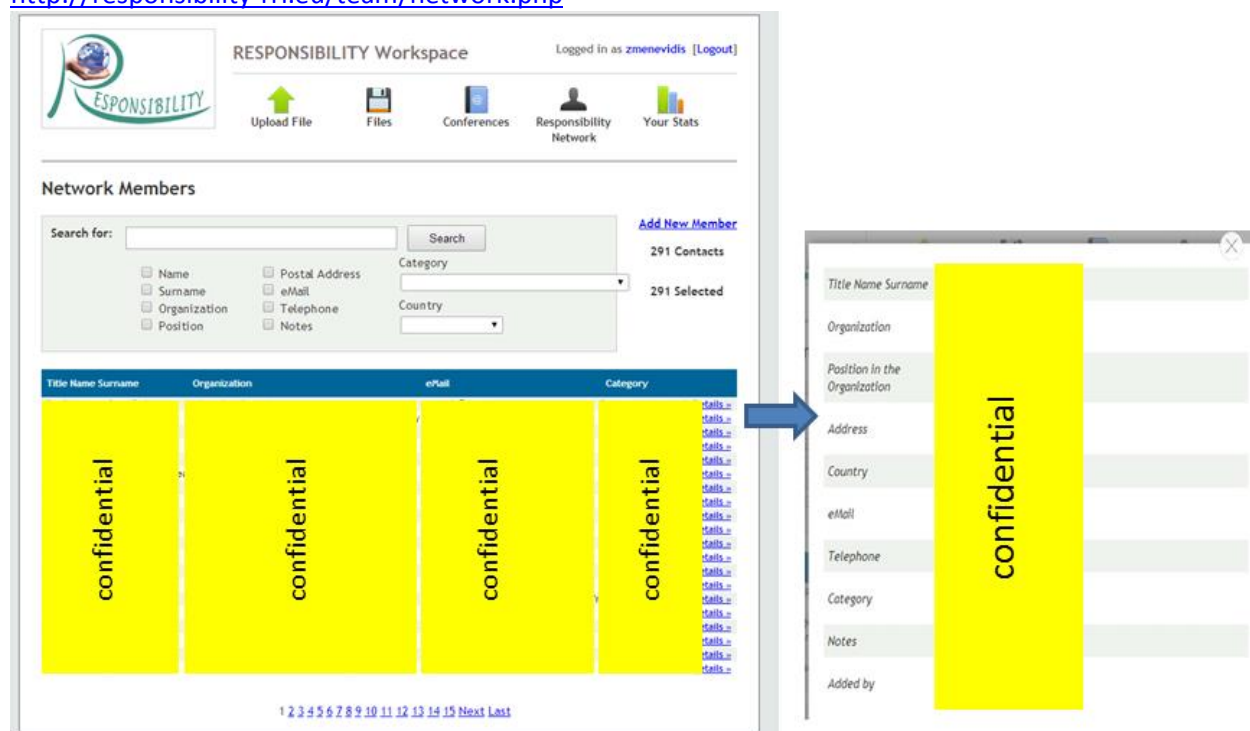
## 8.7 Contribution to the stakeholder selection process

The above steps in the process of selecting stakeholders and the proposed template are intended to ensure that the RESPONSIBILITY project and the maintenance team of the Observatory after the project selects stakeholders that are representative of a range of institutions, issues, attitudes and networks relating to RRI. This should include 'hard cases' - stakeholders that are potentially hostile to RRI, or have low awareness and/or motivation. The aim is to have the means to identify such stakeholders at an early stage with a view to finding ways to include them in the proposed forum and observatory.

The above steps will first feed into the network of networks concept, the list, and later into the development of the analytic grid. The analytic grid will in this case be developed iteratively, with feedback between those developing the initial network of network report and those generating the later analytic grid. The lists of stakeholders can be used to identify those relevant to developing parameters for the analytic grid.

It is expected that the project partners will contribute to the production of the list of stakeholders by submitting suggestions for stakeholders using the template provided above.

<http://responsibility-rri.eu/team/network.php>



The screenshot shows the 'RESPONSIBILITY Workspace' interface. At the top, it says 'Logged in as zmenevidis [Logout]'. Below this are navigation icons for 'Upload File', 'Files', 'Conferences', 'Responsibility Network', and 'Your Stats'. The main section is titled 'Network Members'. It includes a search bar with a 'Search' button and a list of search criteria: Name, Surname, Organization, Position, Postal Address, eMail, Telephone, and Notes. To the right of the search bar, it says 'Add New Member', '291 Contacts', and '291 Selected'. Below the search bar is a table with columns: Title Name Surname, Organization, eMail, and Category. All the data in this table is redacted with a large yellow box containing the word 'confidential'. A blue arrow points from the table to a detailed form on the right. This form has fields for: Title Name Surname, Organization, Position in the Organization, Address, Country, eMail, Telephone, Category, Notes, and Added by. All these fields are also redacted with a large yellow box containing the word 'confidential'.

Figure 4: Online Stakeholder Network list that can be only accessed with permission

## 9 BIBLIOGRAPHY

- [1] H. Sutcliffe, "A Report on Responsible Research and Innovation," MATTER for All, 2011.
- [2] NWO, "Maatschappelijk Verantwoord Innoveren," 2013. [Online]. Available: <http://www.nwo.nl/onderzoek-en-resultaten/programmas/maatschappelijk+verantwoord+innoveren>. [Accessed 28 June 2013].
- [3] K. Sykes and P. Macnaghten, "Responsible Innovation: Opening Up Dialogue and Debate," in *Responsible Innovation: Managing the Responsible Emergence of Science and Innovation in Society*, Chichester, Wiley, 2013, pp. 85-104.
- [4] E. Fisher and A. Rip, "Responsible Innovation: Multi-level Dynamics and Soft Intervention Practices," in *Responsible Innovation: Managing the Responsible Emergence of Science and Innovation in Society*, Chichester, Wiley, 2013, pp. 165-177.
- [5] J. Schot and A. Rip, "The Past and Future of Constructive Technology Assessment," *Technological Forecasting and Social Change*, pp. 269-86, 1997.
- [6] P. Willetts, "The Cardoso Report on the UN and Civil Society: Functionalism, Global Corporatism, or Global Democracy?," *Global Governance*, 2006.
- [7] Debating Innovation, "Observatory for Responsible Innovation," 2012. [Online]. Available: [www.debatinginnovation.org](http://www.debatinginnovation.org). [Accessed 24 April 2013].
- [8] Panel of Eminent Persons on United Nations-Civil Society Relations, "We the Peoples: Civil Society, the United Nations and Global Governance," United Nations General Assembly, 2003.
- [9] Internet Governance Forum, "Dynamic Coalitions," 2010. [Online]. Available: <http://www.intgovforum.org/cms/dynamiccoalitions>. [Accessed 28 June 2013].
- [10] J. Malcolm, Multi-Stakeholder Governance and the Internet Governance Forum, Perth: Terminus, 2008.
- [11] J. van den Hoven, C. Jacob, L. Nielsen, F. Roure, L. Rudze, J. Stilgoe and K. G. A.-L. M. R. C. Blind, "Options for Strengthening Responsible Research and Innovation," European Commission Directorate General for Research and Innovation, Luxembourg, 2013.
- [12] BBC, "BBC Future," 25 June 2013. [Online]. Available: <http://www.bbc.com/future>. [Accessed 26 June 2013].
- [13] Progress, "Progress," [Online]. Available: <http://www.ea-aw.de/forschung/aktuelle-projekte/progress-promoting-global-responsible-research-and-social-and-scientific-innovation.html>. [Accessed 29 July 2013].
- [14] R. Mohd Nor, "UNIMAS Input for an Initial List of Stakeholders for Asia Region," UNIMAS, 2013.
- [15] J. Lenoble and M. Maesschalck, Toward a Theory of Governance, Dordrecht: Kluwer, 2003.
- [16] J. van den Hoven, "Value Sensitive Design and Responsible Innovation," in *Responsible Innovation: Managing the Responsible Emergence of Science and Innovation in Society*, Chichester, Wiley, 2013, pp. 75-80.
- [17] CNS-ASU, 2003. [Online]. Available: <http://cns.asu.edu/>. [Accessed 26 June 2013].
- [18] R. T. De George, "A History of Business Ethics," 2012. [Online]. Available: <http://www.scu.edu/ethics/practicing/focusareas/business/conference/presentations>

- /business-ethics-history.html. [Accessed 26 June 2013].
- [19] A. B. Carroll, Oxford Handbook of Corporate Social Responsibility, Oxford: OUP, 2008.
- [20] Siemens, "Values," 2013. [Online]. Available: <http://www.siemens.com/about/en/values-vision-strategy/values.htm>. [Accessed 28 June 2013].
- [21] L'Oreal, "The Pillars of Responsible Innovation," 2013. [Online]. Available: <http://www.loreal.com/research-innovation/our-innovation-model/the-pillars-of-responsible-innovation.aspx>. [Accessed 28 June 2013].
- [22] IBM, "Responsibility at IBM," 2013. [Online]. Available: <http://www.ibm.com/ibm/responsibility/initiatives/>. [Accessed 28 June 2013].
- [23] G. SEB, "Responsible Innovation," 2013. [Online]. Available: <http://www.groupeseb.com/en-en/content/responsible-innovation>. [Accessed 28 June 2013].
- [24] GlaxoSmithKline, "Responsible Research," 2013. [Online]. Available: <http://www.gsk.com/research/science-and-innovation/responsible-research.html>. [Accessed 28 June 2013].
- [25] CORIN, "CORIN Academy," 2013. [Online]. Available: [http://www.coringroup.com/corin\\_academy/about\\_corin\\_academy/responsible\\_innovation/](http://www.coringroup.com/corin_academy/about_corin_academy/responsible_innovation/). [Accessed 28 June 2013].
- [26] Shell, "Responsible Chemistry," 2013. [Online]. Available: <http://www.shell.com/chemicals/responsible-energy.html>. [Accessed 28 June 2013].
- [27] Matter for All, "Matter for All," 2012. [Online]. Available: <http://www.matterforall.org/>. [Accessed 24 April 2013].
- [28] KARIM Network, "KARIM Low Carbon Observatory," 2013. [Online]. Available: <http://www.karimnetwork.eu/policy-makers/Pages/The-KARIM-Low-Carbon-Observatory.aspx>. [Accessed 28 June 2013].
- [29] UN Secretary General's Special Representative on Business and Human Rights, "Business and Human Rights Resource Centre," 2013. [Online]. Available: <http://www.business-humanrights.org/SpecialRepPortal/Home>. [Accessed 28 June 2013].
- [30] OECD, "Guidelines for Multinational Enterprises," 2013. [Online]. Available: <http://www.oecd.org/daf/inv/mne/>. [Accessed 28 June 2013].
- [31] NWO, "Maatschappelijk Verantwoord Innoveren," 2012. [Online]. Available: <http://www.nwo.nl/onderzoek-en-resultaten/programmas/maatschappelijk+verantwoord+innoveren>. [Accessed 24 April 2013].
- [32] FRRRICT, "Responsible Innovation," 2012. [Online]. Available: [www.responsible-innovation.org.uk](http://www.responsible-innovation.org.uk). [Accessed 24 April 2013].
- [33] Nano and Me, 2012. [Online]. Available: <http://www.nanoandme.org/home/>. [Accessed 28 June 2013].
- [34] R. Owen and J. Goldberg, "Responsible Innovation: A Pilot Study with the UK Engineering and Physical Sciences Research Council," *Risk Analysis*, pp. 1699-1707, 2010.
- [35] Nuffield Council, "Emerging Biotechnologies," December 2012. [Online]. Available: <http://www.nuffieldbioethics.org/emerging-biotechnologies>. [Accessed 28 June 2013].

- [36] Comitato nazionale per la bioetica, "Comitato nazionale per la bioetica," 2013. [Online]. Available: <http://www.palazzochigi.it/bioetica/>. [Accessed 28 June 2013].
- [37] Comité Consultatif National d'Ethique , "Comité Consultatif National d'Ethique (CCNE)," [Online]. Available: <http://www.ccne-ethique.fr/fr>. [Accessed 28 June 2013].
- [38] Commission de l'éthique de la science et de la technologie , "Commission de l'éthique de la science et de la technologie," 2013. [Online]. Available: Commission de l'éthique de la science et de la technologie . [Accessed 28 June 2013].
- [39] D. Ethikrat, "Deutscher Ethikrat (German Ethics Council)," 2013. [Online]. Available: [www.ethikrat.org/](http://www.ethikrat.org/). [Accessed 28 June 2013].
- [40] National Advisory Board on Research Ethics, "National Advisory Board on Research Ethics," 2013. [Online]. Available: <http://www.tenk.fi/en/index.html>. [Accessed 28 June 2013].
- [41] National Bioethics Advisory Commission, "National Bioethics Advisory Commission," 2013. [Online]. Available: <http://www.bioethics.gov/>. [Accessed 28 June 2013].
- [42] National Bioethics Commission, "National Bioethics Commission," 2013. [Online]. Available: [www.bioethics.gr/](http://www.bioethics.gr/). [Accessed 28 June 2013].
- [43] A. Van Rooy, Civil Society and the Aid Industry, London: Earthscan, 1998.
- [44] J. Nelson, "The Operation of Non Governmental Organisations in a World of Corporate and Other Codes of Conduct," *Corporate Social Responsibility Initiative Working Paper*, 2007.
- [45] D. Lewis, "LSE Centre for Civil Society Working Papers," 2010. [Online]. Available: [http://eprints.lse.ac.uk/29052/1/CSWP13\\_web.pdf](http://eprints.lse.ac.uk/29052/1/CSWP13_web.pdf). [Accessed 28 June 2013].
- [46] F. H. Cardoso, "We the Peoples: Civil Society, the United Nations and Global Governance," United Nations General Assembly, New York, 2004.
- [47] European Union, "Responsible Research and Innovation: Europe's Ability to Respond to Social Challenges," European Union, 2012.
- [48] Directorate General for Research and Innovation, "Options for Strengthening Responsible Research and Innovation," European Commission, Brussels, 2013.
- [49] UNESCO, "Science, Innovation and Societal Benefit," UNESCO, 2013.
- [50] PROGRESS, "Promoting Global Responsible Research and Social and Scientific Innovation," UNESCO, 2013.
- [51] H. Fourdeux, "FI-CONTENT," 2013. [Online]. Available: <http://www.fi-content.eu>. [Accessed 28 June 2013].
- [52] K. Noyens, "Smart Grids Projects," 2013. [Online]. Available: <http://www.smartgridsprojects.eu/>. [Accessed 28 June 2013].
- [53] P. Van Hove, "Smart Grids ETP," 2013. [Online]. Available: <http://www.smartgrids.eu/>. [Accessed 28 June 2013].
- [54] G. Niblett, "BCS Information Security Specialist Group," 2013. [Online]. Available: <http://www.bcs-issg.org.uk/index.html>. [Accessed 28 June 2013].
- [55] Bisogni, "ENISA," 2013. [Online]. Available: <http://www.enisa.europa.eu/activities/risk-management/working-group/WG%20EoS>. [Accessed 28 June 2013].
- [56] D. Giminez, "SAFECITY," 2013. [Online]. Available: <http://www.safecity-project.eu>. [Accessed 28 June 2013].
- [57] J. Jiminez Delgado, "FI-Ware," 2013. [Online]. Available: <http://www.fi-ware.eu/>. [Accessed 28 June 2013].



- [58] MTSFB, "MTSFB Green ICT Working Group," 2013. [Online]. Available: <http://services.eumcci.com/policy-advocacy/ict-sector/342-mtsfb-green-ict-working-group>. [Accessed 28 June 2013].
- [59] B. Crooks, "BCS Green IT Specialist Group," 2013. [Online]. Available: <http://www.bcs.org/category/10547>. [Accessed 28 June 2013].
- [60] Communicate Green, "Communicate Green," 2013. [Online]. Available: <http://www.communicate-green.de/index>. [Accessed 28 June 2013].
- [61] J. Lorenzo, "ENVIROFI," 2013. [Online]. Available: <http://www.envirofi.eu>. [Accessed 28 June 2013].
- [62] 3tu Centre for Ethics and Technology, "Ethics and Technology," 2012. [Online]. Available: <http://ethicsandtechnology.eu/>. [Accessed 24 April 2013].
- [63] R. von Schomberg, "Responsible Innovation," 2013. [Online]. Available: <http://renevonschomberg.wordpress.com/>. [Accessed 28 June 2013].
- [64] J. Stilgoe, "Responsible Innovation," 2013. [Online]. Available: <http://jackstilgoe.wordpress.com/>. [Accessed 28 June 2013].
- [65] Debating Innovation, "Events," 2012. [Online]. Available: <http://www.debatinginnovation.org/?q=node/105>. [Accessed 28 June 2013].
- [66] Responsible Innovation Conference, "Responsible Innovation Conference," 2012. [Online]. Available: <http://www.responsible-innovation.nl/conference/conf11/>. [Accessed 24 April 2013].
- [67] Science in Dialogue, "Conference on Responsible Research and Innovation," April 2012. [Online]. Available: <http://scienceindialogue.dk/>. [Accessed 28 June 2013].
- [68] Prime Minister's Office of Malaysia, February 2011. [Online]. [Accessed 28 June 2013].
- [69] Malaysian Government, "Agensi Inovasi Malaysia," 2011. [Online]. Available: <http://innovation.my/aboutus.php>. [Accessed 28 June 2013].
- [70] Ministry of Energy, Green Technology and Water, 2013. [Online]. Available: <http://www.kettha.gov.my/en>. [Accessed 28 June 2013].
- [71] Malaysian Government, "National Innovation Strategy Support System for Garage Innovators," 2013. [Online]. [Accessed 28 June 2013].
- [72] Malaysia Nanotechnology Association, 2013. [Online]. Available: <http://www.mynano.com.my/16-malaysia-nanotechnology>. [Accessed 28 June 2013].
- [73] OECD, 2013. [Online]. Available: <http://www.oecd.org/>. [Accessed 28 June 2013].
- [74] ASEAN, 2013. [Online]. Available: <http://www.asean.org/>. [Accessed 28 June 2013].
- [75] World Economic Forum, "World Economic Forum," 2013. [Online]. Available: <http://www.weforum.org/>. [Accessed 28 June 2013].
- [76] Institute for Ethics and Emerging Technologies, 2013. [Online].
- [77] C. Hubacek, C. Prell, C. Quinn and M. Reed, "Stakeholder Selection as a Precondition for Successful Participatory Processes," [Online]. Available: [http://homepages.see.leeds.ac.uk/~lecmsr/Hubacek\\_et\\_al\\_stakeholder.pdf](http://homepages.see.leeds.ac.uk/~lecmsr/Hubacek_et_al_stakeholder.pdf). [Accessed 04 04 2013].
- [78] I. M. Young, *Responsibility For Justice*, Oxford: Oxford University Press, 2011.
- [79] RESPONSIBILITY, "RESPONSIBILITY," [Online]. Available: [http://cordis.europa.eu/search/index.cfm?fuseaction=proj.document&PJ\\_RCIN=13902109](http://cordis.europa.eu/search/index.cfm?fuseaction=proj.document&PJ_RCIN=13902109). [Accessed 29 July 2013].
- [80] Directorate General for Health and Consumers, "'Code of Good Practice for



- Consulation of Stakeholders'," European Commission, 2011.
- [81] Danish Council on Ethics, "Danish Council on Ethics," 2013. [Online]. Available: <http://www.etiskraad.dk/>. [Accessed 28 June 2013].
- [82] Observatory for Responsible Innovation, "Debating Innovation," 2013. [Online]. Available: <http://www.debatinginnovation.org/>. [Accessed 28 June 2013].
- [83] A. Zettler, "NGO Participation at the United Nations: Barriers and Solutions," 2009.
- [84] R. Von Schomberg, "Rene Von Schomberg," 2013. [Online]. Available: <http://renevonschomberg.wordpress.com/>. [Accessed 24 April 2013].
- [85] R. Von Schomberg, "A Vision of Responsible Research and Innovation," in *Responsible Research and Innovation: Managing the Responsible Emergence of Science and Innovation in Society*, Chichester, Wiley, 2013, pp. 51-71.
- [86] J. Voets, W. Van Dooren and F. De Rynck, "A Framework for Assessing the Performance of Policy Networks," *Public Management Review*, 2008.
- [87] W. Van Dooren, G. Bouckaert and J. Halligan, *Performance Management in the Public Sector*, London: Routledge, 2010.
- [88] W. Van Dooren, "Better Performance Management: Some Single and Double Loop Strategies," *Public Performance and Management Review*, 2011.
- [89] B. C. Stahl, G. Eden and M. Jirotko, "Responsible Research and Innovation in Information and Communication Technology: Identifying and Engaging with the Ethical Implications of ICTs," in *Responsible Innovation: Managing the Responsible Emergence of Science and Innovation in Society*, Chichester, Wiley, 2013, pp. 199-215.
- [90] I. Shapiro, *The State of Democratic Theory*, Yale : Yale University Press, 2006.
- [91] P. Samarati, "ERCIM," 2013. [Online]. Available: <http://www.iit.cnr.it/STM-WG/>. [Accessed 28 June 2013].
- [92] C. Sabel and J. Zeitlin, "Learning from Difference: the New Architecture of Experimentalist Governance in the European Union," *European Law Journal*, 2008.
- [93] C. Sabel and J. Cohen, "Flexicurity," *Pathways*, 2009.
- [94] J. Rod Franklin, "FINEST," 2013. [Online]. Available: <http://www.finest-ppp.eu>. [Accessed 28 June 2013].
- [95] M. C. Roco, D. Harthorn, P. Guston and P. Shapira, "Innovative and Responsible Governance of Nanotechnology for Societal Development," *Journal of Nanoparticle Research*, pp. 3557-3590, 2011.
- [96] W. H. Riker, *Liberalism Against Populism*, San Francisco: W H Freeman, 1982.
- [97] R. Owen, J. Besant and M. Heintz, *Responsible Innovation: Managing the Responsible Emergence of Science and Innovation in Society*, Chichester: Wiley, 2013.
- [98] R. Owen, J. Stilgoe, P. Macnaghten, M. Gorman, E. Fisher and D. Guston, "A Framework for Responsible Innovation," in *Responsible Innovation: Managing the Responsible Emergence of Science and Innovation in Society*, Chichester, Wiley, 2013, pp. 27-44.
- [99] R. M. P. S. Owen, "Responsible Research and Innovation: From Science in Society to Science for Society, with Society," *Science and Public Policy*, pp. 751-60, 2012.
- [100] A. Ott, "'Stakeholder Theory'," 2013. [Online]. Available: <http://politicalframes.wikispaces.com/Stakeholder+Theory>. [Accessed 04 04 2013].
- [101] W. Mohr, "FINSNEY," 2013. [Online]. Available: <http://www.fi-ppp-finseny.eu>. [Accessed 28 June 2013].

- [102] D. Miller, "Republican Citizenship, National Identity and Europe," in *Republicanism and Political Theory*, Oxford, Blackwell, 2009, pp. 38-60.
- [103] D. Miller, "Deliberative Democracy and Social Choice," in *Citizenship and National Identity*, Oxford, Polity, 2000, pp. 8-24.
- [104] E. McCarthy and C. Kelty, "Nanotechnology and Responsibility," *Social Studies of Science*, pp. 405-432, 2010.
- [105] G. Mackie, *Democracy Defended*, Cambridge: Cambridge University Press, 2003.
- [106] C. a. D. J. List, "Social Choice and Deliberative Democracy: A Reconciliation," *British Journal of Political Science*, pp. 1-28, 2003.
- [107] R. G. Lee and J. Petts, "Adaptive Governance for Responsible Innovation," in *Responsible Innovation: Managing the Responsible Emergence of Science and Innovation in Society*, Chichester, Wiley, 2013, pp. 143-160.
- [108] S. Hix, *What's Wrong With the European Union and How to Fix It*, London: Polity, 2008.
- [109] S. Hix, "Treaty Reform and the Commission's Appointment and Policy Making Role in the European Union," *European Union Politics*, pp. 291-314, 2011.
- [110] T. Hellstrom, "Systemic Innovation and Risk: Technology assessment and the challenge of responsible innovation," *Technology in Society*, pp. 369-84, 2003.
- [111] D. Held, *Democracy and the Global Order*, Stanford: Stanford University Press, 1995.
- [112] J. Hankins, "Building Capacity for Responsible Innovation," in *Responsible Innovation: Managing the Responsible Emergence of Science and Innovation in Society*, Chichester, Wiley, 2013, pp. 269-272.
- [113] D. H. Guston, "Toward Centres for Responsible Innovation in the Commercialised University," in *Public Science in Liberal Democracy: The Challenge to Science and Democracy*, Toronto, University of Toronto Press, 2007, pp. 295-312.
- [114] D. H. Guston, "Responsible Knowledge-Based Innovation," *Society*, pp. 19-21, 2006.
- [115] R. Grimble and K. Wellard, "'Stakeholder methodologies in natural resource management'," *Agricultural Systems Journal*, pp. 173-193, 1997.
- [116] P. Gatellier, "Instant Mobility," 2013. [Online]. Available: <http://instant-mobility.com>. [Accessed 28 June 2013].
- [117] A. Fung and E. O. Wright, *Deepening Democracy: Institutional Innovations in Empowered Participatory Governance*, Verso, 2003.
- [118] R. E. Freeman, *Strategic Management: A Stakeholder Approach*, Marshfield, M A: pitman Publishing, 1984.
- [119] R. E. H. J. S. W. A. C. P. B. L. d. C. S. Freeman, *Stakeholder Theory: The State of the Art*, Cambridge: Cambridge University Press, 2010.
- [120] J. Dryzek, *Deliberative Global Politics*, Cambridge: Polity, 2006.
- [121] I. De Wilde, "Flexicurity: The Emergence of a European Concept," *Tijdschrift voor Sociaal Recht*, 2013.
- [122] S. Compans, "ETSI," 2013. [Online]. Available: <http://www.etsi.org/technologies-clusters/technologies/security>. [Accessed 28 June 2013].
- [123] J. Cohen and C. Sabel, "Global Democracy?," *NYU Journal of International Law and Politics*, pp. 763-797, 2005.
- [124] J. Bohman, *Democracy Across Borders*, Cambridge: MIT Press, 2007.
- [125] R. Bellamy, "Republicanism and Constitutionalism," in *Republicanism and Political*

- Theory*, Oxford, Blackwell, 2009, pp. 61-78.
- [126] S. Bekker, T. Wilthagen, P. K. Madsen, J. Zhou, M. Keune and A. Tangian, "Flexicurity: A European Approach to Labour Market Policy," *Intereconomics*, 2008.
- [127] K. Arrow, "A Difficulty in the Concept of Social Welfare," *Journal of Political Economy*, pp. 323-346, 1950.
- [128] D. Archibugi, *The Global Commonwealth of Citizens*, Princeton: Princeton University Press, 2008.
- [129] F. Alvarez, "INFINITTY," 2013. [Online]. Available: <http://www.fi-infinity.eu>. [Accessed 28 June 2013].
- [130] European Commission, "Towards Common Principles of Flexicurity: More and better jobs through flexibility and security," European Commission, 2007.
- [131] The Israel Academy of Sciences and Humanities, "The Israel Academy of Sciences and Humanities," 2013. [Online]. Available: <http://www.academy.ac.il/>. [Accessed 28 June 2013].
- [132] SUBITO! , "SUBITO! Research and Futures," 2013. [Online]. Available: <http://www.subito.as/6.html>. [Accessed 28 June 2013].
- [133] European Commission, "Stakeholders in CorMan Project," 14 09 2012. [Online]. Available: <http://ec.europa.eu/environment/nature/cormorants/stakeholders.htm>. [Accessed 04 04 2013].
- [134] INBAS Social Research, "Stakeholders," 2011. [Online]. Available: <http://www.stakeholders-socialinclusion.eu/site/en/concepts/stak>. [Accessed 04 04 2013].
- [135] UNESCO, "Science, Innovation and Societal Benefit," 2013. [Online]. Available: [http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/SHS/pdf/Concept-Note\\_Progress\\_2013.pdf](http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/SHS/pdf/Concept-Note_Progress_2013.pdf). [Accessed 4 April 2013].
- [136] Ministry of Science, Innovation and Higher Education, "Science in Dialogue," [Online]. Available: <http://scienceindialogue.dk/>. [Accessed 28 June 2013].
- [137] Vinnova, "Responsible Research and Innovation," 25 January 2013. [Online]. Available: <http://www.vinnova.se/en/Publications-and-events/Calendar/2013/130225-The-Role-of-the-Media-in-Responsible-Research-and-Innovation/>. [Accessed 28 June 2013].
- [138] Responsible Innovation Conference, "Responsible Innovation Conference," 2012. [Online]. Available: <http://www.responsible-innovation.nl/>. [Accessed 28 June 2013].
- [139] MATTER, "Matter - Projects," 2013. [Online]. Available: <http://www.matterforall.org/projects/food-irradiation/>. [Accessed 28 June 2013].
- [140] Internet of Things, "Internet of Things," 2013. [Online]. Available: <http://www.theinternetofthings.eu/members>. [Accessed 28 June 2013].
- [141] ESRC Genomics Network, "Innogen," 1 June 2013. [Online]. Available: <http://www.genomicsnetwork.ac.uk/innogen/>. [Accessed 28 June 2013].
- [142] Institute for Ethics and Emerging Technologies, "IEET," 2013. [Online]. Available: <http://ieet.org/>. [Accessed 28 June 2013].
- [143] EPSRC, 2013. [Online]. Available: <http://www.epsrc.ac.uk/funding/calls/2013/Pages/frict.aspx>. [Accessed 28 June 2013].
- [144] Nuffield Council on Bioethics, "Emerging Biotechnologies," [Online]. Available: <http://www.nuffieldbioethics.org/emerging-biotechnologies>. [Accessed 04 04 2013].

- 
- [145] Integrated Assessment, "'Definining the Stakeholders: An Example from Agriculture'," 2012. [Online]. Available: [http://www.integrated-assessment.eu/guidebook/defining\\_stakeholders\\_example\\_agriculture](http://www.integrated-assessment.eu/guidebook/defining_stakeholders_example_agriculture). [Accessed 04 April 2013].
- [146] Observatory for Responsible Innovation, "Debating Innovation: The Journal of the Observatory," 2011. [Online]. Available: <http://www.debatinginnovation.org/?q=debatinginnovation>. [Accessed 28 June 2013].