Governance for Responsible Innovation

GREAT – 321480

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1. Executive Summary

GREAT aims at developing an empirically based and theoretically sound model of the role of responsible research and innovation (RRI) governance. WP 3's role in this process has been to build on the theoretical approach developed in WP 2, and complement the latter with qualitative empirical research into the context of responsible innovation. This deliverable provides a synthesis of the main findings. After a brief introduction the objectives of WP 3 are summarised. Next, the methodology used and the empirical data gathered in WP 3 are explained. This is followed by a discussion of the commonalities and differences between WP 3 and GREAT's WP 4 (Applied Analysis – Development of Case Studies). Both WPs have conducted empirical social science research into the same EU funding programme (the CIP ICT PSP), albeit in different ways. Next, an overview of GREAT's Analytical Grid is provided, and how this key outcome of WP 2 has been submitted to a 'reality check' through the empirical research conducted in WP 3. The subsequent section includes the executive summaries of all past WP 3 deliverables. Based on this overview, and drawing on further selected findings, key insights cutting across various WP 3 deliverables are discussed. This includes the following main points:

- WP 3 confirms, and has elaborated further on WP 2's observation that responsibility is a polysemic concept.
- WP 3 has identified the governance patterns which prevail at the level of projects (most of the projects we have studied are EU projects). This includes the finding that the 'Consultation' model epitomises best the empirical reality observed.
- Other important empirical observations concern the actual complexities involved in realising a participatory approach in practice. This includes our point that the engagement of *internal* stakeholders has to be considered a major achievement of project participants. Based on this and further points WP 3 suggests both a broader and a more nuanced understanding of participatory approaches.
- WP 3 has also specified 'second-order reflexivity', one of the key concepts of the GREAT project as a whole. This deliverable explains and exemplifies second-order reflexivity in two ways: first, from a conceptual point of view, which includes a discussion of 'reflexive governance'; and second, from participants' perspective who make sense of the term by reference to different institutional levels (funding framework, organisational level) and structural dimensions (legal and temporal constraints of funding agreements; labour market).

We conclude that research and innovation processes are already complex and challenging for scientists and other actors (stakeholders) *without* consideration of explicit RRI measures. Empirically, there are many extant and evolving formal rules and regulations that actors already need to cope with, while there are also many rules and aspects of a given project (e.g. its outcomes) that are negotiated within extant and evolving (epistemic, technological) subgroups.

Thus, any 'additional' RRI measures to be introduced to these complicated, dynamic and hence challenging contexts need to be designed in a very heedful way.

2. Introduction

GREAT aims at developing an empirically based and theoretically sound model of the role of responsible research and innovation (RRI) governance. WP 3's role in this process has been to build on the theoretical approach developed in WP 2, and complement the latter with qualitative empirical research into the context of responsible innovation. The following social science understanding of context, as defined in GREAT's glossary (D 2.1), has guided our empirical enquiry:

"Context" is a key component of any interpretation: In order to understand a phenomenon or give sense to it, social scientists and anthropologists gather its surrounding features. In other words, contextualization "involves making connections and, by implication, disconnections" (Dilley 2002: 438-439). For instance, a context can be "political" or "economic", but the concept can also indicate different levels of (micro or macro) analysis, such as the "situation", a particular "society", a specific state or even the "world-system" (Dilley 2002: 438). [... Also,] "context is generated and negotiated in the course of social interaction and exchange" (Dilley 2002: 439).

Following this analytical orientation the data gathering process and analysis in WP 3 put emphasis on different participants' (multiple stakeholders') understanding of context and RRI. We have analysed participants' perceptions of, as well as experiences with both RRI and the context in which the former would need to be embedded. Concrete examples of relevant contexts are research and innovation *projects* (EU projects and others) which we investigated in greater detail.

Section 3 explains the objectives of WP 3, and section 4 elaborates further on the methodology as well as the empirical data gathered in WP 3. Section 5 builds on this by explaining the relationship between WP 3 and WP 4 (Applied Analysis – Development of Case Studies). In WP 4 empirical research has been conducted too, and we explain both the commonalities and the differences. Next, section 6 provides an overview of the main findings by reference to GREAT's Analytical Grid (AG), one of the key outputs of WP 2 and the project overall. Section 7 includes the executive summaries of all past WP 3 deliverables. In section 8 certain crucial empirical insights, which allow for fleshing out and amending the AG, will be discussed in greater detail. Finally some conclusions will be drawn.

3. Objectives of WP 3

The three objectives of WP 3 have been the following:

(1) To develop an understanding of the context of Responsible Research and Innovation (RRI) focusing on the landscape of EU funded projects, industry and research agencies.

Section 4 summarises the empirical data that we have gathered in order to develop an understanding of the context of RRI. This includes an overview of the projects, actors and institutions involved in the data gathering process.

(2) To build a corpus of empirical findings and identify governance patterns relating to RRI and to create a taxonomy of common approaches.

Section 7 and 8 will provide key insights into the corpus of empirical findings built in WP 3. This includes a discussion of governance patterns, and we will explain which governance approaches appear to prevail in the empirical contexts investigated.

(3) To develop methods and approaches for assessing and evaluating outputs of the project with user communities.

The next section provides a summary of the methodological approaches followed in WP 3. This includes an overview of those applied in the engagement with user communities, namely two workshops and the field trial.

4. The Context of RRI: methodology and empirical data gathered in WP 3

WP 3 applied a mixed-method approach, including the following methods (for further details see D 3.1 Fieldwork Methodology Report):

- review and application of relevant theoretical literature (as, for instance, in D 3.3 RI Corpus of Guidance and Governance and Taxonomy of Approaches);
- document-based analysis of 6 EU projects and 1 national project (D 3.2 Exemplifying the Typology with Relevant RRI Projects);
- 22 semi-structured interviews (with 23 interviewees), and two focus groups with 13 participants (D 3.4 Context of RRI Report);
- two workshops that have been conducted akin to focus groups, namely, the Cross-disciplinary Cross-nation Context Workshop (5 participants), which has been reported in D

3.4, and the Issue-based Workshop (8 participants) reported in D 3.5 (RRI Requirements for Model for Guidance and Governance);
- a field trial with the EU project SNIFFPHONE, as reported in D 3.6 (Field Trial report), comprising 3 semi-structured interviews (with 5 interviewees), a focus group (4 participants) and the analysis of project documents.

The interviewees, focus group and workshop participants included multiple stakeholders, who may be characterised as follows (for further details see D 3.4, D 3.5 and D 3.6):
- *interviewees*: researchers, innovators, technology developers, other experts (including financial experts), representatives of CSOs and further members of the public;
- *focus group participants*: EU funded researchers and other researchers as well as representatives from business and industry);
- *workshop participants*: EU funded researchers.

A great deal of the analysis in WP 3 was geared towards ethnography and grounded theory. This inductive, bottom-up approach has been combined with a more deductive, top-down approach oriented towards the theoretical underpinnings, and in particular the Analytical Grid developed in WP 2. This dual approach shows in all deliverables, while the emphasis on either side varies depending on the deliverable considered. For instance, while D 3.4 mostly provides an empirical exploration of RRI issues from interviewees' and participants' perspectives, D 3.3 develops much more abstract interpretations by considering the governance patterns identified in D 3.2 as instances of broader societal paradigms. In doing so D 3.3 builds on the theoretical work in WP 2. Also, D 3.3 follows a more normative (or 'prescriptive') approach than other WP 3 deliverables such as D 3.4, by distinguishing between more or less democratic, and hence more or less desirable societal paradigms.

5. The relationship between GREAT's WP 3 and WP 4

Within GREAT, WP 3 and WP 4 (Applied Analysis – Development of Case Studies) are the two work packages concerned with empirical social science research. From a methodological point of view, the two WPs complement each other: WP 3 follows a qualitative approach, and WP 4 follows mostly a quantitative approach, while it also includes qualitative document-based case studies (to be discussed further below). Both WPs investigated European Commission's FP 7 CIP ICT PSP (Competitiveness and Innovation Framework Programme, ICT Policy Support Programme) that has funded 206 projects from 2007 to 2016.

Broadly speaking, WP 3 has conducted a more fine-grained, agency-oriented analysis of RRI issues and practices at the project and consortium level, whereas WP 4 focuses more on structural, aggregate and network features of the entire 'population' of 206 CIP ICT PSP projects. D 4.1 (Database and Survey Report) provides a good overview of the CIP ICT PSP as a whole, and also of the different methodological approaches used in the analysis. For instance, in WP 3 semi-structured interviews with 9 participants of 8 different CIP ICT PSP projects were conducted (see D 3.4, section 4). The related interview schedules were partly designed in response to the requirements of WP 4 such as, for the survey. The interviews helped in better understanding the kinds of participants involved in CIP ICT PSP projects, which helped in refining the 'actor types' presupposed in the survey. In a next step the survey results have been used to calibrate the agent-based model developed in WP 4.

D 4.1 explains the basic motivation for the quantitative survey conducted in WP 4, which also applies to the qualitative interviews undertaken in WP 3. Both WPs rely on previous work in WP 2 where theoretically informed research into relevant RRI concepts, governance models, frameworks and tools has been conducted (D 2.2 Theoretical Landscape; D 2.3 Analytical Grid Report). Against this backdrop WP 3 and WP 4 set out to investigate two questions: to what extent, and in which way does RRI, as conceptualised in WP 2, already exist in EU projects such as those in the CIP ICT PSP? And what are realistic opportunities for the (further) realisation of RRI in practice?

As mentioned previously, WP 3 conducted research focusing mostly on RRI (or lack thereof) at the project and consortium level, whereas WP 4 has put emphasis on the programme level. However, WP 4 has also investigated the relationship between the two analytical levels. D 4.2 (Case Study Report) elaborates on this micro-macro relationship by problematising the ways in which EC work programmes appear to 'preconfigure' the ways in which, and the extent to which RRI can be realised by project participants at the consortium level. This point is discussed further under 'second-order reflexivity' (see section 8.4 in this deliverable).

Given these and further commonalities between WP 3 and WP 4, in the subsequent sections we will occasionally draw on findings from WP 4 research. The latter has helped us to check, confirm or amend the findings obtained in WP 3.

6. Overview: GREAT's Analytical Grid and WP 3's main findings

As mentioned previously, the Analytical Grid (AG), one of the key outputs of GREAT (cf. D 2.3 Analytical Grid Report), played an important role in WP 3. The findings reported in this

deliverable allow for a 'reality test' of the Grid, i.e. for fleshing out, amending and specifying crucial parts of the AG (see figure 1; for further details on the Grid's composition, and theoretical background, see, for instance, D 3.6 Report from Field Trial, p. 5).

No.	Parameter	Description (research questions, analytical steps)
1	'Anticipation'	What is the (implicit) 'Weltanschauung' (vision of the world) of the project? What is the (implicit) relationship with the future?
2	'Product'	What kind of product does the project intend to create? What are the product's ethical implications? What are the reasons behind providing the product?
3	'Tools'	Does the project include tools for maintaining and enhancing reflexivity (and in this sense, an ethical approach)? If yes, what are these? In studying the empirical data we try to identify tools such as, an ethical board/committee, ethical review, or comparable organisational units and practices.
4	'Process'	Does the project include procedure(s) to pursue reflexivity? And an adequate level of participation?
5	'Epistemic Tools'	Does the project implicitly or explicitly rely on risk assessment (only)? Alternatively, do the project participants follow the precautionary principle (only)?
6	'Assessment'	In which way are the technology and the project's results being assessed? Does this assessment involve any reflexivity? If yes, does this reflexive process involve a general normative horizon, or is it only concerned with technological developments or profits?
7	'Participatory Approach'	In which way has participation (inclusion of external stakeholders) been realised in the project? Five levels of influence may be distinguished when analysing the empirical data: Manifestly Absent – *Spectator* Ambiguously Absent – *Commentator* Medium – *Influence* High – *Co-construction* Too High – *Binding*
8	'Cultural	Does the project take into account cultural differences (of any kind, such

	Differences'	as, different organisational cultures)? If yes, in which way?
9	'Norm/Law Relation'	Is the project only driven by laws or also by other norms? If yes, what kind of normativity is pursued? Norms possess a power for action that cannot be limited to a legal commitment.
10	'Responsibility'	How is responsibility conceptualised? Possible conceptualisations include: - liability/blameworthiness - care - responsiveness - accountability

Figure 1: Summary of the ten parameters of the Analytical Grid

Section 8 focuses on the following key concepts that have been explored in WP 3, and that are incorporated in the Grid:

- *responsibility* (see AG parameter 10) is discussed in the section 8.1;
- *governance*, as implied in parameter 6 (for instance, in the mention of the co-construction model), is discussed in section 8.2;
- the findings on *participation*, which is explicit in the parameters 4 and 7, are summarised in section 8.3;
- and *reflexivity*, especially second-order reflexivity, which is included in the parameters 3, 4 and 6, is to be discussed in section 8.4. In this section we will also elaborate on the related term 'reflexive governance'.

Further important findings may be summarised as follows. For a more detailed understanding please consider the summaries of the WP 3 deliverables included in section 7, as well as the references to particular sections and pages attached to the following overview:

- *Cultural differences* (see AG parameter 11) matter a lot in the realisation of RRI. 'Culture' affects a project work in various ways, albeit not only negatively. We have discussed the main points in D 3.4 (Context of RRI Report), section 5.4.2, and D 3.5 (RRI Requirements for Model for Guidance and Governance), pp. 12-13.
- Also, there is usually a heterogeneous mix of existing as well as evolving *norms and laws* (see AG parameter 9) that scientists, technology developers and other actors in research and innovation processes already need to respond to, independently of any (additional) RRI initiative. We have summarised the main points in D 3.4, section 5.4.3.
- We provided insights into the empirical complexity of the concept of *risk*, and *risk assessment* (which is part of the AG parameter 6). See D 3.4, section 5.4.4., for further details on this.

- Also, we presented our main findings on *responsiveness* (which is included in parameter 10) in D 3.4, section 5.4.5, and in D 3.6 (Report from Field Trial), section 5.8.
- Our findings on *anticipation* (AG parameter 1) are reported in D 3.4, section 6.3.4.1. Also, we conducted a comparative literature review on RRI and design approaches in HCI, which included a discussion of anticipation as compared to similar approaches in HCI (Grimpe/Hartswood/Jirotka 2014).
- Finally, there are important difficulties involved in realising *transparency* in practice. The related main points have been discussed in D 3.4, sections 5.4.4 and 6.1.2.2, as well as in D 3.6, pp. 24-26.

7. Summaries of WP 3 deliverables

This section includes the executive summaries of all past WP 3 deliverables. Based on this overview, and drawing on further selected findings, the next section will present key insights cutting across various WP 3 deliverables.

D 3.1 Fieldwork Methodology Approach Including Interview and Observation Techniques

The fieldwork methodology approach of WP 3 (Context of Responsible Innovation) consists of a mix of different analytic orientations, with special emphasis on the "analytical grid" (WP 2). We adopt a cyclical approach in which theory and empirical findings are constantly iterated, and deductive reasoning is supplemented by inductive reasoning. Thus, apart from the "analytical grid" our research is oriented to grounded theory – this is our second basic analytic orientation. We will also occasionally and selectively include ideas and assumptions from other analytic orientations (discourse analysis, thematic analysis, practice theory and ethnomethodology) which are part of the methodological background of WP 3. We apply different qualitative methods in a flexible way depending on the different tasks in the work package. The methods to be used are: document analysis, semi-structured interviews, focus groups and a field trial. In order to test our methodology and methods we conduct two pilot studies by the end of December 2013: The first one is about innovative technologies used in the care for elder people, the second about innovative technologies in contemporary financial markets. We suggest that the empirical data elicited in WP 3 is shared within the project on a 'case-by-case', 'need-to-know' and 'need-to-use' basis. Any 'raw data' that is sensitive will not be shared, and we will anonymise where possible. All empirical data collected will be destroyed after the end of the project. In case we wish to use some of it for future research we will ask the interviewees or participants for their consent again.

D 3.2 Exemplifying the Typology with Relevant RRI Projects

This deliverable provides a document-based analysis of seven case studies (1 national project, 6 EU projects) to illustrate the different RRI models that have been identified in D 2.4. Applying the Analytical Grid (AG) developed in D 2.3., we scrutinize the type of relation between norms and contexts each project establishes and the type of reflexivity showed by the governance process it relies on according to a five step methodology directly extracted from the AG. Consistently with the theoretical framework developed in WP2, we assess the kind of responsibility each project proposes, though the different aspects of their governance devices.

D 3.3 Corpus of Guidance and Governance and Taxonomy of Approaches

This deliverable is meant to represent an epistemological analysis on the results of D 3.2. The latter gathered data from 7 European and national research projects highlighting the different frames and tools adopted for ethical purposes. The aim was to provide some material, coming from desk studies, useful for further analysis.

In this sense the aim of the present deliverable is to analyze those data via the parameters developed earlier in the project in order to abstract characteristics that are common to research projects. The objective is to delineate paths that could help us in understanding the trends of research and innovation in order to assess the reasons for potentially bad and good practices in RRI.

The methodology adopted in this deliverable could be understood as a dialectic between a descriptive and a prescriptive approach. If on the hand we started from the data and we just highlighted the similarities and contrasts under the light of the parameters resumed in the Analytical Grid, on the other hand we unveiled the epistemological presupposition that specific paths embody, showing how the adoption of determined tools or strategies within research projects imply specific understandings of the relation between science and society.

The results we obtained depict a scenario where most of the research projects conceive the context as an external factor that should be taken into account only from a top-down perspective. Precisely, 5 out of 7 projects are completely decontextualised adopting reductive tools to implement ethical issues showing an approach that presupposes the norms construction. One project has a consideration though limited of the context and one (funded at a national level) embeds a co-constructive governance model.

Accordingly we have discovered that almost all of the projects can be epistemologically identified as expression of non-democratic paradigms, falling under the categories of technocratic, ethocratic or epistocratic one. Only one could be defined as a democratic attempt to promote research and innovation with and for society.

From this scenario and the reasons that cause it, we were able to draw some hypothesis as a proposal for RRI. In fact our analysis was based on parameters derived from D 2.3 and the absence or exploitation of certain factors is the main reason for an environment where the context is highly ignored. Thus, the list of processes or action (and their quality) that could divert the route was deduced by a matching operation with the Analytical Grid.

The main stream of science seems to ignore the context by reducing participation to a pre-determined consultation process imposing or shaping the outcomes. The only possible rapport coming from the context is reduced to a consumers' needs feedback avoiding to consider other normative claims and the manners to include them in the development of research. Therefore we suggested to enhance participatory frames that must be based on the effective contribution of a wide range of stakeholders. The effectiveness of this contribution can only be guaranteed by the settlement of a two-fold reflexive process where participants are called to carefully consider not only specific issues but also the very conditions of the reflexive process itself. Only such a structure could provide research projects with the sufficient legitimacy necessary in every democratic process.

D 3.4 Context of RRI Report

GREAT aims at developing an empirically based and theoretically sound model of the role of Responsible Research and Innovation (RRI) governance. This report is part of GREAT's WP 3, Context of Responsible Innovation. The aim is to provide insights into the ways in which individuals, and the teams that they are part of, identify, debate and decide upon RRI issues within actual projects, and within empirical contexts of responsible research and innovation more generally.

The report presents empirical findings based on a combination of two distinct analytical orientations. Firstly, different types of empirical data have been analysed through the lens of eight parameters for 'measuring' responsible innovation (see GREAT's D 2.3 Analytical Grid Report), and five 'pillars of RRI' (see D 2.2 Theoretical Landscape). The purpose of the RRI pillars is to guide participants in different disciplines, domains, and projects towards conducting research and innovation in a responsible way. The pillars are: anticipation; transparency; responsiveness; reflexivity and participation. The eight RRI parameters are summarised under the

following terms: product; tools; process; epistemic tools; assessment; participatory approach; cultural differences; norm/law relation. Secondly, the data analysis was also geared towards grounded theory, thus helping to amend and refine the Analytical Grid and the five pillars of RRI. The empirical analysis reveals many contextual issues that complicate the realisation of RRI ideals in practice.

The following types of data have been analysed:

- 22 semi-structured interviews with different stakeholders (researchers, innovators, technology developers and other experts as well as representatives of CSOs and further members of the public);
- two focus groups conducted with 13 participants (EU funded researchers and other researchers as well as representatives from businesses and industry);
- a Cross-disciplinary Cross-nation Context Workshop conducted with five EU funded researchers.

The report draws on a qualitative mixed-methods approach. The interviews have been analysed following a case study approach; the basic method used was thematic analysis. The latter also applies to the focus groups and the workshop, which has been conducted akin to a focus group.

The interview data falls under three case studies that reflect themes addressed by Work Programmes of the European Commission's Competitiveness and Innovation Framework Programme – ICT Policy Support Programme (CIP ICT PSP):

1. care for the environment;
2. care for older people;
3. the automation of services. Empirical focus: automation in financial markets.

The first two case studies reflect important 'societal challenges' identified by the European Commission. The third one, the automation of services, is a basic theme underlying the entire funding scheme.

The case of care for older people has been selected due to the expected increase in older people in European societies which will occur in parallel with the expected tightening of public budgets. Against this backdrop maintaining high standards in health care and social services for older people is a major societal challenge. ICT hold the promise of reducing the costs in the provision of (increasingly automated) care, and of preventing the isolation of older people who may use social media, wearables and other ICT-based solutions to compensate for shrinking personal networks. However, we chose to study this domain because the introduction of ICT in this domain is not only promising but also has some more controversial features. Automation done without a

sensitivity to the role that social interaction plays, i.e. ICT becoming a substitute for person-centred face-to-face support, may actually undermine human dignity and bring about deprivation of essential needs in the original meaning of the term 'care', i.e. genuinely *human* care.

The case study on care for the environment has been selected for the following reason: Is economic growth possible whilst also respecting the environment and taking into account the scarcity of resources? ICT appear to provide a solution by, for instance, facilitating the saving of energy in buildings and transport. However, introducing ICT for environmental sustainability in a given context also influences, and may change significantly, the existing *human* relations and services. This entails the basic question in how far the introduction of ICT for environmental sustainability may also be a socially responsible and desirable measure.

In terms of the case study on automation, the empirical focus on financial markets has been chosen against the backdrop of the last international financial crises. Financial markets, and their continuing automation, may be seen as a prominent example of potentially 'irresponsible' behaviour with global socio-economic repercussions.

In the two focus groups various key issues have been explored. One focus group was intended to provide insights into privacy and data protection, governance and responsibility in EU funded research. The other one was concerned with RRI in robotics. Robotics is a quickly evolving field of research, which has notable business expectations across countries. The field seems to be in a similar state as ICT research and innovation ten years ago. But the ethical and social implications of robotics development may be much more profound, considering, for instance, the emotional response humans tend to have on human-like robots, or the development of artificial intelligence. Robotics will not just affect people working in industry, but the development of service robots will directly affect the lives of the elderly people as well as other vulnerable users such as children and disabled. Thus, robotics has been selected as the theme of this focus group due to its significance as a research field, and because of the possibility that the robotics research and innovation could really benefit from the RRI approach.

The aim of the workshop was to discuss and shape emerging patterns, and to identify further themes of RRI. EU funded researchers were asked to reflect upon, and provide their feedback and viewpoint regarding the ways in which RRI is identified, debated and decided upon. The purpose was to find out whether and how four out of the five RRI pillars, i.e. reflexivity, responsiveness, participation and anticipation, apply to different EU projects.

The main findings may be summarised as follows. Further important findings are presented in the summary sections (D 3.4, sections 5.4, 6.1.5, 6.2.4, 6.3.5) and the conclusions (D 3.4, section 7.).

Responsibility

An important finding from the two focus groups and the workshop is that various notions of responsibility matter to participants. For instance, as a starting point various researchers considered their responsibility *as* researchers important, stressing the need to keep science as autonomous as possible, and to ensure scientific process. They also saw responsibility as being already embedded in grant application processes and related formal ethical reviews; and that projects concerned with applied research would generally be more amenable to the incorporation of different stakeholders than other projects. Furthermore, there was an understanding of responsible behaviour towards individuals (the well-being of workers, customer orientation); towards the society (ensuring high rates of employment); and towards the innovation system as a whole as well as colleagues (networking, sharing information). Certain aims associated with actions were also considered 'responsible' such as, using tax payers' money in a transparent way. Other participants pointed to the difference between professional responsibilities on the one hand, and personal or family responsibilities as well as societal responsibilities on the other hand. Sometimes these appeared to be hard to reconcile. Also, participants reporting on their experiences with EU projects alluded to a concept of distributed responsibility, or the problem of many hands, by arguing that it is often difficult to determine who should be ultimately responsible in a chain of command; by arguing that not only researchers but also funders should take responsibility; and by noticing that, in general, there is much uncertainty associated with innovation processes since the application and use of innovations is very hard to anticipate given the diversity of society. Generally, it was recognised that the levels of responsibility and the nature of responsibility could be different or conflicting depending on context.

For proponents of RRI it appears to be a challenge, but also very important to learn from these different, and legitimate meanings of responsibility and responsible behaviour in practice, and to acknowledge the related problem of ensuring something like 'overall' responsibility. Accordingly, it seems advisable that the Analytical Grid developed in GREAT is sufficiently open to this empirical complexity.

Participatory approaches

When considering the ability or willingness of a given consortium to actively engage various kinds of external stakeholders, it appears to be important to acknowledge that from the perspective of project participants, it is already a challenge to ensure good collaboration and interaction at the consortium level, i.e., to engage all *internal* stakeholders in an adequate way.

EU projects such as, CIP ICT PSP projects are complex in terms of the number and type of consortium partners that need to coordinate their work across Europe (e.g. across different national jurisdictions and time zones). Given this everyday complexity of 'normal' project work, it may be particularly hard to also actively involve various external stakeholders akin to the 'Co-construction' governance model (as specified in D 2.3 Analytical Grid Report, p. 87). Therefore we suggest a broader understanding of participatory approaches: when analysing or even problematising the extent to which, and the ways in which a given project involves external stakeholders it appears appropriate to also study the extent to which, and the ways in which internal stakeholder engagement takes place – and to explore potential relationships between the two dimensions.

In a similar vein it appears necessary to study any processes of exclusion and inclusion of stakeholders that already occur in a given project's local environment, and that may 'preconfigure' to what extent and in which ways certain stakeholders can possibly be involved by the consortium in the first place.

We developed this hypothesis based on a local context study in the domain of care for older people. This domain includes different stakeholders such as, employees of public institutions or public governments, charities (CSOs), and individuals that are part of 'civil society' (e.g. older people and their informal carers such as, family members). It may be argued that such a local context and a given project consortium are loosely coupled to one another: a project running a pilot needs to interact with the different stakeholders, and understand their existing work relationships (including existing technologies) if the envisaged technological innovation is to be embedded successfully, or to be developed further in a meaningful (context-sensitive, user-friendly) way.

However, there are many social, political and economic factors that influence how the different stakeholders 'participate' in the local care system in the first place. Consider, for instance, the main group of stakeholders, older people: their access to the provision of care, including care technologies, and hence their experiences with existing care technologies are shaped by numerous contextual factors such as, the ways in which they are assessed and classified; by available individual and institutional budgets; and by the existing technological environment.

It may be argued that a given project consortium that tries to realise RRI in practice would need to develop an understanding of such pre-project structures and dynamics (as much as possible), and to engage in numerous careful interactions with the various local stakeholders to understand and learn from the existing work relationships, including numerous extant responsibility relationships. Consequently, it may be argued that RRI is not created from a single point (certain

individuals, or specific groups such as, researchers only), but emerges from the numerous careful interactions between various distributed actors.

Finally, all types of data analysed in this deliverable (interviews, focus group and workshop) suggest that the governance approach that is favoured by most of the participants, or deemed the most realistic and appropriate one (explicitly or implicitly), is 'Consultation' (see GREAT's Analytical grid Report, pp. 80-82). Or, to put it differently: from the participants' perspective neither a pure 'Standard' governance approach nor a radical 'Co-construction' approach appear to be favourable, realistic and appropriate. This resonates with the findings from an earlier GREAT deliverable (D 4.2, Case Study Report, p. 64).

Culture

Cultural differences matter a lot in a consortium's work. It appears that project participants, who are mostly aware of such differences, often experience them as hindrances. However, in at least two cases cultural differences were also experienced as a positive source for individual learning and better ICT design.

'Culture' means various things in practice, and this variety may need to be reflected in GREAT's Analytical Grid.

- Cultural differences show in different countries and (national) languages. There is the need to spend time and money on frequent translations, and there are difficulties of understanding each other (project partners) properly.
- There are differences between distinct areas of application to which the 'same' technological innovation envisaged needs to be tailored as much as possible.
- Within a heterogeneous project consortium different epistemic cultures, or communities of practice, need to be reconciled as much as possible.
- The EC may be considered an important (rationalistic) community of practice in its own right, engendering a comprehensive set of reporting structures and practices at the level of a given consortium.

Ethics, norms and laws

Project participants working across different national jurisdictions and developing technologies for complex domains that include various local organisations and institutions need to juggle a multitude of (informal and formal) norms, as well as laws. It appears to be important to acknowledge this challenge in the RRI discourse where responsible innovation is often considered as being geared towards ethical values that go beyond legal rules, or everyday social norms (such as, from a sociological perspective, beyond the implicit norms of social interactions).

Another finding is that interpretation is crucial in the relationship between laws and ethics. The boundary between the two dimensions is not clear-cut. We found, for instance, that local stakeholders – care professionals – in the domain of care for older people need to spend considerable time on interpretative work, trying to match the reality of various legal rules with the concrete situations of people in need of care (which is an ethical problem). Also, a lot of the interpretative work of local care professionals depends on the latter's tacit and embodied knowledge acquired over long periods of time.

We consider this entire situation a challenge to new projects entering a given local context. It appears to be important for a project consortium to develop technological innovations that take into account various existing local norms and laws; and that are also tailored to local needs as much as possible. However, this may be difficult (time-consuming) when the related relevant local knowledge, which includes considerations of what is ethical, is tacit and embodied.

Finally, interview data suggests that at the level of existing project consortia, there are not only formal ethical committees, or ethical boards aiming at ensuring the responsible behaviour of project participants. We also found functional equivalents such as, advisory boards or informal 'polycentric' practices of ethical screening. Thus, when analysing a given project from an RRI perspective it appears to be important to not only search for explicit organisational units or procedures for ethical conduct, but also implicit and more hidden alternatives.

Transparency

From an RRI perspective it is important to promote transparency without turning it into a compulsory measure. Depending on the context there is the need to strike a balance, and to consider carefully what can and what should be made transparent to whom. For instance, many EU projects involve companies and partners from industry, and these cannot be expected to fully disclose all their existing, and continuously evolving knowledge about a given technology, its consequences and forecasted uses. Also, prospective technology users or other affected stakeholders in a given local context have mixed views about rigorous transparency, suggesting certain pitfalls. These concern technologies making various aspects of work and life visible, and also changing these to some extent. This implies potential infringements of privacy, including data privacy; or threats to existing, established work conditions.

Change

An important structural feature of research and innovation processes and their contexts is change. The latter is conceptually tied to 'responsiveness', one of the five pillars of RRI identified in GREAT. Basically, responsiveness means being ready to make adaptations to technologies (or related services and solutions) throughout the entire course of a given project. However,

manifold changes also make continuous responsiveness of all actors hard to realise in practice. Important dimensions that may change include, for instance, the organisational and institutional (macro) structures in a project's environment such as, at pilot sites; the technological landscape that is interrelated with an envisaged new technological solution; or the preferences, needs and abilities of various affected stakeholders. The latter shows most clearly in the case of older people whose health changes continuously. However, individual preferences, needs and abilities may also change in other domains, and on part of other stakeholders.

Since a given consortium usually *also* needs to fulfil certain targets defined at the outset of the project, or alternatively, needs to convincingly justify deviations from the original plan, realising 'responsiveness' in practice actually seems to imply a balancing act between this required strictness on the one hand, and the desirable flexibility, or adaptability, on the other.

Risk (assessments)

First, the finance case study suggests that the RRI discourse could be extended by a number of notions of risk. Understanding the 'language' of risk (but possibly also other key terms) in the financial domain, and potentially also other domains, might be necessary if RRI is intended to be embedded in different research and innovation contexts. Back-and-forth translations between the RRI 'language' and the languages of different practical domains appear to be necessary.

Second, both the finance case study and the case study on care for older people suggest that the existing risk assessment expertise (that also involves technologies) is to a great deal embodied and tacit. Consortia developing technological innovations may need to 'tap into' this kind of extant local risk knowledge in order to develop appropriate solutions.

Innovation

The data from one of the focus groups suggests that the Analytical Grid developed in GREAT should better take into account the different nature of responsible *innovation* compared to responsible *research*. Innovation processes seem to be tied to tight economical contexts. Responsibility is articulated within the discourse of business, competition and economy, and whilst responsible innovation includes responsibility towards society, it does so in quite a focused way – as the need to create new jobs and new business opportunities.

Altogether, these and further findings presented in this deliverable lead to the following conclusion: it may be argued that RRI ideals cannot be reached or fulfilled completely, and they always need to be complemented by an ongoing discussion of associated downsides and pitfalls that are specific to different domains, stakeholders and the 'small' everyday situations these experience. Ultimately this may imply a more modest understanding of responsible behaviour,

without being fatalistic or abandoning the RRI initiative altogether. It may be argued that, in part, 'responsible' research and innovation is about acknowledging that there are no approaches that are good for all stakeholders in all situations at all times. However, we suggest that this context-sensitive understanding of responsibility and responsible behaviour still implies a lot of work: studying in detail, and always anew, whether, to what extent and in which ways different RRI ideals can be realised in a given context of research and innovation – or are already being implemented, perhaps under different names.

D 3.5 RRI Requirements for Model for Guidance and Governance

This GREAT deliverable collects empirical findings from significant case studies and workshops reported this far (June 2015) in the GREAT project. The empirical findings provide input into the iterative development of the RRI model that is used as a tool to help to identify debate and decide upon issues related to RRI. The empirical findings are collected from four earlier deliverables of the project:

D3.2 Exemplifying the Typology with Relevant RRI projects
The deliverable presents a document-based analysis of six EU projects and one national project. Six of the projects were technology-driven. The goal of the deliverable is, through the project examples, to illustrate the different governance models (D2.4): Standard Model, Revised Standard Model, Consultation Model and Co-Construction Model. In particular, the deliverable illustrates the different roles that innovation and research projects allocate to participation, deliberation, the types of reflexivity and the relation between norms and contexts they elaborate.

D3.4 Context of RRI Report
The report presents empirical findings of 22 semi-structured interviews, two focus groups and a workshop with EU and other researchers, innovators, technology developers, representatives from business, industry and CSOs and members of the public. The goal of the deliverable is to provide insights into the ways in which individuals and teams identify, debate and decide upon RRI issues within actual projects and within empirical contexts of responsible research and innovation more generally. The data has been analysed through the lens of the eight parameters of the Analytical Grid as well as on the basis of grounded theory to amend the Analytical Grid.

D4.2 Case Study Report
Demonstrates, comparably to D3.2, to what extent and in which ways the RRI governance models apply to five EU projects. The findings are based on a thematic analysis of selected deliverables and other publicly available documents such as homepages and websites of the projects. The

detailed case study procedure (seven analytical steps) corresponds to the case study approach adopted in D3.2. Two important analytical foci of the deliverable are 'reflexivity' and 'participation'. All five projects have been scrutinised for any instances of reflexive governance, that is, examples of collective learning in the conduct of the project. The related conclusions are: all projects show instances of reflexive governance, albeit not to the same extent.

D6.1 Requirements for Guidelines
Defines and discusses the requirements for the guidelines (Task 6.1). Developing a clearly define set of requirements helps to ensure that practical relevance is injected across the GREAT project early in the research phase. This set of requirements will serve as an input to the work conducted in earlier WPs, as well as ensure that the resulting guidelines will be both useful and relevant.

D 3.5 collects the findings from these deliverables together to make a synthesis of them, and to point out tendencies and gaps in the research. In addition we try to already propose some insight into the possible solutions or approach that could take us a little bit closer when to accomplish e.g. reflexivity and especially second-order reflexivity in research and development project context.

8. Corpus of empirical findings: key insights

8.1 The theoretical and empirical polysemy of responsibility

From a theoretical point of view, responsibility is a complex concept with multiple meanings, as explained in WP 2. WP 3 has elaborated further on this 'polysemy' (cf. D 3.3 RI Corpus of Guidance and Governance and Taxonomy of Approaches, p. 54; cf. Vincent 2011; Grimpe/Hartswood/Jirotka 2014: 2968).

The polysemy of responsibility also shows in the empirical findings, even though participants use a different and perhaps more concrete, but no less important 'language' to express the term's complexity. The following (not exhaustive) list of participants' understandings of responsibility draws on D 3.4 (Context of RRI Report, p. 6):

- Researchers have responsibility *as* researchers (often implying that science is to be kept as autonomous as possible, ensuring scientific process).
- Responsibility is already embedded in grant application processes and related formal ethical reviews.
- There are different forms of responsible behaviour:
    - towards individuals (e.g. the well-being of workers, customer orientation);

  - towards the society (e.g. ensuring high rates of employment);
  - towards the innovation system as a whole as well as colleagues (networking, sharing information).
- Using tax payers' money in a transparent way is responsible behaviour.
- There are, on the one hand, professional responsibilities, and personal or family responsibilities as well as societal responsibilities on the other. The two sides are sometimes hard to reconcile.
- There is distributed responsibility, or the problem of many hands: it is often difficult to determine who should be ultimately responsible in a chain of command (such as, in complex EU projects).
- Funders have responsibility, not only researchers.
- There are different levels of responsibility, and the nature of responsibility can be different or conflicting depending on context.

Further examples of empirically extant forms of responsible behaviour, or of perceptions of responsible behaviour, are given in the subsequent sections. For instance, another empirically important form of (implicit) responsible behaviour is project participants' engagement with internal stakeholders at the level of a given project consortium (see section 6.3).

It appears to be the case that actors in research and innovation processes need to juggle many such explicit or implicit responsibilities on a daily basis. Thus, we draw the following conclusion for RRI: Any explicit RRI movement or initiative for the introduction, or reinforcement, of particular responsibilities or forms of responsible behaviour in a given context needs to start from a thorough understanding of such existing (often implicit) perceptions of, and practical experiences with responsibility. This basic tenet is echoed in D 3.5 (RRI Requirements for Model for Guidance and Governance) where it is argued that we need to make 'thick descriptions' (Geertz 1973) of actors' realities before and during the process of any design and implementation of explicit RRI measures.

8.2 Prevailing governance patterns

WP 3 has built on the distinction of four governance models developed in WP 2 – the Standard, Revised Standard, Consultation and Co-construction Model – and investigated whether, to what extent, and in which ways these four models actually show in reality. In other words, WP 3 analysed to what extent and in which ways empirical reality may be characterised through these four models, if at all. The related findings may be summarised as follows:

There is a clear tendency in projects, and research and innovation processes more generally, to be governed in ways other than the most radical, ideal-type version of responsible governance as epitomised by the Co-construction model (cf. Callon 1998; Joly 2001). Full co-construction is hardly achieved (cf. D 3.2 Exemplifying the Typology with relevant RRI projects; and also D 4.2 Case Study Report from WP 4 strongly supports this conclusion). D 3.3 (RI Corpus of Guidance and Governance and Taxonomy of Approaches) then moved on to specify the larger societal paradigms implied in the four governance models, and found that the Co-construction model is closely related to the 'Democratic Paradigm'. Only one other governance approach, that is, governance following the Consultation Model, also shares aspects of the Democratic Paradigm, but much less so (see D 3.3, p. 43-44).

Also, based on D 3.4 it can be specified further which other governance model captures best empirical reality: the Consultation model. Implicitly or explicitly this governance approach has been favoured by most participants (interviewees, focus group and workshop participants), or has been deemed the most realistic and appropriate one. Again, this resonates with the findings reported in D 4.2 (WP 4).

8.3 The complexities involved in realising a participatory approach

As explained previously, we found that the research and innovation processes investigated in WP 3 rarely followed a full-fledged co-constructionist governance approach. This implies that 'participation', i.e. the active involvement of multiple external stakeholders throughout a given research and innovation process, has hardly ever been fully achieved.

At first sight this is not ideal from an RRI perspective. As argued elsewhere, participation is a cornerstone of RRI, an important step in ensuring that research and innovation processes lead to socially desirable outcomes (cf. D 2.2 Theoretical Landscape; see also Stilgoe et al. 2013). However, we also found a possible reason for this limited engagement with external stakeholders, as explained in D 3.4 (Context of RRI Report). EU projects such as, CIP ICT PSP projects are complex in terms of the number and type of consortium partners that need to coordinate their work across Europe (e.g. across different national jurisdictions and time zones). Given this everyday complexity of 'normal' project work, it may be particularly hard to also actively involve external stakeholders, as expected in the 'Co-construction' governance model.

Thus, instead of considering the observable practices of project participants as some sort of 'failure' in terms of external stakeholder engagement, we suggest to shift the perspective and develop a broader understanding of participatory approaches. When analysing or even

problematising the (limited) extent to which, and the ways in which a given project involves external stakeholders it appears appropriate to also study the extent to which, and the ways in which *internal* stakeholder engagement takes place – and to explore potential relationships between the two types of participatory approaches (external and internal). In a similar vein it appears necessary to study any processes of exclusion and inclusion of stakeholders that already occur in a given project's local environment, and that may 'preconfigure' to what extent and in which ways certain stakeholders (a) have already been included as formal consortium partners at the start of a given project and (b) can possibly be involved by that consortium over the course of the project. It may be argued that a consortium that is in the making (preparatory phase), and that intends to realise RRI in practice, would need to develop an understanding of such pre-project structures and dynamics (as much as possible), and to engage in numerous careful interactions with the various local stakeholders to understand and learn from the existing work relationships, including numerous extant responsibility relationships. Consequently, it may be argued that RRI is not created from a single point (certain individuals, or specific groups such as, researchers only), but emerges from the numerous careful interactions between various distributed actors. Also, RRI becomes much more a temporal, or even 'historical' achievement, as implied in the need to account for extant work relationships, pre-project structures and dynamics mentioned previously.

Other important points about participation have been made in D 3.2 (Exemplifying the Typology with Relevant RRI Projects, p. 40), and these points resonate with the empirical findings reported in D 3.4 (Context of RRI Report, p. 110-112). Participation and deliberation (especially when the latter does not include the characteristics of deliberative democracy theory; cf. D 2.4.) do not lead by themselves to responsibility. A successful implementation of RRI requires the assessment of different forms of participation in a more thorough way than RRI approaches currently do. What kind of participatory activities most favor 'quality' deliberation? To what extent are topics discussed in a participatory approach constructed in a reflexive way? How binding are the outcomes of such processes of inclusion? Finally, at another level, what do participatory approaches aim at: avoiding market-failures? Or opening up the possibility for a common normative assessment of innovation allowing different kind of agreements: compromise, deliberative dissent, modus vivendi, accommodation, *etc.*? These questions need to be raised and answered as early as possible for a given project to be conducted in a responsible way.

8.4 Reflexivity and second-order reflexivity

One of the core concepts of GREAT's Analytical Grid (figure 1) is reflexivity. Implicit in this is the more specific concept of second-order reflexivity, as explained in D 2.3 (Analytical Grid Report p. 74; see also D 3.6 Field Trial Report p. 23). Thus, WP 3 also devoted some time to elaborating on

second-order reflexivity from an empirical perspective. The concept got investigated in the field trial as well as the second 'Issue-based' workshop conducted in GREAT. The following synthesis summarises the related main findings reported in D 3.6 and D 3.5 (RRI Requirements for Model for Guidance and Governance). We start with a conceptual discussion of second-order reflexivity, and the related term 'reflexive governance', thus providing for a link with GREAT's WP 2.

Second-order reflexivity, and reflexive governance, are not easy terms to pin down. Their ambiguity stems largely from the multiple faces of reflexivity. 'To be reflexive' in its most elementary meaning is the capacity to turn or bend back on oneself. Reflexivity, then at least in a methodological sense, refers to 'the mutual interdependence of observer or knower to what is seen or known' (Johnson 1977: 172). When reflexivity is taken beyond the individual and applied to larger sociological phenomena, its meaning becomes more slippery. For Beck (1994), reflexivity is used to describe a phenomenon of late modernity, when society begins to accept that we cannot control our development path and that many of the premises, structures and institutions taken for granted in first modernity are questioned and reconsidered. In his later work, Beck together with his colleagues (1994) extends 'reflexivity' to incorporate more cognitive and normative elements by calling on society to become more reflexive; that is, more attentive and pre-emptive of modernity's side-effects. For Latour (2003), reflexivity is interpreted more narrowly as the recognition in society that we cannot control the intractable problems that modern societies produce. Dryzek (2000) applies the concept of reflexivity to the arena of international politics and develop the notion of reflexive action in which state and non-state actors 'attend to the kind of world they are helping to create, recreate or indeed undermine.' Others interpret reflexivity in a strictly administrative sense, for example, by labelling the co-constitution of new service reforms in the public sector reflexive governance'.

Given the wide net cast by different notions of 'reflexivity', the term 'reflexive governance' seems destined for misunderstanding. But for those working with sustainability in mind, reflexive governance has come to take on a particular meaning, one that is best appreciated by Voss and Kemp's (2005) distinction between first-order and second-order reflexivity. Under this schema, first-order reflexivity refers to the continuous cycle of side effects from simple modernity. Reflexivity of this kind is 'reflex like'. It captures the unconscious and unintended consequences of industrial modernization, or what Beck labels the 'self-confrontation' aspect of reflexive modernization (see Beck 1994). In contrast, second-order reflexivity is about the self-critical and self-conscious reflection on processes of modernity, particularly instrumental rationality. It evokes a sense of agency, intention and change. Here actors reflect on and confront not only the self-induced problems of modernity, but also the approaches, structures and systems that reproduce them. This is the kind of reflexivity that scholars interested in governance for sustainability have in mind. For example, Stirling (2006) takes reflexive governance "to imply the

exercise ex ante of deliberate agency, rather than to describe ex post unintentional reflexes in the face of unpredicted consequences". Grin (2005) goes further, arguing that reflexive governance also concerns the transformation of the governance system itself, that is, institutions of government, the market, science and society, as well as of their mutual alignment. The important presupposition being that policy and polity are both being shaped in relation to each other (cf. Hajer/Wagenaar 2003). This puts important additional demands on agency in the policy process in that actors need to consider changes well beyond existing structures (Grin 2005).

Some scholars have taken agency a step further, by viewing second-order reflexivity as a mode of steering and coordination. This is clearly what Voss and Kemp (2005) have in mind, for example, when they define 'reflexive governance' as: 'the organization (modulation) of recursive feedback relations between distributed steering activities'. They interpret reflexive governance as a strategic process involving five key elements (Voss/Kemp 2005):

1. transdisciplinary knowledge production;
2. experiments and adaptivity strategies and institutions;
3. anticipation of long-term systems effects of measures;
4. interactive participatory goal formulation;
5. interactive strategy development.

Though these goals give greater shape to the meaning of reflexive governance, how it might be put into practice remains unclear. On one level we get a sense that it involves applying 'methods of problem handling which are more open, experimental and learning orientated' (Voß/Kemp 2005). Reference is made to a host of existing procedures such as constructive technology assessment, deliberative policy making, social appraisal of technology, and Local Agenda 21. Though these arrangements represent potential sites of reflexivity, they seem to fall short of the kind of organised or modulated approach to steering so central to definitions of reflexive governance (for sustainability).

From an empirical perspective, that is, from participants' points of view, second-order reflexivity concerns different institutional levels (funding framework; organisational level) and structural dimensions (legal and temporal constraints of funding agreements; labour market). The main points raised by the participants in our empirical studies may be paraphrased as follows:

- The EC funding frameworks shapes the room for manoeuvre, also in terms of ethical behaviour. This view echoes previous findings in GREAT's WP 4 (D 4.2 Case Study Report). From the perspective of RRI assessments it thus seems advisable to include analyses of the relevant EC work programme as well as related EC policy documents a given project needs to respond to, in order to specify whether, to what extent and how this project is

shaped through such external funders' expectations. These, in turn, are likely to reflect (*respond* to) broader societal concerns, trends, and historical trajectories. Hence their analysis would also need to be included in the RRI assessment of the project in question, in order to understand the scope and nature of collective responsibility.

- Part of this basic framing of project through funding institutions such as, the EC, is the need to meet political and economic goals, and less so research goals. Researchers may thus need to find ways to cope with multiple conflicting goals, as they nevertheless need to fulfil academic and scientific expectations in order to secure their position in a tight job market. This is an example of tensions and dilemmas built into everyday project work. This matches a line of reasoning we developed in D 3.4 (Context of RRI Report): ideally, tensions and dilemmas are taken into account in any RRI analysis of a given project.
- Current funding and project structures do not appear to be flexible enough to cope with uncertainty, emerging issues and incomplete knowledge. Thus, difficulties in realising responsiveness at the project level appear to be coupled to a lack of institutional responsiveness on part of the funding institution (Stilgoe et al. 2013: 1573).
- Within their respective organisations, EU project participants often have multiple duties, including having to work for more than just one EU project. This is also true for some of the EU project participants we interviewed (see D 3.4 Context of RRI Report). Thus, it appears sensible to introduce a multi-project perspective to RRI assessments, and to account for the complexity of project participants' work, and the increased pressure under which they are set if they are expected to realise RRI in *each* of their projects.

9. Conclusions

D 3.5 (RRI Requirements for Model for Guidance and Governance) includes a first attempt to specify GREAT's model for RRI, which is supposed to make sense in the empirical contexts of research and innovation processes studied in WP 3. Figure 2 shows the 'Group and Grid' diagram developed from Mary Douglas' cultural theory (1978), which informed the modelling approach in D 3.5.

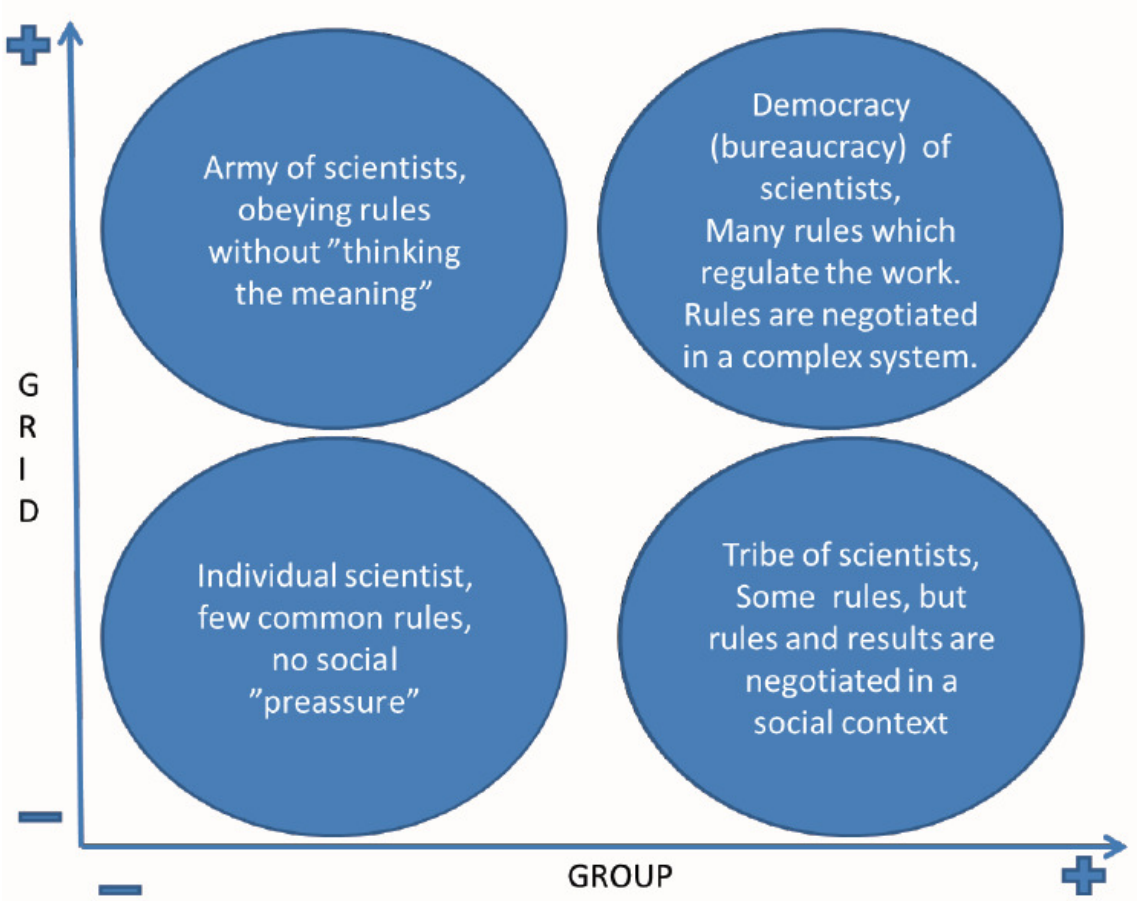

Figure 2: Group and Grid in relation to R & D

Based on the empirical findings summarised in the preceding sections the following preliminary conclusions may be drawn. Broadly speaking the context(s) of responsible innovation that we have studied are already complex and challenging for scientists and other actors (stakeholders) involved in research and innovation processes *without* consideration of explicit RRI measures. Thus, we would typify current empirical situations as being akin to the upper right circle in figure 2. Empirically, there are many extant and evolving formal rules and regulations that actors in research and innovation processes already need to cope with (Grid Dimension), while there are also many 'rules and results' that are still negotiated within extant and evolving (epistemic, technological) subgroups (Group dimension). Thus, any 'additional' RRI measures to be introduced to these complicated, dynamic and hence challenging contexts need to be designed in a very heedful way. We will need to investigate these preliminary conclusions further in WP 5.

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