Governance of Responsible Innovation

GREAT – 321480

RRI requirements for model for guidance and governance			
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Executive Summary

This GREAT deliverable *D3.5 RRI requirements for model for guidance and governance* 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 defined 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.

The present deliverable 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 little bit closer when trying to accomplish e.g. reflexivity and especially second-order reflexivity in research and development project context.

1. Description of the earlier empirical work

1.1. Projects that have been analysed

D3.2 Exemplifying the typology with relevant RRI projects

Six EU projects and one national project. Five of the projects were suggested by the GREAT partners and two were selected on the Cordis website by searching with keywords (not specified in the deliverable). Five projects were developing a specific technology or a set of technologies and two were not: they were "driven by Social Science and Humanities scientists and aimed at reflecting about the development of a given technology" (p. 4).

- **BEAMING** developed a new type of communication technology based on virtual and augmented reality: avatars, holograms and robots. Issues: data protection, privacy of data and emotions, applicability of laws and regulations. No participation. Ethical issues addressed by an internal ethical board, (apparently) without ethical expertise.
- **INDECT** developed a set of detection technology for identification of suspicious behaviours leading to thievery or terrorism, to support decision-making in the security context. Ethical committee with ethical experts focused mainly to ethics of research with human subjects, less to the ethics of technology. No participation.
- **HUMABIO** developed several technologies to evaluate the emotional and physiological state of human beings and their aptitude to achieve certain tasks (e.g. piloting a plane). Issues: privacy, data protection, ethical validity of assessing aptitudes through physiological measurement. Ethical board. Participation was applied (questionnaires) to consult end-users in purpose to increase acceptance. No broader discussion of societal or ethical impacts or moral responsibility.
- **BestEnergy** developed ICT technologies to reduce energy consumption in work buildings and street lightning. Participation as questionnaires and workshops (with room for discussion) was applied throughout the project to ensure acceptance and market success. Ethical issues not addressed, no reflexivity on values or norms (understanding, implementation in context).
- **MIAUCE** developed Ambient Intelligence intellicenge techniques to analyse multimodal behaviour (gaze, eye blinks, body movements) of users within the context of real applications. An ethical workgroup of SSH experts (philosophers, ICT experts, sociologists). Three-step ethical process: 1) internal discussion of the ethical group, 2) internal discussion with the project partners and 3) survey and focus groups with the 'civil society'. Normative background and values of the technologies were studied. 'Quality deliberation' going beyond mere identification of ethical issues to highlight the values and value systems shaping the design of technology (D3.2 p.28). The participation and deliberation did not have a visible impact to the technology (co-construction of issues but not of technology).
- **COWAM** (a SSH project) studied and elaborated the common norms related to management of nuclear waste (e.g., location). Several stakeholders (e.g., NGOs, local communities, experts) were invited to discuss in workshops and agree about good practices. Participation

both to co-develop waste management recommendations and for reflexive construction of the issues.

- An **unnamed project** led by INRA (French National Institute for Agricultural Research)participated in developing experiments on genetically modified wines. A team of SSH researchers (mainly sociologists) led a participative and partly deliberative process for social acceptability of the experiments. Various stakeholders (N=14) participated in a workgroup. An external evaluation committee to deal with (in)dependency issues of two SSH researchers. The deliberation results were advisory.

D 4.2 Case Study Report

Five CIP ICT PSP projects, selected because a) they all fall under important societal challenges as identified by the European Commission and b) they allowed the authors to discuss all three possible governance models in focus in the deliverable (Standard, Consultation, Co-construction).

- **CommonWell** (Common Platform Services for Ageing Well in Europe) developed a general model of an ICT architecture facilitating the convergence of social and health care, aiming at "supporting older people and those with long-term conditions to live independently and lead fulfilling lives." Basically, the project aimed at developing telecare and telehealth systems. This included four ICT-based services adapted to four different national pilot sites.
- **eSESH** (Saving Energy in Social Housing with ICT) targeted to facilitate the reduction of energy consumption in social housing provided across Europe. This included the development and testing of "ICT-based services for Energy Management (EMS) and Energy Awareness (EAS)". These services were intended to help tenants with monitoring their individual consumption. Another aim was to support social housing providers as well as government (regional and national) striving to "optimise their energy- related policy and investment decisions". The overall goal was to meet European emission targets (reduction of energy consumption).
- **SPOCS** (Simple Procedures Online For Cross-Border Services) aimed at the further implementation of the EU's Services Directive targeting the removal of "legal and administrative barriers to trade in the services sector". So-called "Points of Single Contacts" should be established, i.e. Internet portals providing service providers "at distance and by electronic means" with all the necessary forms and information needed to start a business in a foreign EU member state. For instance, if an Italian tourist agency wanted to establish a branch in Germany, it would ideally find, and fill in, all the necessary forms online, provided through the German Point of Single Contact. SPOCS has developed various technical procedures and formats supporting this transformation of national administrations from face-to-face and paper-based work to online operations across the EU.
- **Diego** (Digital Inclusive e-Government) aimed at to extending e-Government services to citizens, especially "elderly, people with disabilities or people with lack of user skills", facilitating their communication with public authorities related to health services, libraries and other administrative services. Some of DIEGO's sub goals were to create

"citizen-oriented" ICT interfaces that would increase citizens' participation in e-Government services; and to develop "a more citizen-driven offer" of public services, i.e. more "personal and proactive services". Thus, DIEGO intended to both empower citizens and public administration providing more citizen-oriented services.

- **Immigration Policy 2.0** (Participatory Immigration Policy Making and Harmonization based on Collaborative Web 2.0 Technologies) developed ICT-based services for the "collaborative development of immigration policies". For instance, the objective was to build an Internet platform that would enable migrants to receive information on immigration policies, "evaluate various migration related proposals", "provide feedback" and "record [...] their opinions, problems and anticipations".

1.2 Approaches and procedures

For the detailed descriptions of the procedures, please see the original deliverables.

D3.2 Exemplifying the typology with relevant RRI projects

A document-based analysis based on public deliverables downloaded in the project's website or provided by the project coordinator. 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.

The analysis method consisted of five steps:

1. Identifying governance tools for a) dealing with ethical or complex issues and for b) participation and deliberation
2. Identifying the type of norm production in relation with the context
3. Identifying the use of each governance tool determined in Step 1
4. Identifying the SIM (Schematizing, Intentionalist, Mentalist)presuppositions of each use of the tools
5. Identifying the model of governance

The analysis of D3.2 projects is further extended in D5.1, which scrutinise the same projects in terms of the 8+2 parameters of the Analytical Grid and describes their match and mismatch with the Grid in more detail.

D4.2 Case Study Report

A thematic analysis of selected deliverables and other publicly available documents such as homepages and websites of the projects, and project summaries provided by EC. The goal of the deliverable is to demonstrate to what extent and in which ways the RRI governance

models apply to the projects. The detailed case study procedure of seven steps corresponds to the case study approach adopted for D3.2:

(Introduction: to present a working hypothesis on governance for the project)

1. To identify at least one governance tool actually used in the project
2. To characterise the relationship between the governance tool(s) and the wider context
3. To specify the purpose of the governance tool(s)
4. To identify any instance of reflexive governance or collective learning related to the tool(s)
5. To identify at least one ethical challenge associated with the tool(s). Analyse how the consortium dealt with this potential ethical issue
6. To reconsider the working hypothesis
7. Tp contextualise the project's approach by comparing it to the related EC work programme

D3.4 Context of RRI report

Applies mixed methods: semi-structured interviews, focus groups and a workshop that was conducted akin to a focus group. The analysis follows two complementary approaches: first, the parameters of the Analytical Grid and the five pillars of RRI were applied to empirical data (a top-down approach). Second, the data is analysed to identify emerging themes from the data itself (grounded theory/a bottom-up approach).

The **interviews** were gathered under three main themes

- Care for the environment
- Care for older people
- The automation of services (automation in financial markets)

Of the 22 interviewees, 9 were either researchers or coordinators from CIP ICT PSP projects (different organisations) and the other participants were from various backgrounds: from occupational therapist and family carer to academic researchers to hedge fund managers, managing director and IT experts.

The **focus groups** were arranged in two countries (Finland and UK) to discuss and shape emerging patterns and identify further themes of RRI. Stakeholders in research and innovation were asked to reflect upon and provide their feedback and viewpoint regarding the ways in which responsible research and innovation (RRI) is identified, debated and decided upon The VTT and DMU focus groups were conducted similarly addressed and so the participant selection criteria and the nature of participants were different. The VTT focus group investigated RRI in-group concentrated on gaining insight into understanding of privacy and data protection, governance and responsibility within research in EU projects.

In addition, a **workshop** was conducted in which EU funded researchers were asked to reflect upon, and provide their feedback and viewpoint regarding the ways in which responsible research and innovation (RRI) is identified, debated and decided upon. The

participants' experience with EU projects varied between one project (early career researcher) and around 15-20 projects (Lead Scientist/Executive VP). One of the participants also had experiences in reviewing EU projects.

D6.1 Requirements for Guidelines

A workshop was conducted to evaluate and provide feedback and suggestions on an initial set of requirements for guidelines for conducting research and innovation processes in a responsible way. The initial set of 14 requirements was constructed by building on findings from GREAT work packages other than WP 6, and taking into account existing practice from related European projects. The participants were encouraged to reflect on these requirements and any alternative or additional requirements for ensuring acceptance of the guidelines within their own experience, and in view of the context and norms of research and innovation practices within their discipline. In this way the workshop facilitated reflexivity. The seven participants were EU researchers and academics researchers at different career stages from doctoral student to professors, and amongst those people who are the potential users of the guidelines and thus were considered to have an interest in both their design and development.

2. Report from the Issue-based workshop

2.1 Introduction

In this section we summarise the findings from the issue-based workshop conducted at VTT Technical Research Centre of Finland, Tampere, Finland, 16th June 2015. The goal was to explore key issues that have emerged from the theoretical and empirical analyses conducted in GREAT so far (DOW, Workplan table, p. 11).

A broad range of stakeholders had been invited. The eight workshop participants – four female, four male –were researchers at different stages of their career (middle to late), and had past or current EU project experience in various fields (e.g. technology development in healthcare, security, and for entrepreneurs). The participants were all employees of VTT. VTT has been chosen as a case while testing the approach in the field (i.e. real life context) for the main purpose of the workshop. The workshop took 1.5 hours and was prepared and co-organised by Barbara Grimpe (UOXF) and Marketta Niemelä (VTT). Barbara Grimpe moderated the session.

We decided to report on the workshop in this deliverable, which is part of WP 3, as the findings help us to understand better the gap between the empirical findings and the theoretical insights developed in GREAT so far and they also give valuable input to the practical implementation plan. The workshop is meant to help shape the developing models, and especially the Analytical Grid that has already been subject to some (suggested)

refinements or amendments, both theoretical and empirical ones (D 2.3 Analytical Grid Report; D 3.2 Exemplifying the Typology with Relevant RRI Projects; D 3.6 Report from Field Trial). In what follows we present findings that help to elaborate further on some of the ten parameters of the Grid. Our report also includes insights into 'second-order reflexivity'[1], a key concept of GREAT (D 2.3 Analytical Grid Report, p. 73-74) which is implicit in at least three out of ten parameters ('Tools', 'Process' and 'Assessment').

Figure 1 provides a summary of the ten parameters of the Analytical Grid. Subsequently a basic definition of second-order reflexivity is given, as developed in GREAT's D 2.2 Theoretical Landscape and D 2.3 Analytical Grid Report (p. 73-74).

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.[2]
4	'Process'[3]	Does the project include procedure(s) to pursue reflexivity? And an adequate level of participation?

[1] 'In terms of RRI a first-order and a second-order reflexivity could have different meanings. However we could say that, considering an innovation (GMO, for instance) on which participants are called to express an opinion, a first order reflexivity would be a reflection on that specific innovation in its consequences, effects, need, etc. A second-order instead would require thinking about the same conditions that allowed us to think, and to think in a certain way. What could it be the interest behind, who is financing the project, who settled the participatory structure, why, etc. Of course this second-order could go from questions of a practical nature to more abstract and ambiguous matters as the discourse itself.'

'We could also say that the second-order reflexivity is the means by which we can reach the first-order one. We need to understand the institutional frame that surrounds us and in which we are embedded before we could start questioning sensibly about us'.

[2] Most of the examples listed here are actually also governance bodies.

[3] This parameter overlaps with the parameter 'Tools', and also with 'Participatory Approach'.

5	'Epistemic Tools'	Does the project implicitly or explicitly rely on risk assessment (only)?[4] Alternatively, do the project participants follow the precautionary principle (only)?[5]
6	'Assessment'[6]	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 Differences'	Does the project take into account cultural differences (of any kind, such 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 (as already included in D 3.5 Field Trial Report)

[4] As has been argued in D 2.3, pp. 84-85, risk assessments may be conducted in a quantitative way (based on mathematical calculations) or qualitative way (based on more personal expert opinions). Both types would not be sufficient for assessing the impact of a system on society.

[5] D 2.3, pp. 85-87, includes a comprehensive discussion of the precautionary principle. For instance, it is argued that the precautionary principle often lacks a basis in ethical values.

[6] This parameter overlaps with the parameters 'Tools', 'Epistemic Tools' and 'Process'.

The workshop was envisaged to be divided into three parts:

- *Your experiences with conflicts in norms and interests, and how to go about these*
- *Whether and how to realise a particular RRI principle in practice: reflexivity*
- *Your alternative concepts of, and experiences with innovation*

We have chosen the first topic because GREAT aims at developing an RRI framework that does not impose any specific normativity to a given context, but, on the contrary, addresses different contexts (with different norms) and helps them to interact with one another. The ultimate goal is to develop a set of joint, shared norms that participants from different contexts are happy to agree on. Only then these norms may be considered effective (D 2.3 Analytical Grid Report, p. 54-58, 64, 68).

The second topic has been chosen in order to elaborate on second-order reflexivity, as defined and explained previously. The participants raised various issues under these first two points, e.g. related to cultural differences when discussing 'norms'. This took quite some discussion time, and therefore we omitted the third point on innovation (see Annex for the schedule used in the discussion).

The workshop was conducted akin to a focus group (Krueger/Casey 2000), recorded and selectively transcribed.

2.2 Analytical Grid parameter 'Cultural Differences'

With regard to the first topic of the workshop (conflicts in norms and interests) the participants discussed various forms of cultural differences they have experienced in EU projects to date. These include 'culture' in the sense of:

- (perceptions of) different national attitudes;
- different language backgrounds (e.g. French versus Finnish) that also affect the partners' English and make it much harder to understand one another;
- different epistemic cultures, including even differences within different types of technical expertise;
- different temporal orientations, that is, difficulties in coordinating work across different time zones.

The discussion revealed that these cultural differences can affect project work to varying degrees. There may be minor irritations (see first quote attached), but also major ones:

- 'linguistic' problems can affect the communication strongly, requiring to switch from oral to written communication only (second quote).
- There can be fundamentally different understandings of the meaning of terms that take time to get noticed and to be reconciled (third quote).

- Practical issues such as long-term absence of a partner can become more complicated to solve when they need to be communicated across (supposedly) different national cultures (fourth quote).

Quotes (underlined)

'There are many Italian partners [in one of our EU projects], and they are, how do you say, quite emotional. There was a little conflict about [a lack of cooperation between the Italian and other partners, and] that was a little bit an issue in that meeting. [...] It doesn't affect so much my work, I was just a little bit confused about this situation that they were so loud and, a little bit like a fight. [...] I think in Finland we don't do that.'

'We had some maybe communication difficulties, we had a French partner and when we scheduled a telephone meeting they were speaking in English but it was impossible to understand what they say. And it was a bit frustrating because the partners were willing to collaborate with us [...] but still this kind of linguistic issue created some frustration. So then we attempted to solve this we actually turned into written communication.'

'I think in European projects we have cultural differences but [...] technology is also a culture, people speak certain technologies, languages which are very familiar to them. [...] For example [...] we will use the same words for completely different meanings, and you think that you understood but suddenly you realise you don't. [...] I learn of course that thing [...] So now on a more abstract level discussions I can follow, I can discuss, I can contribute. That was something good that came out.'

'Some partners they don't do the work and they say: oh my mother died; I'm very sick, I've been in the hospital – and then they have a lot of manmonths and then you are the [one in the] work package [who is] responsible thinking what they do. So I think also there you are also put in a situation that is difficult to handle.'

Coping with differences in cultural norms, or perceptions about possible differences, can take a significant portion of a project's time, and of people's attention and focus. They can also affect the distribution of labour, and hence responsibilities within a project, as the fourth quote exemplifies. We may regard these responsibilities as everyday 'small' but important forms of RRI: participants trying to somehow find solutions that are acceptable to as many project participants as possible.

In terms of the Analytical Grid parameter 'Cultural Differences' one may conclude that it actually points to a huge area of potential conflicts in a given project. This resonates with our previous empirical findings in GREAT (D 3.4 Context of RRI Report; D 3.6 Field Trial Report). It could be useful to add more examples for possible cultural differences in the description of the parameter itself, or in background material. This could help an analyst using the Grid in becoming or remaining aware of the myriad ways in which the participants of a given project can get entangled in webs of (different) meaning, and that they need to cope with these on a daily basis as part of RRI.

2.3 Analytical Grid parameter 'Assessment'

There is an additional cultural aspect not mentioned in the last section that is worthwhile being considered in relation to the 'assessment' parameter. The current description of this parameter focuses on three possible alternatives of participants' reflections on project

activities: being geared towards a general normative horizon; technological developments; or profits. We may need to add a fourth possibility: (geo)political interests. EU projects require cooperation between partners from different EU member countries. First, an overarching goal is to create some common 'added value' for the EU as a whole. This implies a first type of geopolitical interest: the EU as an international community, and a certain territory, that is presumably worth being safe-guarded and maintained. Second, different partners can also show, and try to realise, different national political interests. As the following quote exemplifies, these can be intertwined with economic interests, i.e. profit-seeking (as included in the AG parameter), since project partners may wish to support 'their' national companies or industry.

Quotes (underlined)

Participant: '[In one EU project] there was a real conflict, because Finnish people [were promoting] another platform and the other countries [...] were trying to turn it to the other platform. Because when the decision was finally made we had to reorganise the resources once again because there were a lot of resources put on those countries that were thinking in their mind in another platform. [...] So the reorganisation of resources was a big job and I think they even had to get some permission from the Commission or something because there was a big mess.'

BG: 'Do you think there was some kind of national cultural bias in these kind of –'

Participant: 'In that sense national that certain companies are in certain countries'.

BG: 'So did the Finnish partners favour the [name] operating system'?

Participant: 'Yes of course [laughs; other participants also laugh]. [...] Others saw that the future is in others than in [the Finnish] operating system. But we won, that's the important thing.' [Some participants laugh]

2.4. Second-order reflexivity

When the workshop moved on to discuss 'second-order reflexivity', the participants raised various issues. These concern different institutional levels (funding framework; organisational level) and structural dimensions (legal and temporal constraints of funding agreements; labour market).

- The EC funding frameworks shape the room for manoeuvre, also in terms of ethical behaviour (quote 1). This view echoes our own previous findings in GREAT (D 4.2 Case Study Report).
- Part of this basic framing 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 (second quote). This is an example of tensions and dilemmas built into everyday project work. We have argued previously that ideally, tensions and dilemmas are taken into account in an RRI analysis, and hence the Analytical Grid (D 3.4 Context of RRI Report; D 3.6 Field Trial Report).
- Current funding and project structures do not appear to be flexible enough to cope with uncertainty, emerging issues and incomplete knowledge (third quote). Thus, the inability to realise responsiveness at the project level appears 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 (fourth quote). This is also true for some of the EU project participants interviewed in GREAT earlier (D 3.4 Context of RRI Report). The current version of GREAT's Analytical Grid focuses on RRI activities and attitudes per (one) project. However, it appears sensible to introduce a multi-project perspective, thus accounting 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.
- At VTT, participatory design approaches are strongly preconfigured – and very limited – by industrial and commercial partners usually selecting the (potential, prospective) users to be engaged in a given project. During the workshop discussion, and also afterwards various participants realised that this is a strong constraint in realising RRI.

Quotes (underlined)

'It's really an issue who is capable of deciding what is the value of your work, where do you find these experts really to state that you are doing the right thing, that you are doing ethically the right thing, I think it's really very difficult. [...] We have the frameworks and the frameworks dictate partly, so what are the topics, so that gives the frame really.'

'Today the researchers in general they are actually trying to reach so many goals at the same time [other participant: yes] [... Like for example you have to do a PhD, also make the deliverables, and so on, you have to increase the number of publications and also – to – you know increase commercial, so work with directly more close to industry, do the innovation – so it's actually – if you look at the EU proposal it's more like a political – you have to meet all the political and the economic goals, most of the researchers are struggling for their own jobs but nowadays they have to promise that they will create jobs actually through their projects [other participants agree]. So it's a lot of conflicting – and also [...] there is so much pressure nowadays with this funding that people will promise almost everything to get the funding [another participant: yes]. It's not real - the free thinking we are hurting that in some way through that. Being able to change your mind, being able to say no, is not so straightforward.'

One participant: 'The whole structure of the project is very fixed and not flexible. So you are submitting a document on the basis of partners who are completely stranger to you in the beginning, and then you are bound to it, it becomes like a contract'. [...] [Also, at the beginning, when signing the contract:] At that stage you don't have the best knowledge. There could be some partners who are very active at the proposal preparing stage and they just disappear after the project starts.'
Another participant: 'yes I think that's quite common.'

'In other research organisations as well as in VTT we are doing other projects, and they are doing other projects. It's just one project among others [...] [other participants agree], if everyone is doing that one I think the collaboration would be totally different.'

2.5 Issues of coordination and collaboration

Many of the points discussed in the previous sections touch on issues related to collaboration and cooperation *within* a given project. This resonates with our previous empirical research in GREAT (D 4.2 Case Study Report; D 3.4 Context of RRI Report). Before any assessment of the extent to which, and the ways in which a given consortium may engage with external stakeholders, an RRI analyst may need to spend a considerable amount of time on unpacking all the complexities and comprehensive work involved for project participants when they try to engage with other consortium members. EU projects are usually quite heterogeneous in terms of academic disciplines, communities of practice, types of organisations and national – 'linguistic' as well as legal – backgrounds being represented at the consortium level. Partners with these varying profiles are meant to work together, and to jointly realise a complex plan of work packages and tasks that are often distributed widely across different countries (e.g. pilot sites).

Such coordination and collaboration issues may not appear to be explicitly 'ethical' in nature. However, they are numerous; and they are also, in part, demanding, thus minimizing the energy and time a consortium has left for addressing issues that appear more explicitly 'ethical' such as, engaging with *external* stakeholders (AG parameter 'participation'; see also the fifth bullet point in the last section). Thus, from a conceptual point of view we may need to find a way to integrate the topic 'coordination and collaboration issues at the consortium level' into a given RRI analysis, and hence also in GREAT's Analytical Grid.

3. Main findings - RRI requirements for model for guidance and governance

Green growth, frugality and responsibility are examples of themes and terminology that have been introduced recently both to research and development as more sustainable ways to act than before. These concepts have been also introduced to citizens and consumers: there are more sustainable ways to behave, consume and live in general; new cars are branded as green transportation, ethical shopping or travelling are maybe more expensive but more sustainable and responsible way to consume nowadays. These concepts guarantee to consider ecological, economic and social perspectives in relation to each other but what they mean in different contexts varies very much.

The European implication to these themes in the context of research and development is called Responsible Research and Innovation (RRI). RRI has been described as "a transparent, interactive process by which societal actors and innovators become mutually responsive to

each other with a view to the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products in order to allow a proper embedding of scientific and technological advances in our society" (Von Schomberg, 2013).

RRI is also described in a similar way in recent official statements by the European Commission: "RRI is an inclusive approach to research and innovation (R&I), to ensure that societal actors work together during the whole research and innovation process. It aims to better align both the process and outcomes of R&I with the values, needs and expectations of European society." The Engagement, Open Access, Gender Equality, Ethics, Science Education and Governance are presented as critical dimensions for the RRI. (European Commission 2013),

On the other hand Owen et al. (2013) define four different dimensions that Responsible Innovation as such requires to be considered effective only when next of the themes are working: Reflexive, Anticipatory, Responsive, and Deliberative. Still a little bit different conceptualisation can be found in the AREA (Anticipate, Reflect, Engage, Act) approach defined by The Engineering and Physical Sciences Research Council (EPSRC 2015) from the UK. In this definition Responsible Innovation approach should be one that continuously seeks to Anticipate, Reflect, Engage and Act – and by using these processes to influence the direction and trajectory of the research and innovation process itself. (Besides these definitions and characterisations of RRI there are quite a few others and there is not yet a common understanding to the RRI or more contextualised view to the definitions.

Based on previous deliverables (D3.2., D3.4., D4.2., D6.1.) and previous experiences of VTT in technological development projects (e.g. Mimosa, Minami, Guardian Angels, Sniffphone, Appendix 1), we now present a preliminary analysis for "RRI requirements for model for guidance and governance". We have picked up and combined the main ingredients (RRI requirements, dimensions, elements or pillars) and give them a short description from practical view for implementation of these ingredients to the actual research and innovation work performed by various stakeholders:

Governance/Responsiveness: **The governance model of RRI has to be taken into account in the beginning of the project design.** The management structure of the project defines how the RRI aspects are taken into account during the project. The management structure and the work plan of the project reflect both the more general requirements of the resource provider (i.e. funding program of company, public entity), more specific requirements of the funding call or initiative and requirements that are rising from the intentions i.e. what the researchers want to achieve with the project) of the project designers. Resource allocations among various tasks in the project (i.e. management, technological or organisational development, RRI) depend from all these elements and have an influence thus how RRI is

valued and performed in the project if at all. > **RRI work should have reasonable amount of resources (time, money) to be able to integrate to the project well and to perform a horizontal role in the project in order to have true value for the work and results of the project**.

Anticipation: It is a vital part for any project in order to be able to abstract the future consequences in some level (both positive and negative). Anticipation can be performed in many ways for various purposes. Sort of anticipation for technological development projects is very often done nowadays with scenario-based design approach. This is usually done in order to find the main technical and user-related requirements for technologies and practises but is widely used also to examine societal issues in relation to the R&D. A good overview to anticipation (future studies) can be found from: https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbnxldGljYXByb2plY3RmcDd8Z3g6MTI2YTc0YzczZmUxYjcwOA

Participation/engagement/inclusion is regarded generally currently as one of the main elements and tasks in R&D and there is a strong emphasis by funding organisation to increase the volume and visibility of this activity. The meaning and practise in the real world naturally varies a lot and the benefit and true impact of this activity is still not well explicitly argued. The quantity, quality and specific focus or purpose related to the methods/tools that are used in participation is not usually well justified or it is hard justify due the nature of this activity. Participation and engagement also are relevant aspects in the project internally and in close relation to the governance and structure of the project.

Reflexivity is naturally very hard for the projects as it is also for anyone. External point of view might help to establish a situation where one's (individual, organisation or project) own framing of the context can be examined as objectively as it is possible. Naturally reflexivity already requires a certain attitude to the world when one's own framing can be revealed, discussed and even questioned. Indeed, in our opinion all other dimensions of RRI need be active also if and when authentic reflexivity can be achieved (if ever). Although transparency, reflexivity and responsiveness are in technical level a kind of requirements already in R&D processes (state of the art, open innovation, agility – lean innovation), they still are hard to accomplish systematically on non-technical level: D5.1 p.26: "[…] our hypothesis of a substantial tendency towards a restricted role of engagement and a clear absence of questioning the frame. Moreover, the stress is often placed onto specific dimensions like law, making inclusiveness appear just instrumental for good-image purposes."

3.1. Preliminary Model/process for installing the requirements for RRI

In the following, we present preliminary thoughts how RRI must be or could be taken into account in Research and Development projects.

Figure 2. Project phases

1) Project design/planning -phase:

- Requirements of various funding schemes might require already RRI approach (RRI required/compulsory – no compulsory need to include RRI aspects)
- If RRI is a required element to be included to the R&I work or if it is seem to be useful even without condition then you need to think:
  a) Do you get RRI –part to the R&I in-house or outside (from your own organisation, from partner organisation or as pure consultation/contract work from third party)
  b) Resource allocation for the RRI –part of the project

All these "RRI" attributes, dimensions or requirements are in relation to the specific project and in that sense Analytical Grid (look pages from 8 to 10 in this document) could be very useful for a kind of RRI self-assessment in the beginning of the project design. Naturally each project is at least a little bit different from each other and therefore requirements of the project and on the other hand requirements of the model should be adjusted and customised for each specific case.

2) RRI governance models and implementation in the project:

- **Governance** structure and tools for RRI implementation in the project, different "models" to accomplish RRI in the project
  a) As integrated holistically all over the project (continuous interaction – check points for RRI – self-assessment etc.)
  b) Consultation towards research work in the beginning of the project and review of the results (and work) in the middle and in the end of the project.
- How governance/management structure allows the RRI to have active role in the project? Does RRI has possibility in reality to guide and orient project and even stop the project in some cases?
- Anticipation: who is performing it with what resources, tools and expertise?

- How reflexivity, mutual learning, deliberation is enabled? Who is enabling and supporting it with what resources, tools and expertise?
- Identifying and selecting the stakeholders, who are performing it with what resources, tools and expertise?

3) Project ends
- How to measure the success of RRI implementation in the project (some kind of criteria, measurements, parameters needed)
- Lessons learnt, best practises
- Follow-up and developing the approach for the next activities
- Customising the approach for the other kind research and development context

3.2. Anthropological theory and practice to the reflexivity dimension?

As it is clear, it is hard to fill in dimensions like anticipation, transparency, responsiveness and reflexivity, if you have not thought thoroughly the engagement and interaction with various stakeholders. Engagement and inclusion of various stakeholders are naturally dependent of the nature, content and resources of the project. Good presentations, examples and guidelines e.g. for participatory design and the user engagement are available publicly so the main task for the engagement designer/planner is to familiarise with new examples and customise the plan according to the project requirements. (Example web links in Annex 3)

However in this chapter we try to shortly introduce some suggestion from anthropological approach and based on our own experiences on project work to the issue of reflexivity and especially to the issue of establishing possibility to second-order reflexivity.

As defined in the page 8

“In terms of RRI first-order and second-order reflexivity could have different meanings. However we could say that, considering an innovation (GMO, for instance) on which participants are called to express an opinion, a first order reflexivity would be a reflection on that specific innovation in its consequences, effects, need, etc. A second-order instead would require thinking about the same conditions that allowed us to think, and to think in a certain way. What could it be the interest behind, who is financing the project, who settled the participatory structure, why, etc. Of course this second-order could go from questions of a practical nature to more abstract and ambiguous matters as the discourse itself…..We could also say that the second-order reflexivity is the means by which we can reach the first-

order one. We need to understand the institutional frame that surrounds us and in which we are embedded before we could start questioning sensibly about us”

As second-order reflexivity seems to require revealing both explicit and implicit structures of the society and penetration of various levels of society and even individual, we do not except here to offer a comprehensive approach to the issue as it is. But nevertheless we want to try to offer some ideas, possible new views in this context of RRI that may take us a little bit closer to start to work in projects with concept like second order reflexivity.

3.3. Thick description and Dialogical method

To Clifford Geertz (1973) concept of culture is above all semiotic.

“Culture is most effectively treated, the argument goes, purely as a symbolic system (the catch phrase is, "in its own terms"), by isolating its elements, specifying the internal relationships among those elements, and then characterizing the whole system in some general way-according to the core symbols around which it is organized, the underlying structures of which it is a surface expression, or the ideological principles upon which it is based.”

One of the key terms in Clifford Geertz's anthropological theory is that of "Thick Description". Geertz thinks that anthropology's task is that of explaining cultures through thick description which specifies many details, conceptual structures and meanings, and which is opposed to "thin description" which is a factual account without any interpretation. Thin description for Geertz is not only an insufficient account of an aspect of a culture; it is also a misleading one. According to Geertz an ethnographer must present a thick description which is composed not only of facts but also of commentary, interpretation and interpretations of those comments and interpretations. His task is to extract meaning structures that make up a culture, and for this Geertz believes that a factual account will not suffice for these meaning structures are complexly layered one on top and into each other so that each fact might be subjected to intercrossing interpretations which ethnography should study.

In "□ HYPERLINK "http://culturalstudiesnow.blogspot.com/2012/05/clifford-geertz-thick-description.html" □Thick Description: Toward an Interpretive Theory of Culture□" (1973) Geertz outlines four parameters for an adequate "thick description" and a study of culture:

1. **Interpretative study.** Since anthropology is a semiotic endeavor, cultural analysis should be an interpretative practice which traces the manner in which meaning is

ascribed. The raw observational material collected by an ethnographer is not sufficient if we are to achieve a thick description of a culture.

2. **The subject of interpretation is the flow of social discourse.** Interperative ethnography according to Geertz should produce the codes required for decoding social events.

3. **Interpretation deals with extrovert expressions.** Data collection and interpretation are limited to what local informants can tell us. Therefore the thickest of descriptions can only be based on extrovert expressions of culture.

4. **Ethnographic description is microscopic.** According to Geertz ethnographic findings describe local behaviors and truths as serve as an ethnographical miniature. We always view specific and contextualized happenings, and these make up the thick description".

As making thick description possible requires very thorough understanding of the studied culture we propose for the project purpose "quick and lean" – method as a starting point in order to establish mutual learning and understanding process and to be able to start interpretation of the cultural (i.e. project related) meanings. The method is called dialogical method.

In the group of different stakeholders, we use A punctilious manuscript in order to accomplish an equal, democratic way of discussing and developing particular predefined themes and groups. The goal is to get different perspectives from the various stakeholders e.g. for the concept development in a deliberative manner. An example procedure for the dialogue/discussion is the following:

1. Short introduction to the theme (5-10 minutes)

2. First group discusses the theme (5-7 minutes) – all the others are silent

3. Next group starts first commenting about what they have heard and then continue to discuss the theme on they own view (7-10 minutes)

4. Then all the other groups are gone through in the same manner till the first one who started the dialogue will also comment about discussion.

Based on our experience the listening and interpreting the heard is the important part of the process of understanding other groups' views and on the other hand identifying some new views to the person's own thinking. The fundamental concept to open one's own thinking for "deliberative" dialogue is trust: it cannot be achieved easily so naturally "quick and lean" dialogical session can be only the first starting point in building up "thick description" for the more holistic design process. The optimal way to start the research and development project would be to organise a series of the workshops where the trust and mutual learning process is accomplished. In multicultural and multinational project environment it is hard to arrange enough face to face meeting for continual interactions virtual co-design tools and methods of a new kind could be utilised for this purpose.

3.4. Grid and Group analysis in relation to RRI

Another interesting anthropological perspective to the reflexivity could be found in Mary Douglas' (1978) Grid and Group cultural theory. These two dimensions of sociality have been named group and grid. The exact natures of the two dimensions have been the topic of many discussions and debates, especially related to methodological consequences. The two dimensions include a series of aspects, but those are not necessarily present in each case observed.

For the grid, Mary Douglas (1978) distinguishes in four elements: insulation, autonomy, control and competition. Whereas the four elements of group strength include: frequency (of interaction), mutuality, scope (of activities) and (group) boundary. The two dimensions are generally acknowledged as such, but their presentations may vary. Aaron Wildavksy (1987) for example generally introduces the two dimensions as grasping the answer to two fundamental questions for each human being: (1) who am I? and (2) how should I behave?

Below (Figure 3) you can find the cultural map: two dimensions, four types (Douglas, 1978), which can be seen in a soft version as a theoretical framework, a heuristic device, a classification scheme. On the other hand, the hard variant is a full explanatory theory. The main features of the theory, soft and hard, can be summarised in a few claims.

The main claim of grid-group cultural theory is that culture matters. Preferences and justifications shape the world of social relations. Everything human beings do or want is culturally biased. Therefore this is a cultural theory. The second claim is that it is possible to distinguish a limited number of cultural types. That can be done by constructing a typology of cultures. This typology includes viable combinations of patterns of social relations and patterns of cultural biases (or cosmologies). These combinations are often called (sub)cultures, ways of life or rationalities, sometimes ways of organising, social orders, solidarities, political cultures, or simply types. Combinations are viable when social relations and cultural biases reinforce each other, that is: the cultural bias justifies the social relations which confirm the expectations raised by the cultural bias: i.e. when people behave rationally. The very fact that rationality is plural and that several types of rationality can be established is an important contribution of the theory to the social science where the rational choice paradigm is hegemonic. (Mamadouh 1999)

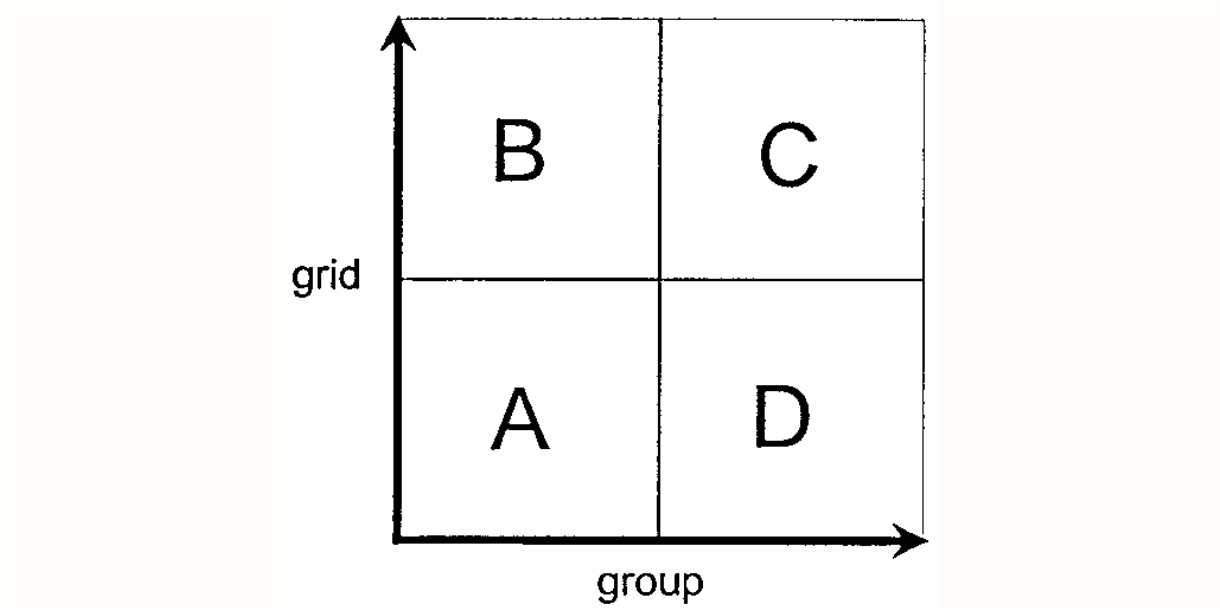

Figure 3. The cultural map: two dimensions, four types (Douglas, 1978)

In the A area, both dimensions of group and grid are weak and it has been abstracted as area of individualism. The individual is free to enter transactions with others as (s)he wishes. Boundaries are provisional. They are subject to negotiation. Individuals are relatively free of control by others but their ability to control others is a measure of their position in the network. Area D (strong group, weak grid) can be called factionalist area. It is characterised by strong group boundaries coupled with few regulations. The group is maintained through intensive relations between group members. Internal role differentiation is minimal. In the area B, where the sense of group is weak but the grid dimension is strong isolation can be imposed or by choice (a possibility not always acknowledged). These individuals have little to say about the ways they live their life, it is organised from the outside. They live at the margins of organised patterns discussed above such as hierarchies or networks. The upper right quadrant (area C) is a social environment characterised by strong group boundaries and binding prescriptions. These prescriptions are justified by the importance of the whole over the parts, the collective over the individuals. Consequently division of labour, differentiated roles, hierarchical social relations are typical of these nested groups. Fairness consists of equality before the law.

Utilising this kind of framework or model of analysis in relation to the research and innovation and especially in order to open a door slightly to the second-order reflexivity and RRI is the next step after this very short introduction to the theory. Let's embed research and development work and projects to the framework as "culturally defined activity". We can surely find various subcultures in different branches of R&D and differences between publicly and privately funded projects. In addition there are still national and international differences in these subcultures. However taken into account these limitations we still try to do a soft heuristic analysis with this framework regarding to R&I, and especially in relation to RRI.

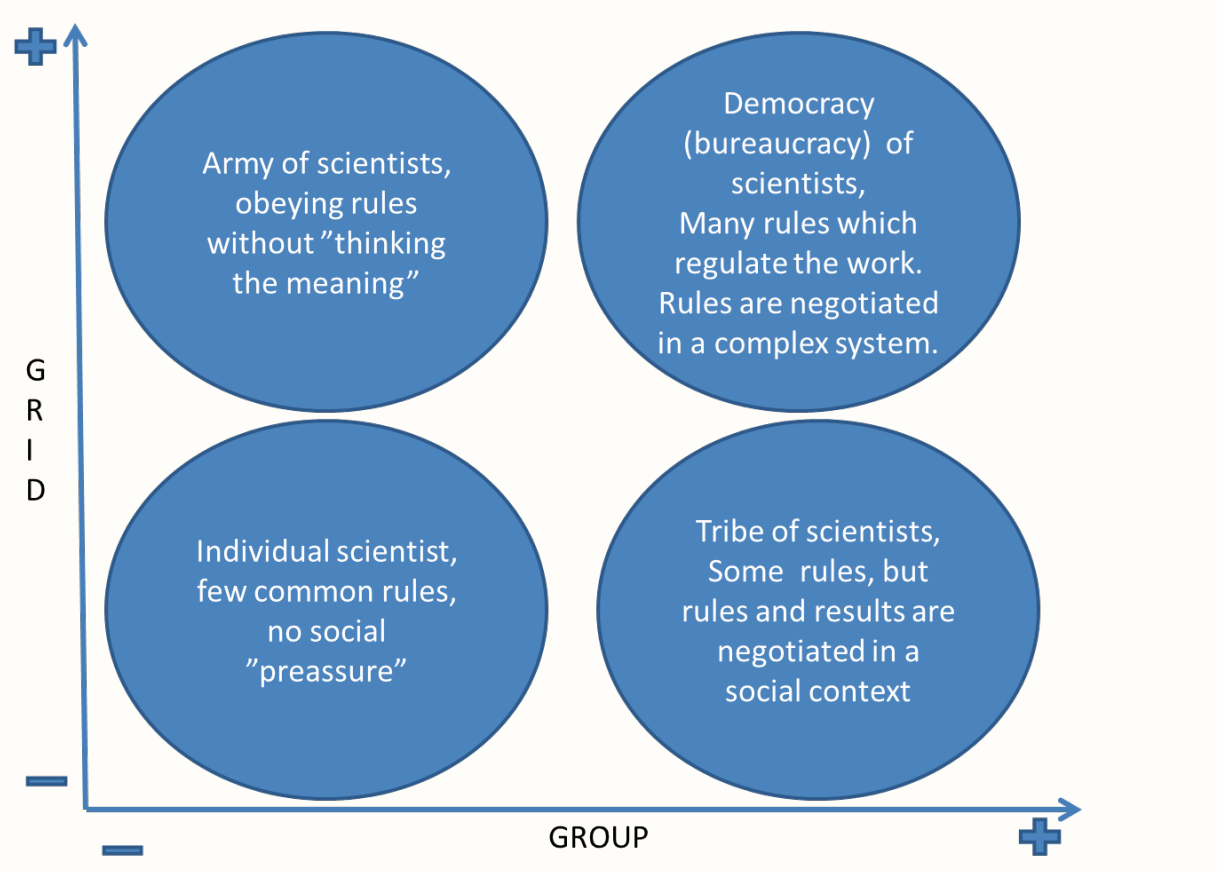

Figure 4. Group and Grid in relation to R&D

In principle R&D can be found in all these “ideal types” – sometimes even as very extreme expression of these two dimensions. For example some of the experiments made before and during the Second World War can be quite easily be categorised as work of either “mad scientists” or as a R&D work where the higher ideology or dictatorship defines the content and measures. Although in general in R&D landscape it seems that regulations, rules and collective consciousness have increased since and have a predominant role today, we still today can find some examples of those extremes. Strong group and strong grid area of framework might first seem very ideal for the science, research and development: rules, regulations, codes of conduct, peer-reviews, associations, organisations, network etc., etc., are needed for the fact-finding and validation. This area also strongly, via democratic measures, defines what and how something is to be researched, developed and innovated. Due its bureaucratic nature in this area lots of resources are however lost in the “administrative” work and in principle very strict regulation and hierarchy (based on predominant paradigms) might build obstacles to the “freedom of research and innovation”. Therefore the ideal model for most innovative, still quite pragmatic research and development could be found somewhere between rules, regulations (GRID) and more freely working research and development groups (GROUP).

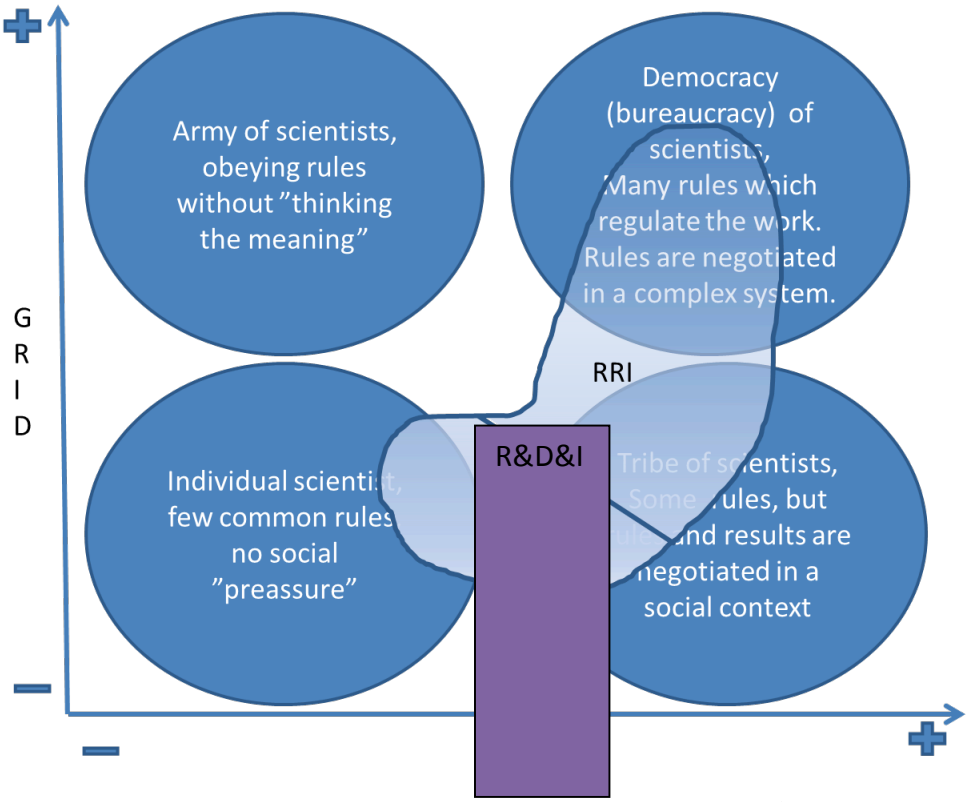

Figure 5. RRI and R&D&I in Group and Grid framework

Basically a workable Responsible Research and Innovation approach should cover somehow at least both strong group and grid area and strong group and weaker grid area. The Grid should never be so strong that it cannot be questioned and discussed. Without authentic dialogue among various stakeholders, you will lose your capacity to achieve reflexivity and will follow the most popular, although, still jointly agreed via very complex structures and hierarchies, paradigm, model or the system. Naturally some rules have to be quite strong while some others have to be more negotiable and context-dependent. Innovation is mainly team work and RRI can strengthen the idea of collective, inclusive and even very pragmatic idea of social innovation. However, there might be sometimes even need for the "mad scientist" in some occasions to bring to the landscape something totally new ideas – as long as we could be sure that those ideas and innovation still do not cause harm to the society. One of the issues that we are leaving out here is the concept and influence of personality in these ideal types. It is obvious that it should be included in the profounder and more thorough analysis of reflexivity. Here we just can mention that personality is naturally one of the three key dimensions also both Geertz and Douglas – likewise to Habermas (1987), who defines the three spheres of the lifeworld: "culture", "society" and "personality" with like Geertz and Douglas.

4. Conclusions

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. We have collected the main findings from deliverables (D3.2, D3.4, D4.2, and D6.1) and VTT's experiences of previous and current R&D&I projects together to make a synthesis of them, and to point out tendencies and gaps in the research.

If there is possibility to give evidence-based guidance and recommendations for participation it would be remarkable help for the RRI implementation. Procedures, models or even standards have been of great help in other fields of R&D (e.g. HCD – Human Centred Design or CSR – Corporate Social Responsibility) when implementing certain approaches. However standardisation of RRI might be very hard or impossible due the nature of RRI dimensions: they are not absolute or measurable yet and in many cases, contexts vary a lot and RRI integrates inside already a broad, even holistic view to the R&D. Besides these arguments one of the characteristics of RRI is flexibility and openness to interpretations, which again challenges easy implementation of very detailed rule-based system.

D6.1 Req 10: Acknowledge that tools and case studies provided may not always be relevant and should be adaptable to encourage stakeholders to produce new approaches based on their own experience and expertise. Whilst flexibility was discussed as being important, particularly where there may be discipline specific needs the ability to re-assess both the guideline process and the substantive elements should be included. This could involve a regular review of the guidelines themselves in addition to the flexibility to revise the guidelines to ensure relevance to each stakeholder group (p. 23)

We have presented preliminary descriptions of RRI requirements for model for guidance and governance. It is not an extensive one yet, besides we think that there must be contextual understanding of various possibilities to work (customise) with requirements in real life. We have also tried to give some insight to that how some RRI dimensions might benefit from anthropological analysis. As one of the great goals of the RRI is to make reflexivity possible in the world of R&D, we think that these views might help to grasp an idea for the further development and implementation of reflexivity (and hopefully even second-order reflexivity) enabling approaches, methods and tools. One of the issues that we did not touch yet is the question of personality and more psychological perspective to the reflexivity although all these theorists (Geertz, Douglas and Habermas) share the same concept in their analysis. Here we have abstracted these issues somewhat more theoretically based on previous empirical work done in the project but our aim is to be able to outline in the next deliverables (5.3. 6.3) still more detailed and practical model(s) and guidelines for the implementation of RRI to the various contexts of R&D based on some more later interactions and empirical work.

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Annex 1 Schedule for issue-based workshop

Overview

- **Introduction to RRI: five key principles**
- **Discussion**
  - **Your experiences with conflicts in norms and interests, and how to go about these**
  - **Whether and how to realise a particular RRI principle in practice: reflexivity**
  - **Your alternative concepts of, and experiences with innovation**

Responsible Research and Innovation (RRI)

- **Policy initiative and interdisciplinary research agenda**
- **Objectives:**
  - **prevent hazards**
  - **provide societal or environmental benefits**
  - **Examples: controversies around GMO, nanotechnology**
- **Relevance: Horizon 2020 (EU), EPSRC (UK), NSF (USA), ...**

Five principles of RRI

Reflexivity	Be mindful that a particular framing of an issue may not be universally held
Responsiveness	React to (social, ethical) issues emerging over course of project (e.g. stakeholder requirements)
Inclusion/ Participation	Let stakeholders and wider public participate in research process (early, and on ongoing basis)
Anticipation	Elicit, discuss and shape desirable futures; prevent hazards; provide societal or environmental benefits
Transparency	Open knowledge: about project, (unintended) consequences of technology, deliberation process

Conflicts in norms and interests in EU projects

- **Concrete examples**
- **Attempts to solve these**
- **Other thoughts and suggestions**

- **Dilemmatic situations**
- **Attempts to solve these**
- **Other thoughts and suggestions**

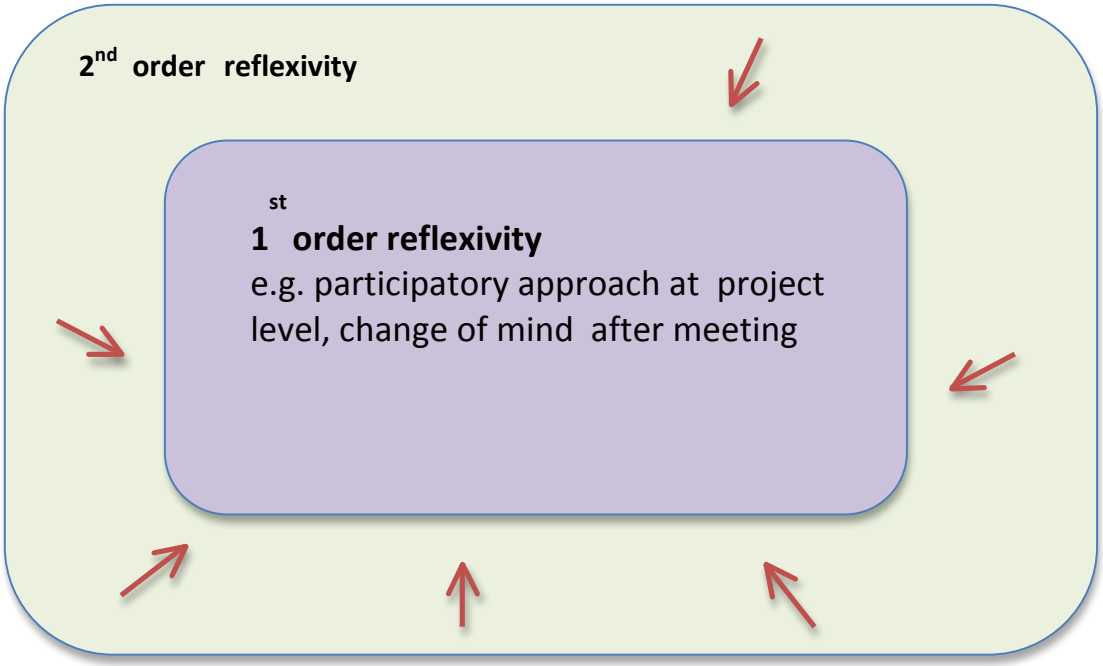
Reflexivity in practice

Reflexivity	Be mindful that a particular framing of an issue may not be universally held

Participatory approach

- Your experiences, examples
- Challenges

You changed your mind after a project meeting... or stakeholder meeting...
If yes, in which way? Further concrete steps?



Annex 2 Implementing RRI into the EU – funded project

Task T7.3: Towards responsible research and innovation: Ethical Issues (*i.e*. adaptation of an ethical approach)

Task leader: VTT - Duration: M3-M42

Ethical work in project will be two-fold: Ethical issues in the research activities within the project and Ethics by Design of x-technology and applications. The first goal is to identify ethical issues with regard to the project's research activities, and to provide ethical guidance especially related to user studies within the, but also to the early stages of the technical development. Ethical guidelines for the project will be created and maintained during its whole lifetime. These internal guidelines will define the regulations and ethical principles to be followed, and they will define the procedures to obtain approval for user studies from relevant ethical committees.

The second goal is to foster an ethical design approach in the project. Here, the main idea is to embed a strong ethical reflexivity throughout the project work: all stakeholders should be aware of different (and sometimes even conflicting) viewpoints related to the developmental work and they should work on including ethical principles into the whole design process. Broader ethical implications will be analysed related to the wide future usage possibilities for the technology. Potential ethical concerns related to foreseen application possibilities will be identified and raised for discussion within the project and with the wider society.

Ethical Guidelines for undertaking ICT research in H2020 have been the basis for planning the ethics work in the project. In particular guidance on privacy, wearable computing as well as ICT and bio/nanoelectronics have been taken into account. In addition, the ethics work in the project will be guided by the principles of responsible research and innovation in the information society (http://renevonschomberg.wordpress.com/implementing-responsible-research-and-innovation/), by the guidelines of European Group on Ethics (http://ec.europa.eu/bepa/european-group-ethics) as well as by relevant regulations and guidelines for each aspect of the X - project and application case.

The consortium has partners who are specialized in ethical issues but to support them in the demanding Ethics by Design work it will nominate members of an Ethics Advisory Board (EAB), who will cooperate closely with whole project.

Ethical issues in the research activities within the project

In the X - project user needs are gathered through questionnaires, observations and interviews. In this context, related personal data will be collected. Users' recordings (of clinical, physical, physiological data) will be collected in the validation of the X - technology

and applications. The studies will be conducted according to universal bioethical principles (Universal Declaration on Bioethics and Human Rights of UNESCO, 19 October 2005; The Charter of Fundamental rights of the EU, 2000; Helsinki Declaration of June 1964; Directive 95/46/EC and related national legislations for protection of personal data).

Task T7.3.1 Setting up Ethics Advisory Board (EAB)

The EAB will be set up as an external body of experts in different fields of ethics. The EAB will formulate Ethical Recommendations and Guidelines for the project and will be involved in the conceptualisation of Ethics by Design approach.

Task T7.3.2 Ethical governance model

The EAB will define the Ethical governance model for the project. The ethical governance model defines a system of decision-making procedures for the whole project, and will insert the ethical aspects and factors into this decision-making system. The approach will be future-oriented: ethics will be included already in the conceptualization phases and will be kept there throughout the whole process.

Task T7.3.3 Ethical training

Participants of the consortium will be given an introduction to ethical design and privacy regulations. The aim is that the participants will understand the purpose of ethical design and will commit to common goals. (VTT)

Task T7.3.4 Ethics by design

Ethics by Design is positive, forward-looking, and proactive ethical thinking. Ethical points of view are taken early into negotiations and collaborative activities of the project, with the aim to create positive, ethical, target-oriented mind-set among project partners. The ethical approach should not just be identifying current or future problems but actively designing for and be inspired from achieving ethically sustainable solutions.

Task T7.3.5 Wider ethical issues

Ethical issues and regulation related to the foreseen application possibilities will be studied.

Annex 3 Some links for participatory, engagement, inclusion approaches and tools

http://www.bridgeproject.eu/en/about-bridge/expected-results

http://www.johnvines.eu/publications/

http://www2.epa.gov/sites/production/files/2014-05/documents/ppg_english_full-2.pdf

http://www.opengovguide.com/country-examples

http://toolkit.ineesite.org/toolkit/INEEcms/uploads/1033/Participatory_Techniques_EN.pdf

http://archive.unu.edu/hq/library/Collection/PDF_files/CRIS/PMT.pdf

http://econnet.eu/media/handbook__online.pdf

https://euparticipation.files.wordpress.com/2015/05/e-participation_guideline_final.pdf

http://pe2020.eu/

http://engage2020.eu/