Governance of 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. 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 (5.4, 6.1.5, 6.2.4, 6.3.5) and the conclusions (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.

2. Introduction

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 report describes RRI themes and concepts that emerged from a qualitative analysis of the following types of empirical data:

- 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 altogether 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 aim of this deliverable is to provide insights into the ways in which these 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. We identify various patterns of RRI (DOW Work plan table p. 13): various perceptions and reported practices of existing RRI as well as lack thereof, and also a variety of reported difficulties, or tensions, in realising RRI.

As explained in GREAT's D 4.1, Database and Survey Report (p. 48-49), the interview data falls under three case studies. These case studies reflect themes which have all been addressed by work programmes (WoPr) of the European Commission's Competitiveness and Innovation Framework Programme – ICT Policy Support Programme (CIP ICT PSP):

4. care for the environment (e.g. WoPr 2008: "ICT for energy efficiency in public building and spaces, including lighting"; WoPr 2012: "smart urban digital services for energy efficiency");
5. care for older people (e.g. WoPr 2007: "ICT for ageing well"; WoPr 2011: "ICT solutions for fall prevention and detection and ICT and ageing network");
6. the automation of services. Empirical focus: automation in financial markets.

The first two case studies reflect important "societal challenges" identified by the European Commission.[1] The third one, the automation of services, is a basic theme underlying the entire funding scheme.

[1] EC (2013): ICT for Societal Challenges https://ec.europa.eu/digital-agenda/en/news/ict-societal-challenges-new-publication-research-and-innovation-projects; 10-09-2014;

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.

The empirical focus on financial markets has been chosen against the backdrop of the last international financial crises. Given this collective experience, financial markets, and their continuing automation, may be seen as a prominent example of potentially 'irresponsible' behaviour with global socio-economic repercussions.

EC (2012): ICT for Societal Challenges http://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CCEQFjAA&url=http%3A%2F%2Fbookshop.europa.eu%2Fen%2Fict-for-societal-challenges-pbKK3012650%2Fdownloads%2FKK-30-12-650-EN-C%2FKK3012650ENC_002.pdf%3Bpgid%3Dy8dlS7GUWMdSR0EAlMEUUsWb0000j4rV35sH%3Bsid%3DRsgye7wCVdkyfezE-Dms3N4nQRs0qPFhWLo%3D%3FFileName%3DKK3012650ENC_002.pdf%26SKU%3DKK3012650ENC_PDF%26CatalogueNumber%3DKK-30-12-650-EN-C&ei=6RMQVJuHMce2yAS_q4K4Cg&usg=AFQjCNGxvthL8oJuR8JVhVnKo2SsAQEDmg&bvm=bv.74649129,d.aWw; 10-09-2014.

In two focus groups involving multiple stakeholders various key issues have been explored (Task 3.1, DOW, Workplan table p. 11). One focus group was concerned with RRI in research and innovation in robotics. The other one focused on gaining insights into privacy and data protection, governance and responsibility in EU funded research.

The aim of the workshop was to discuss and shape emerging patterns, and to identify further themes of RRI (Task 3.1, DOW, Workplan table p. 11). 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 key principles of RRI, i.e. reflexivity, responsiveness, inclusion (or participation, stakeholder engagement) and anticipation, apply to different EU projects.[2]

The next section elaborates on the aims of the analysis and presents the conceptual frame, which is based on two GREAT's WP 2 deliverables (D 2.2, Theoretical Landscape; D 2.3, Analytical Grid Report). This corresponds to the envisaged work flow in GREAT as depicted in the DOW, part B, p. 6. Section 4 explains the methodology of the data collection and analysis. Next, in the main part of the document the empirical findings are presented: in section 5 those from the interviews, and in section 6 the results from the two focus groups and the workshop. All findings are summarised in separate summary sections: the interviews in 5.4; the focus groups in 6.1.5 and 6.2.4; and the workshop in 6.3.5. Section 7 presents overall conclusions.

3. Aims and conceptual frame of the analysis

3.1 Five pillars of RRI: anticipation, transparency, responsiveness, reflexivity and participation

As explained in previous deliverables of the GREAT project (D 2.2, Theoretical Landscape; D 4.2, Case Study Report) the following five principles[3] may be considered the five main 'pillars' of RRI:[4]

Anticipation:

[2] The fifth pillar of RRI, 'transparency' (cf. GREAT's D 2.2, Theoretical Landscape, p. 73; D 2.3, Analytical Grid Report, p. 88), has been omitted from the workshop discussion in order to keep the data gathering exercise feasible in the given time. However, this report does include important findings from the interviews and the focus group on robotics that concern transparency (section 5.4.4 and 6.1.5).

[3] From the perspective of GREAT's WP 4, the four 'principles' are actually elements of the RRI construct (cf. D 4,1, Database and Survey Report, p. 105).

[4] A more comprehensive discussion of these RRI principles is included in D 2.2, Theoretical Landscape, pp. 71-76, as well as D 4.2, Case Study Report, pp. 8-9.

- Forecasting desirable and undesirable social outcomes associated with the development of a given technology.
- Building scenarios while avoiding a too rationalistic interpretation since many outcomes of research and innovation processes remain uncertain.
- When supported by narratives, anticipation is a process helping individuals to reflect on ethical issues, and to reveal their visions of the world associated with a given technology.

Transparency:

- Making available and distributing existing knowledge about a given technology, its consequences and forecasted uses.
- Making available and distributing the results of any related deliberation processes.

Responsiveness:

- The coupling of reflection and deliberation to action, that is, to a potential concrete change in a given research and innovation process.
- Adapting a given research and innovation process due to public values, especially socially or ethically desirable values.
- Being ready to make adaptations over and over again throughout the entire course of a given technology project.

Reflexivity:

- A system's capacity to adapt and change its state.
- Researchers and innovators thinking about their own ethical, political or social assumptions (framings) implicitly guiding their work.
- Researchers and innovators take responsibility for their framings.

Participation:

- Making research and innovation processes interactive and inclusive.
- Involving various actors (end-users, civil society, other researchers, NGOs, industry, policy makers) who are affected by, or concerned with the development of a given technology.
- Following a bottom-up approach to technology development: 'co-building' technology and ensuring co-responsibility for the outcomes.

Previous empirical work in GREAT (D 4.2, Case Study Report) focused on two out of these five principles of RRI: participation ('participative governance') and reflexivity ('reflexive governance'). The subsequent analysis goes further and presents findings related to all five principles.

3.2 The Analytical Grid: eight parameters for 'measuring' responsible innovation

The five principles of RRI explained in the previous section and discussed in D 2.2, Theoretical Landscape, have been translated into a more concrete template for investigating and assessing whether a given research and innovation process or project may be considered 'responsible'. This template is called 'Analytical Grid' (D 2.3, pp. 83-91). The Analytical Grid (AG) consists of eight parameters. In section 5

these parameters will be applied to the nine interviews conducted with CIP ICT PSP participants, in order to develop an understanding of the extent to which, and the ways in which research and innovation processes in CIP ICT PSP may be considered 'responsible'. Thus, as envisaged by the DOW, we "gain a detailed understanding of various means of responsible research and innovation". Studying CIP projects "provide[s] practical examples and references for researchers to analyse and develop critical insights into responsible research and innovation" (DOW, part B., p. 5).

Each parameter is associated with more specific research questions and analytical steps. The following summary draws on D 2.3, pp. 83-91:

No.	Parameter	Description (research questions, analytical steps)
1	'Product'[5]	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? With regard to the projects analysed in the first part of this deliverable, CIP ICT PSP projects, this parameter needs to be extended to also address ICT-based services and solutions.
2	'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 interview data we try to identify tools such as, an ethical board/committee, ethical review, or comparable organisational units and practices.[6]
3	'Process'[7]	Does the project include procedure(s) to pursue reflexivity? And an adequate level of participation?
4	'Epistemic Tools'	Does the project implicitly or explicitly rely on risk assessment (only)?[8] Alternatively, do the project participants follow the precautionary principle (only)?[9]
5	'Assessment'[10]	In which way have the technology and the project's results been assessed? Did this assessment involve any reflexivity? If yes, did this reflexive process involve a general normative horizon, or was it only concerned with technological developments or profits?

[5] The 'Product' parameter is not directly an indicator for responsible innovation but provides additional contextual information about a given project.
[6] Most of the examples listed here are actually also governance bodies.
[7] This parameter overlaps with the parameter 'Tools'.
[8] 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.
[9] 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.
[10] This parameter overlaps with the parameters 'Tools', 'Epistemic Tools' and 'Process'.

6	'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*
7	'Cultural Differences'	Does the project take into account cultural differences (of any kind, such as, different organisational cultures)? If yes, in which way?
8	'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.

Not all eight parameters could be covered in conducting each interview reported in section 5. This is due to a number of reasons: The limited timescales in GREAT for an empirical analysis; the need to ensure the anonymisation of interviewees (so, for instance, findings on the 'product' parameter can hardly be reported here); making sure that interviewees have sufficient time for elaborating on certain issues (which is specific to a *semi*-structured interview approach); and the need to develop an interview situation that is as trustful as possible. In order to improve on trustworthiness, and to ensure anonymisation, we decided to contact only one project participant or coordinator per project, thus avoiding possible irritations or tensions that may arise when interview partners know that other colleagues from their project are also interviewed. Furthermore, various respondents had only limited time for an interview (often not more than 30min). Thus, not all eight parameters could be addressed equally.

This approach has led to the identification of certain patterns discussed in the sections 5 and 6. The qualitative approach helps in understanding the *variety* of opportunities and challenges related to RRI.

4. Methodology

The basic methodology underlying this deliverable is a qualitative approach. A qualitative analysis has been undertaken using mixed methods – semi-structured interviews, focus groups, and a workshop that was conducted akin to a focus group. From the three modes of empirical enquiry a number of themes and concepts related to RRI have emerged (DOW Workplan table, p. 13). These findings are presented in the sections 5 and 6. In what follows the qualitative approach is explained in greater detail.

As outlined in the DOW of the GREAT project (part B, p. 27), the empirical analysis in this deliverable follows two complementary approaches. On the one hand, the parameters of the Analytical Grid Report (D 2.3) and the five pillars of RRI identified and discussed in the 'Theoretical Landscape' (D 2.2), will be applied to empirical data (see section 3 of this deliverable). This 'top-down' approach helps to test, confirm or amend the analytical categories developed in WP 2.

On the other hand, a 'bottom-up' approach geared towards grounded theory is followed (cf. Bryant/Charmaz 2007; Corbin/Strauss 1990). The data stems from three sources: semi-structured interviews (cf. Spradley 1979; Bloor/Wood 2006: 105-110), focus groups (Krueger et al. 2000) and the 'Cross-disciplinary Cross-nation Context workshop' which was conducted akin to a focus group (cf. GREAT's Task 3.1 and 3.2, DOW Workplan table p. 11).

The dual approach – 'top down' and 'bottom up' – implies two distinct but related views on responsible research and innovation. In combination, both views help to minimize blind spots in the analysis (GREAT DOW, part B, p. 27). For instance, focusing on the five pillars of RRI – anticipation, responsiveness, reflexivity, participation and transparency – helps to avoid 'getting lost' in the idiosyncrasies of very detailed empirical situations, and provides for strong links with existing discourses on RRI (cf. Stilgoe et al. 2013 on anticipation, reflexivity, responsiveness and participation; von Schomberg 2011 on transparency). At the same time, the 'bottom-up' approach helps to amend and refine the Analytical Grid and the five pillars of RRI. The empirical analysis reveals many contextual issues that complicate the realization of RRI ideals in practice.

Thus, WP2's (conceptual) emphasis on the context that needs to be taken into account when developing RRI theories or designing RRI policies is very appropriate from an empirical perspective (cf. D 2.2, Theoretical Landscape, pp. 81-84; 111, 117). For instance, the parameter 'norm/law relation' (Analytical Grid Report, section 6.2, p. 87) turned out to be very relevant in practice, but actually also very complex when considered through the lens of concrete empirical data (see section 5.4.3). In these and other ways the subsequent empirical analysis provides suggestions for fleshing out the Analytical Grid, and helps us to develop a more nuanced understanding of the five RRI pillars.

Interviews

As explained in the introduction the interview data analysed in this deliverable falls under three main themes. The first two themes correspond to work programmes of the European Commission's Competitiveness and Innovation Framework Programme – ICT Policy Support Programme (CIP ICT PSP), the third theme underlies the entire funding scheme:

1. care for the environment;

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

Across the three themes 22 interviews have been conducted that lasted between 20min and 2h (depending on the interviewees' availability). Nine interviewees were female. On average, an interview took around 1h 5 min. The following tables provide an overview of all interviewees and their affiliations (different organisations participating in CIP ICT PSP projects, and other organisations). The case study on care for older people also includes interviews with local stakeholders in the UK (see the separate table 'local context study, UK' below). These interviews were conducted in order to develop an understanding of the complexity of the local contexts in which CIP ICT PSP projects operate, including existing embedded responsibilities of local formal and informal carers as well as their broader historical and organisational/institutional settings. Also, we conducted an interview with a researcher participating in a EUREKA project and another interview with a researcher participating in an FP7-COORDINATION project. The aim was to develop an understanding of how the characteristics of CIP ICT PSP compare to other international projects. Quotes from these two other interviews have been integrated in section 5: in the analysis of CIP ICT PSP interview 3, and in the discussion of transparency in the local context study on care.

Care for the environment (CIP ICT PSP projects)
Interviewees: - 4 project coordinators[11] - 2 project participants

Care for older people, part 1 (CIP ICT PSP projects)
Interviewees: - 3 project coordinators - 1 project participant

Types of organisation of these 9 CIP ICT PSP interviewees:[12]

- 2 SMEs
- 2 Large Diversified Companies
- Local government (municipality)
- Local government (city council)
- 2 non profit-organisations (CSO)

[11] One of the interviews was conducted with two interviewees who both act as coordinators of the same project, and are employees of the same organisation (the same consortium partner).

[12] At the time of the completion of this report the typology of actors represented in CIP ICT PSP, and developed in WP 4, was under revision. Thus, the types presented here may not match the types that will ultimately be used for WP 4's agent-based model.

- Academic (Research University)

Care for older people, part 2 (local context study, UK)	
Interviews with local stakeholders	*Types of organisation of interviewees*
Occupational therapist	Social services (county council); charity (CSO)
Specialist for Assistive Technology; occupational therapist	Social services (county council)
Manager of a support team	Housing Association (CSO)
Informal family carer	

Automation (in financial markets)	
Interviews with financial and IT experts	*Types of organisation of interviewees*
Managing director	Market-making firm
Former trader, hedge fund manager (*1st interview)*	Self-employed
Chief economist, partner	Asset management firm
IT expert (Software tester)	Consulting firm/ International bank
Sociologist specialised in financial markets	Academic (Research University)
IT expert	International bank
Former trader, hedge fund manager (*2nd interview)*	Self-employed

Other interviews	
Interviews with European researchers	*Types of organisation of interviewees*
Project coordinator, EUREKA	Non-profit organisation
Project participant, FP7-COORDINATION	Academic (Research University)

The interview schedules used in the data gathering process are shown in Appendix III.[13] All interviews have been either fully or selectively transcribed, and have been analyzed following a case study approach (Yin 2014). The basic method applied was thematic analysis (Guest 2012).[14] Thus, the report at hand complements five earlier document-based case studies of CIP ICT PSP projects conducted in WP 4 (D 4.2, Case Study Report).[15]

In order to ensure anonymisation the report on each interview in section 5 includes various omissions (e.g. names of projects, products, partners, pilot sites, countries). Alternatively, we occasionally need to paraphrase statements which otherwise would help to identify a project or interviewee.

Focus groups

Two focus groups were arranged: one at VTT, Finland, and another at DMU, UK. The aim of the focus groups was – similar to the Cross-disciplinary Cross-nation Context workshop – to discuss and shape emerging patterns and to 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. However, the themes addressed and so the participant selection criteria and the nature of participants were different. The VTT focus group investigated RRI in *robotics*. The DMU focus group concentrated on gaining insight into understanding of privacy and data protection, governance and responsibility within research in EU projects.

Focus group at VTT, Finland

Robotics is currently a very quickly innovating 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 approach of responsible research and innovation.

[13] For further explanations please refer to D 4.1, chapter 3, Qualitative Methodology.
[14] For more information on this qualitative approach see D 3.1, Fieldwork Methodology Report.
[15] For a discussion of the differences between document-based and interview-based case studies – methodological advantages and disadvantages – see D 4.1, Database and Survey Report, pp. 50-52.

This focus group was conducted at VTT Technical Research Centre of Finland, Tampere, Finland, 18th September 2014.

The participants of this focus group were selected so that they represented robotics development from research and industry to funding and decision makers in Finland.

Altogether, seven participants – three females, four males – attended the focus group:

	Gender	Career level/Role	Background in robotics
1	F	Researcher – early career	Human-robot interaction in industrial settings
2	M	Researcher – middle career	Human-robot interaction in social settings
3	M	Teacher and entrepreneur – middle career	Teacher of robotic machine vision, entrepreneur in a software company
4	F	Project leader – middle career	The project aims at growing public awareness and support of business activity around robotics
5	M	Development manager – late career	Builds communication with robotics industry in an areal networking and start-up service provider organisation
6	F	Service creation manager – early career	Works for Digile (one of Finland's strategic centres for Science, Technology and Innovation)
7	M	Product development manager – middle career	Robotics industry

The focus group was organised as a 1,5 hour session, moderated by Marketta Niemelä. In the beginning of the focus group, the participants were asked to introduce themselves and to tell their first thoughts about responsibility in research and innovation in robotics from their personal perspective.

After the introduction round, the discussion was guided to deal with responsibility as "citizen engagement", "foresight and reflection" and "transparency and openness" in robotic development.

The discussion of the group was written down by the moderator and an assistant (user researcher). The findings are based on the double notes, which have been analysed thematically, geared towards grounded theory.

The findings are presented in section 6.1.

Focus group at DMU, UK

Governance and responsibility are important in the GREAT project's focus on RRI and the issues of privacy and data protection are aspects of this discussion. This may sometimes be overlooked in projects that are focused on the development of new artefacts, products and procedures and bringing them to market. The focus group conducted by VTT considered RRI in the field of robotics, gaining insight into key issues. The focus group at DMU investigated the perceptions of researchers on responsibility, governance and privacy and data protection issues. By reflecting on the approaches, attitudes and understanding of the participants, all of whom are researchers, issues concerning future use of innovations such as robotics can be better anticipated.

The approach detailed in D4.2 Case study report (D4.2 p. 8-9) informed that of the DMU focus group which particularly utilised the anticipatory and reflexivity elements of the five pillars of RRI as detailed in D2.2, Theoretical landscape p. 71-76 and in section 3.1 above. Further, the analytical grid (D 2.3 Analytical Grid report) informed the analysis. Accordingly, the discussion at DMU provided valuable insight into the participants' perceptions of privacy and data protection, governance and responsibility.

The focus group held at DMU on 17th September 2014 was a 1.5 hour session moderated by Sara Wilford with the assistance of Job Timmermans.

The participants were selected from academics currently or having previously worked on EU projects.

In total two female and four males participated in the focus group.

	Gender	**Career level/Role**	**Type of project(s)**
1	F	Researcher – mid career	Civil society organisations in research
2	M	Researcher – early career	Framework for RRI
3	M	Researcher – mid career	Previous and current research projects involving RRI perspectives.
4	M	Researcher – Early career	Multi centre research project to implement RRI in social and medical projects
5	F	Researcher – Early career	Technical projects, algorithm development

6	M	Researcher – Mid career	Ethical elements within technical projects

Initially the participants were asked to introduce themselves, indicate their area of expertise and briefly explain the research projects they are working within. The three themes for discussion 'privacy and data protection, governance and responsibility' were each introduced. The participants were then asked to provide their initial understanding of what the themes meant to them in a broad (personal and societal) context. The key ideas and perspectives were then placed on post-it notes which were added to three flip charts (one for each theme). There was then a round-table discussion of the themes where initial perspectives were further examined.

The facilitator then provided the participants with a briefing that took the three themes and put them within the RRI governance context. The participants were then put into pairs and asked to discuss the themes in light of the facilitator's guidance by directly relating this to their own EU project experiences and understanding. Finally a further round-table discussion took place to further elaborate on and add to the perspectives revealed in the paired discussions. Additions or revisions to existing perspectives were then noted on the flip charts to provide further insight into participants understanding of the themes discussed.

The findings are presented in section 6.2.

Cross-disciplinary Cross-nation Context Workshop

The aim of the workshop conducted at the University of Oxford, 4th September 2014, was to discuss and shape emerging patterns, and to identify further themes of RRI (Task 3.1, DOW, Workplan table p. 11). 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 original purpose of the workshop was the following:

(1) To find out whether and how four key principles of RRI, i.e. reflexivity, responsiveness, inclusion and anticipation, apply to different EU projects (cf. D 2.2, Theoretical Landscape, pp. 71-76; Stilgoe et al. 2013).[16]
(2) To find out how these four principles relate to the governance of EU projects in practice.
(3) To leave enough room for discussion of further emerging issues and themes.

Once it became clear that the workshop could not take longer than one hour (according to most participants' availability), point 2 had to be omitted from the

[16] As explained in the introduction we omitted 'tansparency' from the discussion to keep the data gathering exercise feasible in the given time frame.

original list. However, as we explain in 6.2 of this report, this reduction meant that there was sufficient room for participants elaborating on point 1; and there was also sufficient time for discussing emerging issues/themes (point 3) such as, the concept of the neutrality of technology and the autonomy of science.

Prior to the workshop the GREAT consortium had agreed on the following selection criteria for participants:

- The participants should be conducting international research ('cross nation')
- They should work in different disciplines or on different research topics
- Technology should play a role in research, as follows:
    - The expected outcome of the participants' research is a technology, or are technological procedures, that may be considered innovative;
    - alternatively, the research process itself involves technological components or technological procedures that may be considered innovative;
    - alternatively, information and communication technologies (ICTs) are strong enablers for the scientific research;
- The innovation process, or the expected outcome, should involve some risk or uncertainty.
- The participants should at different stages of their academic career (e.g. doctoral student; postdoctoral researcher; professor).

The aim was to run the workshop with four to eight researchers funded through the EC working at different departments and institutes/research centres of the University of Oxford. The selection process led to five attendees (all male) of the workshop including:

- one Assistant Professor;
- one early career researcher without PhD;
- two Senior Researchers;
- a Lead Scientist of a Research Centre and Executive Vice President of an ICT company.

These 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. When asked to further specify their experiences in EU projects (both completed and running projects), the five participants explained that they had conducted research into the following areas, amongst others:[17]

- multi-agent systems and artificial intelligence;
- machine-learning techniques, and how to apply these to (human) dialogue;

[17] We need to provide general information only in order to ensure the anonymisation of the participants.

- advanced computation techniques in computer science; high-performance computing;
- human factors in computing and social informatics.

The workshop was moderated by Barbara Grimpe and conducted akin to a focus group (Krueger et al. 2000). Afterwards the recorded session was transcribed selectively, and a thematic analysis geared towards grounded theory was conducted (Guest 2012; Bryant/Charmaz 2007; Corbin/Strauss 1990; see also D 3.1, Fieldwork Methodology Report).

Section 6.3 presents the main findings from the workshop.

5. The context of RRI: empirical findings (interviews)

5.1 Case 1: Care for the environment

In this section the findings from five interviews with six project participants of CIP ICT PSP projects (including project coordinators) are reported; one interview was conducted with two participants from the same project and home organisation. Altogether, this is a case study analysis of projects conducting research and innovation falling under the theme 'care for the environment'.

During one particular interview (interview 2) it turned out that the project to which the interviewee belonged touched the theme 'care for the environment' only marginally. However, the interview led to relevant findings that also partly showed in other interviews, so we have included these findings in the subsequent analysis.

CIP ICT PSP interview 1

AG Parameter	Description
Product	What kind of product (or services) does the project intend to create? What are the product's (or services') ethical implications? What are the reasons behind providing the product?

Main findings
- The project has developed ICT services for saving energy/energy efficiency. - The reason (or motivation) behind providing these services appears to be market-oriented benefits: there "could be a new market possibility to sell our […] products", as the interviewee put it. - However, the new services also appear to have an ethical dimension: the *empowerment* of the envisaged clients due to disintermediation. The interviewee explained this as follows:[18] clients could now monitor their energy

[18] We need to paraphrase the exact answer in order to ensure anonymisation.

consumption themselves and would not need to rely on third parties anymore.

Further findings are:

The interviewee said that automating certain existing services implies a "win-win situation" for two consortium partners (the interviewee's own organization and a partner organization): "both partners win". Moreover, participating in the project would help to expand existing ICT services to more European countries; and thereby the ICT services would become more generic.

Beyond these individual benefits, the interviewee said that there is also a more general "added value" as the new services would be the result of a "collaborative" effort.

AG Parameter	Description
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*

Main findings
- The level of involvement of external stakeholders reported by the interviewee may be considered 'medium'; and the 'Consultation' governance model (D 2.3, Analytical grid Report, p. 80) characterizes the engagement best. The associated broader ethical norm is environmental protection. • It appears that the engagement of external stakeholders has been restricted to technology end-users (including users acting as intermediaries to further users), and a few political decision makers at the local pilot sites. So it seems that other potential stakeholders such as CSOs were not considered.[19] However, the interview data suggests that this

[19] We cannot exclude that this is an interview effect. As with all other interviews there was only a limited time for discussing various issues. Spending more time on discussing the engagement of end-users in greater detail may have led to the interviewee's omission of any other stakeholder-related activities or reflections. And once the interview moved to the topic of end-users the interviewer (Barbara Grimpe) decided to focus on this aspect in greater detail, instead of trying to cover a broader range of aspects in a more general way. This is in line with a qualitative approach.

limited participatory approach was a challenge in practice, as the stakeholders did not represent a homogeneous group but had different requirements (depending on the project's different pilot sites). Thus, while one might argue that the consortium followed 'only' a Consultation governance approach, this, in itself, implied considerable efforts according to the interviewee, and took more project time than expected.

- The consultation process was to some extent tied to trainings of the end-users who then provided feedback on the envisaged technological innovation. However, it appears that consultation activities were not limited to this particular governance tool (i.e. the trainings) but were also fed into the project at other times such as, in monthly meetings held by a specific subcommittee of the project, thus supporting collective learning within the consortium.

- Apart from this, the data also indicates that substantial efforts were made to coordinate the interaction between the heterogeneous consortium partners. We may consider this as an aspiration for a strong *internal* 'participatory approach' (with the consortium members being internal stakeholders). Thus, based on this finding we suggest to extend the AG parameter 'participatory approach' to perhaps not only consider external stakeholder engagement, but also internal stakeholder engagement.

These findings can be explained further as follows:

First, according to the interviewee the experiences of prospective users (external stakeholders) at the project's pilot sites helped the consortium partners to "learn" about different situations at different pilot sites; and hence to dynamically "improve" the ICT services "each month". The feedback gathered seemed to be limited to aspects that are mostly technical or related to reducing the energy consumption. Thus, at first sight the aim of the project does not appear to be ethical (see Analytical Grid parameter 'Assessment'). However, the situation appears to be comparable to the project 'eSESH' that we analysed in D 4.2, Case Study Report (p. 31): both eSESH and the project at hand have been very much geared towards achieving lower levels of energy consumption, explicitly also during the course of the project. This responds to Article 37, Environmental protection, of the Charter of Fundamental Rights of the European Union, and hence does imply a broader normative (ethical) horizon.

While the project may have followed a Consultation governance approach 'only', this nevertheless appeared to be a quite complex and time-consuming task. According to the interviewee it was "hard" compared to other projects that would not engage with external stakeholders at all – in this case, different technology end-users:

"In this project as I told you because of all these different possibilities and activities it is a bit hard. In other projects [...] you don't take into account the end-users so hardly, you are focusing on problems of communication between one model and the other [...] [and only a few other technical aspects]. In

this project we have this collaboration for [number of pilot sites]. So this increased the management aspect by [number of pilot sites]."

Question: "Could you maybe give an example of the kind of problem that you have with the [specific group of end-users]? In that case? And how you go about it, how you - if you say you have some problem and they need training, what is that about and how do you solve it, or try to solve that."

"Yes for [this group], okay we gave them previously these trainings, and then the hardware part was installed, we go again and show them [...] [how to create user-specific features]. [...] They tell us [about various issues], and we found the problem."

The interviewee also explained that some issues were not known at the outset but emerged during the course of the project – and that the consortium needed to gather the related feedback throughout the project, in monthly meetings:

"This is a problem we found in the project, we tried to [...] [account for] the [number] pilot [sites] according to the requirements of any of them, but then we found that, okay each partner can have specifically these kinds of activities, but then we had to decide okay first we have to put the training, then we have to put these [other] activities, then we have to create [...] [certain technical features] – so we had to create this, and how we are going to monitor the activities of these end-users."

Question: "And what about the engagement activities with the users, or the end-users, did you also have to revise that at some point?"

"Yes this part with the end-users started a few months ago [...] and during the previous month we created this eh – the list of things we have to do [...] [at all pilot sites], and then these ongoing activities specific to each [...] [site] will appear with the running of the project. [...] So each month [...] we have this monthly meeting, we revise how is the state of these actions [at each pilot site]. [...] So in this meeting [certain stakeholders] present to the rest of the partners what they have done in this month [...] that may help the other partners how to [...] learn about the different situations. And try to improve each month the engagement with the end-users."

Second, the complexity of the consortium's internal distribution of labour, and the related strong internal engagement of stakeholders at the consortium level (or strive for such an approach), shows for example in the following quotes:

"We meet once a month, each partner presents the status of their activities, and we see the relation with other partners' activities, and if we have found any incoherence we propose a plan [for instance, for an amendment]."

Question: "How would you characterise your own workload for this project? Sort of, the quantity of work, the complexity of work that you need to do for this project?"

"For this project is especially a bit hard. Because - usually I was able to work with only in the technical side, manage technical work in bigger projects, but all partners have the same profile. More or less. So the problems you found were usually similar. Or in the same domain. Now in the [name of current project] we have administrative public partners, we have [...] [other partners], we have [...] [yet other partners], we have technical partners so, all of them ask for different activities, all of them related, and I have to have in mind all the possible relations between them. [...] The day by day makes new things appear. [...] So I need a little bit more time, to answer the DOW, to match all the possible situations."

AG Parameter	Description
Cultural Differences	Does the project take into account cultural differences (of any kind, such as, different organisational cultures)? If yes, in which way?

Main findings
- Cultural differences appear to show in different EU *countries* as well as different *languages* being represented in a consortium, or among the prospective users of the new ICT services at the different national pilot sites across the EU. - Such national and linguistic cultural differences may emerge during the course of the project in unexpected ways, and they may affect negatively the consortium's ability to fulfil other envisaged project tasks. - However, in the case at hand these cultural challenges also appeared to contribute to (partly positively experienced) individual reflection and learning.

These findings can be explained further as follows:

The interviewee said that having to deal with many consortium partners speaking different (national) languages would be a challenge. However, there also appears to be a positive element of individual learning, and hence a form of reflexivity, attached to this interviewee's experience. Both aspects – the challenge and the opportunity to reflect and learn – show in the following quotes:

"It's not the same to be coordinator of national project where you have the same language. So dealing with partners with different countries on such a big consortium of [...] [number] partners, it is a really good opportunity to increase my activities [...] and see, where I fail, and where I can improve myself."

Question: "Are there other examples where it does not sort of neatly match, another task description where you struggled to get something done?"

"The most important has been the translations that we didn't take into account, it was going to be so much time. [We thought first] okay, we have to translate some sections [of the new ICT service], but when we identified that we need to translate it completely [...] this took a lot of time.

The interviewee went on saying that the unexpected additional work load for translating the ICT services in different languages would have meant that other tasks envisaged at the outset of the project had to be reduced.

CIP ICT PSP interview 2

AG Parameter	Description
Assessment	In which way have the technology and the project's results been assessed? Did this assessment involve any reflexivity? If yes, did this reflexive process involve a general normative horizon, or was

	it only concerned with technological developments or profits?

Main finding
- Consortium members strove for an ICT design and development process in which first prototypes got repeatedly assessed by a variety of prospective users. The assessment and design process shows an element of a participatory approach according to the 'Consultation' governance model, or even the 'Co-Construction' governance model (D 2.3, Analytical Grid Report, pp. 80-82): a two-way process of communication between consortium members and prospective technology users. - The associated norm appeared to be "efficiency". - Despite this narrow normative focus the user-centred, iterative assessment and design process may be interpreted as an instance of – at least medium-level – responsible innovation.

This finding can be explained further as follows:

The interviewee described the envisaged ICT services and explained that these were meant to address various, quite distinct domains of application both within a given organisation, and across different organisations across Europe. When, for instance, one of the first prototypes would have been trialled among the distinct user groups of a particular organisation, "lots of feedback" would have been gathered, and "further developments happened to make sure it was more efficient and really ticked all boxes". Next, the subsequent version would have been released to more sites, "which inevitably led to more feedback". There would have been a "two-way communication" between the users on the one hand, and at least three consortium partners (individuals) on the other hand. The interviewee concluded:

"And now we are implementing a few more developments. [...] It's under constant development. [...] We do send out a lot of e-mails to the users to inform them about the developments that are being put in place".

However, the interviewee also argued that the gathering of feedback had to stop at some point, and only rather "general" user needs could have been taken into account. This restriction seemed to be driven by a simple but very important practical limitation: the *costs* of a user-centred, iterative design process. This trade-off between costs and responsible innovation will be discussed next, through the lens of the Analytical Grid parameter 'Participatory Approach'.

AG Parameter	**Description**
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*

Main findings
- There is an important practical limitation to pursuing a full-fledged participatory approach such as, aiming for a high level of including external stakeholders (Co-construction): *financial costs*. Nevertheless, a particular group of external stakeholders – the end-users of the envisaged technology – was involved in the project to a considerable extent, albeit in a relatively controlled way. This resembles the 'Consultation' governance approach (D 2.3, Analytical grid Report, p. 80). - As in interview 1, the data indicates that substantial efforts were made to coordinate the interaction between the heterogeneous consortium partners. We may consider this again as an aspiration for a strong engagement of *internal* stakeholders. - Another notable feature is that the interviewee did not problematise project activities in any of the following ways: no ethical issues, no (internal) conflicts, and no potential lack of responsibility, were mentioned. This may have been an interview effect,[20] but it may also reflect the interviewee's (over)optimistic interpretation of project activities, and collaborative work in the consortium.

These findings can be explained further as follows:

Consortium members of EU projects have to conduct project activities with a limited financial budget. This appears to inhibit a strong co-constructionist governance approach (cf. Analytical Grid Report, p. 82), whereas 'controlled', selective stakeholder engagement – in this case, the engagement of prospective technology users – akin to the 'Consultation' governance model remains feasible.

In the case at hand, the interviewee reported a broad range of domains, and related user groups, the envisaged new services were intended to address. The following quote exemplifies that this implies a trade-off, or the need to strike the right "balance", as the interviewee put it, between costs – which rise when tailoring ICT services perfectly to each specific user need – and sufficient overall "value" for all prospective users as a whole. However, the quote also shows that user feedback was

[20] We have noted before that an interviewee omitting (potential) issues may be an interview effect, and not because there were no such issues in reality. Also, shorter interviews are necessarily much more selective than longer interviews. In the case at hand the interviewee was busy and could only spare 30 minutes.

considered to “put through five more developments”, which means that external stakeholder engagement was not completely absent:

"It's a balance between efficiency - well between adding value and costs. So when we have taken a lot of the feedback, if we don't feel like it's going to add enough value for the cost of the development, then we won't pursue it. And we will feed that back to that particular project [user group]. So the ones - we've just put through five more developments - and each of those five has basically been brought up from each project [user group], something that we've not necessarily missed but didn't deem to be as important as they have seen it. But we have pushed these five developments through. But there are a few others that we just didn't feel added enough value. [...] So if we make it too specific, or too niche, to a particular client then we lose the other people."

Moreover, similar to interview 1, the second interview also indicates that the consortium partners made considerable efforts to coordinate their activities internally – which can be interpreted as aspiration for a strong participatory approach with internal stakeholders. The following quote, especially the last two sentences, exemplifies these collective efforts of ensuring the equal participation of all consortium members:

"We have monthly calls which obviously has proved to be quite difficult with us across Europe, with the [...] different locations. So once a month we come together and have a conversation about the deliverables [...]. So the monthly consortium calls kind of make sure we're on the right track and all ticking the boxes, we also have quarterly meetings, so we all go to each respective office to have a three day meeting to bring us all together, we also have [...] like an e-room, that allows us to communicate all our deliverables through that as well. [...] And we all have our own approval process, so every partner has to be able to approve each other's documentation. So it's presented as a whole."

In the given (short) interview time, the interviewee did not problematise any aspect of this internal collaborative work of the consortium, or of the project activities more generally, from an ethical perspective, or in terms of ‘responsible’ behaviour. For instance, while she mentioned that data security was one of the biggest issues at the beginning of the project, this problem would have been solved quickly; “everybody” would have been “happy with data security”. This relatively optimistic view also shows in the following snippets:

Question: "Did you experience any issues that one may call 'ethical' issues, or issues of – lack of responsibility [...] or let's say, issues related to anything that may not be responsible development, responsible innovation?"

"No, not at all. It has been a very rewarding experience to be honest.” [...]

Question: "And what about the fact that you are as you said in the beginning that you are probably interacting a lot with the [...]who are finally using this [technological innovation]. What are their experiences with [it], how do they perceive it, and how do you go about these experiences?"

"Yeah we've had generally very positive feedback from the users [...]. Generally very positive feedback, they are all using it."

AG Parameter	Description
Cultural Differences	Does the project take into account cultural differences (of any kind, such as, different organisational cultures)? If yes, in which way?

Main findings
- Cultural differences show in different *areas* of application.[21] - They appeared to function as a creative *source* for learning, and for improving the envisaged ICT services.

These findings can be explained further as follows:

In interview 1 the project participant had described cultural challenges such as, the different languages spoken in the consortium, as problems that were also, at least in part, a positive driver for individual learning. This tendency showed stronger in the second interview. Here the interviewee describes cultures – understood as the different domains to which the envisaged ICT services needed to be adapted – as inspirations for making improvements to the first prototypes:

Question: "Do you think culture mattered in any way"?

"No – other than it helping I think, there was no - hindrances with different cultures and different languages other than we got to learn about them, and they aided each other – so it's been fascinating – cause with each monthly visit we will have gone to the specific places in which these [new ICT services] are being developed [...] And from that you can take the lessons learnt back to your own [application] and your own company and see where you can put those things in. And it's been vice versa for those guys as well to learn from what we've been doing with our [application]."

CIP ICT PSP interview 3

Main finding
The following main finding cannot be attributed to any existing parameter of the Analytical Grid, so we suggest to amend the Grid accordingly: An entire project may function as a kind of tool for engendering processes of reflection in a local context *beyond* the confines of a given consortium. In the case at hand, reflexivity meant that project activities reportedly led to a greater awareness

[21] We cannot provide examples from the interview, as anonymisation is required. However, consider, for instance, the project CommonWell analysed in GREAT's D 4.2, Case Study Report. CommonWell aimed at developing an IT "architecture" that was intended to serve distinct subdomains of care such as, emergency care; hospital admission; telehealth for COPD patients; support for heart failure patients. http://commonwell.eu/about-commonwell/the-commonwell-services/; http://commonwell.eu/about-commonwell/the-commonwell-architecture/; 26-11-2014.

among a local organisation's senior staff of using ICT as a (potential) means to improve on environmental protection.[22]

This may be considered a 'spreading', or 'spill-over' of responsible behaviour from a project into its wider context.

This finding can be explained further as follows:

The interviewee belonged to a particular working group within a larger public organisation that, as a whole, was a formal consortium partner of a certain project. So the interviewee was the organisation's formal individual representative in the consortium. Interestingly, he perceived the project's activities as having a very positive influence on his public host organisation and its local context. The following quote exemplifies this:[23]

"I think [the project] was an enormous success, because I think it made very senior people within the authority vividly aware of the impact that [...] [the site where the new ICT services were tested] had on the [...] carbon footprint. [...] And that was only uncovered, or it was vividly demonstrated [...] [by the project] and by the results. [...] [Before, that site had] never been quantified as to the contribution that makes toward our carbon footprint [...] but also it's never been explored as to what we could do in order to reduce that impact. [...] When we were active around [...] [the project] that was really invigorating people to think creatively about what we might need to do to be a greener [...] [society]. [...] And I think in starting that discussion and that debate it's taken us an extraordinary long way in a very short period of time. [...] There is now a new energy services company which is selling sustainable energy [...] [locally]. So from that very small initiative which just caught the imagination of a few very senior people we [...] [have now achieved substantial changes]. Now, I'm not saying that those things wouldn't have happened without [...] [the project] but I'm saying they happened very very quickly."

AG Parameter	Description
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*

[22] Environmental protection may be considered an ethical norm, as it corresponds to Article 37 of the Charter of Fundamental Rights of the European Union.

[23] We cannot quote the full interview passage as it includes many words and names that would help to identify the interviewee and project. So we need to paraphrase all these bits, which makes the description harder to read.

Main finding
Similar to the interviews 1 and 2, this interviewee shows a clear awareness of the need to make substantial efforts to coordinate the participation of, and interaction between the heterogeneous consortium partners. We may consider this again as an aspiration for a strong *internal* participatory approach.[24]

This finding is backed by the following quote:

"I think one of the absolutely key things within a project is to have a representation of the full value chain involved in a project, so there needs to be – let's say in [...] [the project he has worked for] somebody from an energy services company, there has to be representatives from the distribution network operators, there needs to be representatives of [certain] technology developers [...] [interviewee mentions two more groups of representatives] so that the whole value chain needs to be represented, but I think one of the key things is when the project kicks off - everybody needs to start to understand what the motivations for each of those members of that value chain for being involved is. And sometimes it will be in conflict to the reasons you want to be involved in the project, but you have to understand [...] [for instance] why a utility company may want to be involved in a project like this; or why a city council may want to be involved in a project like this, because it's when you find out 6 months, or 12 months down the line that actually you have differing, if not conflictual purposes, for being in a project, that you can, it can start to get in the way of the delivery. It didn't necessarily in [in his project,] but that's been my experience before [in other EU projects] when the real motivations and the real reasons for being involved stand in the way of advancing the project. So if all different elements of the delivery in/and the value chain are represented, but they all express what it is that they want to get out at the start of the project [...]. Everyone puts the cards on the table and says: hey I'm here because commercially it's really important for me [...] to understand users to develop new services to sell them, and I can say, well, it's really important for me to be here because I need to ensure [...] [something else]. Now that might be a conflict with the utility company, but they'll understand that, and I understand them."

AG Parameter	Description
Cultural Differences	Does the project take into account cultural differences (of any kind, such as, different organisational cultures)? If yes, in which way?

Main findings
- In line with interview 1, the need to cooperate across different European countries is considered an issue. - Also, differences between different types of consortium partners – having academic, public institutions' or a variety of private sector (commercial) interests and styles of thinking – appear to be problematic. This situation may be interpreted as tensions between different *epistemic cultures* (Knorr Cetina

[24] In the preceding discussion of interview 1 and 2 we have also analysed the extent to which, and the ways in which external stakeholders have been engaged, thus providing insights into how this classic RRI requirement – inclusion of external stakeholders – is realised in practice. With regard to this and the following interviews we focus on the problem of engaging internal stakeholders only, as well as on other relevant issues that emerged from the interviews. More insights into varieties of external stakeholder engagement in practice have already been provided in D 4.2, Case Study Report (cf. p. 6).

1999), or *communities of practice* (Wenger 2014).
- Interestingly, there is also a physical, or geographical ingredient to such cultural issues: the fact that projects are sometimes conducted across different climate zones.

These findings are backed by the quotes shown below.

With regard to the first quote, the interpretation of different communities of practice, or epistemic communities, is based on the interviewee using, for instance, the expressions “agenda” and to “think differently about things”. However, it is also worthwhile noticing that the interviewee tries to provide a balanced view by arguing that nevertheless, the consortium worked sufficiently well together.

“I work in a lot of European projects and, European projects always have cultural issues which create challenges - now those cultural issues can be to do with different ways of doing things in different countries, but also sometimes the cultures of the different partners. Now what I mean by that is: I work for [...] [name], other partners within the Consortium were ehm - private sector technology businesses, other partners within the consortium were academics, other partners within the consortium were ehm utility companies. Now everybody comes to a project with a particular set of - has a particular agenda, so [...] there were some - tensions is probably a strong word [...]

The fact that we are from different parts of the world, we think differently about things, we're from different climate zones and so sometimes - we didn't understand some things about [...] [name of pilot site] because we have so much of our energy focused around heating, and they have so much of their energy use focused around cooling. [...] But also there's the fact that, as a [...] [public institution] or as an academic or as a private business you have slighty different outcomes in mind and that can create disagreements, tensions, but all of that said - I think that's absolutely common. [...]

The consortium worked as well as any project I've ever worked on. [...] We were all committed to the essential agenda of using ICTs to address energy use [...], and really it was just around the very edges that occasionally we had a discussion or a disagreement, but from the very beginning to the very end we worked as a real, combined, wedded, respectful consortium. And I'm not just saying that, I genuinely believe it.”

The following second quote is from the one of the interviews we conducted with non-CIP ICT PSP researchers; in this case, it is the interview with an EU researcher participating in an FP7-COORDINATION project. In the quote the problem of different epistemic cultures, or communities of practice, shows in expressions such as, “problems of understanding each other” between “partners dealing with big amounts of data” and other partners, and in the “language of technicians” that physicians associated with the project “luckily” knew.[25]

[25] The interview was conducted in German. This is the original quote: “Wir mussten zuerst die Technologiepartner davon überzeugen, dass die Voraussetzungen für manche Technologien nicht gegeben waren, also man kann keinen clinical decision support machen, wenn die Forschung fehlt, auf die sich die Entscheidungsregeln stützen können. Dann mussten wir Partnern, die mit grossen Datenmengen arbeiten, erklären, dass es absolut nicht einfach ist, mit Menschen, die eine Krankheit haben, lange Tests zu machen. Da gab es dann auch mal Verständnisprobleme. Glücklicherweise

"First we had to convince the technology partners that the prerequisites for certain technologies were missing, in other words, you cannot make clinical decision support if the related rules for decision-making are not backed by research. Next, we needed to explain to partners dealing with big amounts of data that it is not at all easy to conduct long tests with people who have a disease. So sometimes we had problems of understanding each other. Luckily we had a few physicians who knew the language of the technicians, and this has also helped a lot."

CIP ICT PSP interview 4

AG Parameter	Description
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*

Main findings
- Similar to the interviews 1, 2 and 3, this interviewee shows a clear awareness of the need to make substantial efforts to coordinate the interaction between the heterogeneous consortium partners. We may consider this again as an aspiration for a strong engagement of *internal* stakeholders. - The interview shows that bringing together different stakeholders in a single consortium may not only be considered responsible because it is ethical (by making different voices heard, and trying to balance their needs). It also seems that this type of responsible behaviour can actually *coincide with economic interests*: enabling the different engaged stakeholders to become more competitive in their respective fields, instead of letting only certain (powerful) actors pursue their economic interests. Thus, inspired by this interview we may amend our conception of 'participatory approaches', and responsible behavior more generally, by acknowledging that economic interests can show in different ways among different actors; and balancing such different economic interests in a way that is as fair as possible may be considered a first important step towards 'responsible innovation'.

hatten wir ein paar Ärzte, die die Sprache der Techniker sprechen konnten, und das hat auch sehr geholfen."

These findings are backed by the following quotes:

The interviewee argued that one of his organisation's goals in his home country is "to work together with local stakeholders in putting together a number of projects that can increase the competitiveness of the [...] [country's] companies in markets that we believe will be competitive in the near future". This combined view – an interest in stakeholder engagement *and* an economic motivation – would also apply to the EU project for which he has been working so far. The stakeholders he mentioned are, for instance, "local, regional and national public authorities, but also [...] private companies". The interviewee specified further this participatory approach as follows:

"We just take the opportunity to put together these [EU and other] projects and to bring the relevant stakeholders to the same table."

Question: "As you were just mentioning the different types of both public authorities and private companies and the local ecosystems that you want to support [...], how does this relate then to all the interests and all the different partners in your consortium? Because they look quite heterogeneous – the mix of –"

"Exactly that's the big challenge: managing stakeholders. That's what we do. Managing different interests – with – our main goal is that at the end of the day there is a clear gain to everybody. Of course some will win more than others. But that's how these projects – really have an impact is that, if we're able to bring all these different interests into the same meeting room and have them agree on a strategy to pursue a number of challenges with a set of objectives that we define initially."

When asked to give an example for this management process of different interests, the interviewee again provided an answer in which he implicitly combined the two types of values: having as many relevant stakeholders represented in a consortium as possible (thus mitigating an individual party's power), and achieving overall economic competitiveness. This combination of two distinct values shows in the last but one sentence of the following quote (the "ecosystem would be more complete and more competitive").

"In Europe when you look at the different initiatives [related to his project's thematic focus] what you see is they are mostly motivated by the energy sector because they want to sell more electricity. But that creates - when that happens the ecosystems become very closed into - ehm dominated by the energy sector and doesn't take into account many other variables that are important. [...] So we always said that it would be much better [...] to have the project ran by a number of stakeholders with different interests, so that at the end the ecosystem would be more complete and more competitive. Even though individually a company might tell you that they lost because they were brought together to the same board as other companies – at the end, everybody won."

The next main findings from this interview are related to elements from two parameters of the Analytical Grid: 'assessment' and 'product'.

AG Parameters	Description
Assessment	In which way have the technology and the project's results been assessed? Did this assessment involve any reflexivity? If yes, did this reflexive process involve a general normative horizon, or was it only concerned with technological developments or profits?

Main findings
- The interviewee shows a high degree of reflexivity by effectively distinguishing between different possibilities of assessing ("evaluating") the success of the project; and by also thinking aloud, and questioning himself whether he and his organisation act in a way that is sufficiently ethical or responsible. - The interview also reveals that it is difficult to *know* at what point activities may be considered sufficiently ethical/responsible. This can sensitise us, as external observers, to the difficulties and uncertainty involved in defining 'clearly' responsible or irresponsible behaviour for concrete work situations, and in making sufficiently informed moral judgements. - With regard to the products delivered by the project – new IT systems brought into an existing "ecosystem" – the interviewee elaborates on a classic ethical problem (privacy of data). Importantly, he explicitly refers to a notion of *care* – instead of framing this problem as, for instance, a purely legal problem.

These findings are backed by the following quotes:

"We try to make things as responsible and ethical as possible. But the boundaries of ethics and responsibility are very blurred sometimes. So we never know. Sometimes I think to myself if we're doing it in the most responsible way – if we would do it differently – there is always the possibility to do it differently, but we try to do it the best we can – and we discuss it many times. Because, as you can imagine, by [...] bringing different stakeholders together, we always have to manage different interests. Okay? And so, that's a big challenge."

"[T]here is always a difficulty which is privacy of data. Which is something that we have to deal with because, when you bring intelligence, when you bring the IT systems in the ecosystem, means that you are gathering a lot of data [...] and you have to be careful of what type of information you are gathering, and how that information might be used to keep track of habits of citizens. [...] [Provides an example from the project] Which is like when you use the credit card. So we have to be very careful about how we use this data. Because the market is very new we always have to be very careful how we design the architecture, how we design the systems, and how we guarantee that privacy is guaranteed. So this is something that we sometimes discuss among the different stakeholders. How to guarantee the privacy."

CIP ICT PSP interview 5 (two interviewees)

AG Parameter	Description
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*

Main findings

- Compared to the interviews 1 to 4, the participants in this interview showed the greatest awareness of the need for a participatory approach (i.e. for the inclusion of external stakeholders) in research and innovation projects. This shows in their discussion of the *living lab* approach that they reportedly applied to various previous projects. The living lab concept comes close to the fourth governance model explained in D 2.3, Analytical Report (p. 82): the *'Co-construction'* model.
- However, the interviewees *also* make comments that clearly match another governance model, namely the '*Revised Standard Model*' (Analytical Grid report, p. 81). This shows in the interviewees problematising the influence of media (newspapers, journalists) in communicating a project's activities and results.

  From a conceptual point of view this second finding implies the following: In practice, a given project may be governed in a 'mixed' way, that is, in a way that combines elements of (theoretically) contradictory governance models. This resonates with the findings in an earlier GREAT Deliverable (D 4.2, Case Study Report).

- The heightened awareness of a key principle of RRI – participation – is accompanied by reflections on the concept of citizen: the interviewees *unpack the notion of citizen* (thus showing *reflexivity*) and explain that it may not be sensible to involve all kinds of citizens. Instead, they argue for a (cautious) selection of appropriate stakeholders.

  This participant perspective matches a theoretical consideration developed in GREAT's WP 2, and explained in D 3.2, Exemplifying the Typology with Relevant RRI Projects (p. 40): the difference between 'quantitative' stakeholder engagement and 'qualitative' deliberation (see also 6.2.4 in this report). While engaging a large number of different stakeholders is an important goal in making research and innovation processes more responsible, pursuing this very ideal, and pushing it the extreme, may also become counterproductive and confuse or distort research and innovation processes in undesirable ways.

Each of the three findings is backed by one of the following three quotes (the first quote, or paragraph, exemplifies the first finding, and so on):

"In fact I think a part is missing in [project name], that is the citizen involvement, a participatory approach. [...] We are used to follow the living lab approach in, I could say now, at least [...] [various] EU projects, so I know what I say and – that's different. [...] I can say that mostly the consortium was – managed and led by the technical partners. The technical partners had a technical approach. But now, now I think we are ready [...], we have started speaking about possible future proposals where to include the participatory and the living lab approach, and the citizen engagement and involvement."

"[T]he accountability of the project results [is important]. It means that we should be able to communicate the results in different ways. You understand that if I go too much in the depth, for some citizens it's difficult to understand. If I only go to the newspapers and to journalists, what they need is the new, and sometimes, to catch the attention, they get the wrong new [...] at the end they write [...] [things] that are totally unuseful for the concrete communication of the results. So [...] how to communicate to reach people, and to use this communication to engage them. [...] It must be a multi-dimensional communication, and it's very very difficult. The social networks are a tool but they can't be the only tool to be used. [...] We need concrete things. [...] We must know that we have developed that action, and citizen can see that action. Can see the impact, the concrete impact, because, as you can guess [...] [in our country and region] the European level is considered as something far."

"[Citizens need to be] able to understand what we speak about, and they can be competent citizens – but competent because there are the technical competences, or competent because they live in the district and they now that the district is not safe, is dark, is not smart, is not sustainable, from the point of view of quality of life. So we have to look at the different ways of competences, of citizen competences. [...] Not the city level, but the [lower] local district level is the right level where to reach citizens, where to involve citizens."

5.2 Case 2: Care for older people

In the first half of this section the findings from four interviews with four project participants of CIP ICT PSP projects (including project coordinators) are reported. This is a case study analysis of projects conducting research and innovation falling under the theme 'care for older people'.

The second half of the section presents the results from our complementary local context study, in this case the UK. As explained in section 4, this study comprises four interviews with different local stakeholders that would be affected by implementing technological innovations in their area of work, or their life (as in the case of the informal family carer). The interviews were conducted in order to develop an understanding of the complexity of the local contexts in which CIP ICT PSP projects operate, including existing embedded responsibilities of formal and informal carers as well as their broader historical and organisational/institutional settings.

CIP ICT PSP interview 6

AG Parameters	Description
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 interview data we try to identify tools such as, an ethical board/committee, ethical review, or comparable organisational units and practices.

Main findings
- This interviewee's project did not have in place a (formal) ethical committee at the consortium level. - However, reportedly each of the project's pilot sites has been subject to a local ethical review process conducted by a local ethical committee. Interestingly, according to the interviewee this decentralised ethical screening was to some extent prepared, steered and supported at the (central) consortium level – but only by way of a loose coupling with the pilot sites. Thus, overall a certain degree of ethical screening spanning the consortium and pilot sites appeared to be in place. Taking together these multiple distributed 'small' efforts of different actors at different locations, the entire ethical screening process could perhaps be called *polycentric* (Ostrom 2010), and also semi-formal.

This finding is backed by the following quotes:

Question: "Have you been accountable to any kind of ethical committee, or have you been subject to any other kind of ethical assessment in the EU project [...]?"

"Well not, not the company directly, because we do not provide the medical devices, but for sure as a project coordinator I was involved in various processes which bring [?] to the ethical committee approvals of our pilot sites. Not directly, I was not directly – involved in any ethical committee."

Question: "[...] But you say there were some kind of procedures or some kind of processes that [...] are nevertheless related to this question. Could you maybe explain, tell me more about these then."

"Well, I mean the point is that – is – as our project is in charge of piloting on over [...] [hundreds of] users some hardware and software [...] [related to a specific aspect of care for older people], of course it was necessary to eh – prepare within the consortium a sort of ethical committee package which has been distributed as a default one to each of the pilot sites, and my role was basically the coordination in/and the preparation of this ethical committee package and to then distribute [...] – obviously each ethical committee behaves in a different way according to the country where it is operated, and as a consequence of this it has been necessary then for each specific pilot site to customize and to adapt this information pack according to the specific needs and specific requests of its ethical committee. So basically I have just coordinated the plan and the preparation of the info

pack, that's it." [...]

Question: "And then you say at these different project sites, there you would have, or you do have some kind of committee, or some kind of formal body to check this? To check whether these rules or these guidelines are applied, or how they are applied?"

"Eeeh no, because basically the ethical committee is up [?] to each pilot site, it's not up to us, we just give this support to the pilot site to prepare the [1W] documentation [...], so we just support them on this but we do not have any authority to influence or to approve of/r guide [?] what an ethical committee has to decide. So no [...] if I understood your question the answer is no."

Question: "So [...] it depends on the pilot site."

"Of course, 100%. We do not have any kind, we can just be the facilitator in the provision of information and can just be the – those that help them in providing answers in case of additional – questions of/r verification of ethical committees."

CIP ICT PSP interview 7

AG Parameters	Description
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 interview data we try to identify tools such as, an ethical board/committee, ethical review, or comparable organisational units and practices.

Main finding
- Similar to interview 6, interviewing the participant from another project (interview 7) revealed the following: although a certain organisational unit may not be *called* 'ethical committee', it may nevertheless exert the related monitoring function i*n practice*. This sensitises us to considering the possibility that also other CIP ICT PSP projects that are lacking a formal ethical committee may nevertheless dispose of functional equivalents, which may be hard to identify quickly or easily by an external observer. - However, as the case at hand shows, there is also a risk that such functional equivalents cannot fully, and rigorously, ensure ethical reflection, but are rather a form of *window dressing* – for instance, in order to "please the European Commission", as the interviewee puts it.

This finding is backed by the following quote:

Question: "You have an advisory board [...] with at least one or two members from [a particular

formal network of experts that are active in care for older people]."

"Yeah – the members [of the board] were selected by [...] [this network], but they are not necessarily all members of [...] [the network]. [...] we tend to have an advisory board on all of our projects, just to have some external input from experts which are not necessarily involved in the projects.

Question: [...] "For me this is then also a kind of monitoring, and maybe not auditing, but a kind of - eh monitoring then."

"Yeah you can call it a monitoring but it's not a - let's say a formal monitoring where you, at the end you have to present your results to somebody and they have to express [...], and – thumbs up or down. But [...] there is the obligation every time you receive an advice to say if the advice has actually been taken into consideration, and you have implemented it, or if you haven't, for which reason you haven't. You have to be fair and to treat any advice you get seriously, not just to say: okay we need an advisory board because that is nice in the eyes of the European Commission but who cares about what they say. [...] [The advisory board,] they told me that in some other projects they were invited [...] but nobody cared about what they were saying [...] they had to be there because we want to please the European Commission [...] And so in our case they were very pleased [...] [since] there were minutes of the meetings, and action plan, and we came back to them, saying, in the case we haven't implemented one of their recommendations – why we have not. Because some of them were not possible in the framework of the project, the technology did not allow it."

AG Parameter	Description
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.

Main findings

- CIP ICT PSP project consortia usually run pilots in different European countries, hence different national jurisdictions; they also interact with different existing local organisations and institutions, and hence face different extant organisational and institutional structures (including extant organisational and institutional responsibilities). This may challenge the conduct of a given project, as it needs to *respond* to the different local conditions as much as possible. These conditions may also change. (Thus, conceptually, the discussion of the norm/law parameter is in this case linked to the RRI pillar responsiveness).
- There seems to be a tension between a particular ethical norm, namely the protection of privacy in professional care providers' handling of patient data (which can be inscribed in national laws), and another very important ethical norm: the duty of (health) care (which is, for instance, reflected in the Charter of Fundamental Rights of the European Union).[26] At this point in time we do not know whether there is any general 'solution' to this dilemma from an RRI

[26] 'Health care' is the topic of Article 35; actually 'Protection of data', which is the other side of the dilemma in the case at hand, is also a topic of the Charter (Article 8); http://www.europarl.europa.eu/charter/pdf/text_en.pdf, p. 10, 16; 14-11-2014.

perspective, but it appears to be an important one as it revolves around securing human dignity and survival in the best possible way.

As the following first quote exemplifies, in many European countries social services and health care are organised as separate sectors (including different organisations, procedures, responsibilities). At one point of the quote the interviewee specifies this separation further by arguing that it implies different organisational "cultures" (thus, conceptually there is a link here to the AG parameter 'cultural differences'). In other countries the different services appear to be more integrated.

"Ambient Assisted Living is particularly complicated because normally, with very few exceptions, you are cutting across the boundaries between social care and health care, because normally the monitoring of the environment is not something that is run by health authorities, but is under the control of social eh services, and in most European countries social services are independent from health care services, not everywhere. [...] Now in Finland they are starting to merge social and health care services under a single responsibility. In Scotland they haven't gone that far, but the budget for health care and social care, with the only exception of the budget for hospital, is merged under the joint authority of the municipalities, or let's say the county councils and the NHS eh managers. So they have to decide together the priority in using it, and in some other countries or regions, there is only one ministry responsible for health and social care.

So I think the general trend is today is bringing the two together, with some major difficulties, because health care tend to be an organization which is run by, let's say managers appointed by the board. While municipalities are elected. So that makes an enormous difference between the cultures of the two organizations, and also health care tends to be, a service offered to everybody for free, or paid by insurances, while social services are means-tested, so in reality if you have [...], the social services will not be offered to you, it's up to you to pay from your own pocket to find somebody to support you. I mean it is anything but trivial to merge these two organizations, but I think that nobody in his right [?] mind [?] today, or her right [?] mind [?] is against the fact that these two things should be organized differently, and to be very complementary to one another, and should be eh coordinated in such a way that you cover all the needs of the people, and [?] at the same time you avoid duplications of efforts." [...]

Question: "How do you deal with these different institutional and legal situations across different pilot sites?"

"Yeah very simple, we have to adapt to the local legislation. [...] [There is no] formula which is good as it is for all European countries and regions."

Given the variety of possible constellations of health care and social services providers, it seems, as argued by the interviewee (see his last statement), that a consortium running pilots at different sites in different countries needs to make significant efforts to *respond* to local peculiarities. These may also change, as exemplified by the interviewee's statement about Finland. Providing technologies for Ambient Assisted Living appears to be especially complicated; we can now ask whether some such complexities also exist with regard to implementing other care technologies.

The following quote show again the differences in legal situations across countries. It also exemplifies the dilemma between data protection (as required by law) and the need to provide care in emergency situations (emphasis in the original).

"In Sweden until a couple of years ago [...] there was a law saying that access to health care [...] was possible for anybody employed by the health care system. That implied that the patient didn't have access to his or her own clinical data. And they had to change the law for allowing the patient to access the data [...] So sometimes the law is an unsurmountable obstacle to develop some services, or it has to be changed for that to become possible. But of course, law changes from one country to the other, you don't have anything like that in the Italian law, as far as I know, but on the other hand, the data protection body in Italy, has views that are more restrictive than anybody else in the whole of Europe, where recently they blocked [?] the possibility in a hospital to assure electronic patient data, saying that the patient should express the consent to the access to each individual doctor or nurse, which again [...] means paralyzing the work of an hospital. Because I don't know who will be on duty tomorrow, so I cannot go to the patient every five minutes saying, eh do you allow Dr. Rossi to access your data [...] Maybe the patient is unconscious, and you have to ask the family.

So what you realise, the law is evolving with an extremely slow pace compared to what technology would allow today. And again I think that you have to keep in mind the interest of the patient. When you go as far as actually putting at risk the health of the patient, because you restrict access to the information, you should really think twice if that makes sense or not. And let's say that the general philosophy today is that there must be situation in which I must be able as a medical doctor to overcome a limitation about access to the information of the patient, if I'm an emergency room doctor, and I get a patient unconscious, I know anything about him except his name, surname and possibly [...] health insurance number, I *must* be able to access information about him. Because if I administer [?] a drug and he is allergic to the drug I can kill the patient. So again is important that there is an access in emergency that is allowed, but at the same time is recorded in such a way that if the patient recovers, he will be able to know that the access [3W] broken because there was an emergency situation."

Altogether, it can be argued that the interviewee shows a high degree of reflexivity about challenges in the implementation of ICT projects.

CIP ICT PSP interview 8

AG Parameter	Description
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.

Main findings
- This interview suggests that we need to develop an awareness of *multiple* norms affecting a project participant's daily work. - Some are legal norms, but some norms are also of a different nature, and they cannot be summarised easily under a single overarching heading. In the case at hand, at least six distinct norms may be identified for a single organisation (consortium partner) only. Thus, it is worthwhile considering the following: if other organisations that are

members of the same consortium also have a number of – different – normative expectations to which they are oriented explicitly or implicitly, the project as a whole would be a very complicated web, or mix, of many different normative expectations to be juggled by all project participants. This resonates with the following point made in GREAT's WP 2: It is necessary to move "to a conception [of RRI] where the adjective 'responsible' is now also ascribed to the complex network of actors, institutions, public policies that is entailed in an innovation process" (D 2.2, Theoretical Landscape, p. 11).

This finding is backed by the following observations and quotes:

During the interview it turned out that the interviewee's organisation could not be easily classified as either public or private. His organisation actually eludes any straight-forward classification. As the interviewee put it: "We're non-profit, and at the same time we're not public, but we are not private". The subsequent interview discussion revealed that this classification problem hides an interesting "complicated circuit" (participant's term) of responsibility towards different stakeholders. "Even in my head sometimes it's not that clear", as the interviewee said himself. The data suggests that the complicate circuit to which the respondent referred consists of a mix of implicit norms – some of them being of a more formal (and even legal) nature, some of them being more informal. We need to present these various implicit norms in a rather general way, to ensure anonymisation.

It seems that there are at least six different normative expectations (which may not be all mutually exclusive) towards which the interviewee was geared in his daily work, explicitly or implicitly. At least two of them may be considered 'RRI' norms: point four, i.e. responsibility towards tax payers (cf. Sutcliffe 2011: 9), as well as point 5 – sensitivity towards the primary stakeholders (older people) and the impact the new ICT solutions may have on them.

- First, there is responsibility towards the European Commission. As is true for other organisations that joined the CIP ICT PSPs, the interviewee's participation in the project is funded through the EC. The interviewee alluded to this responsibility, for instance, by stressing the need to stick to the DOW (Description of Work).
- Second, the interviewee's organisation is registered with a particular legal-economic status. We cannot specify this here due to the required anonymisation, but in principle, a certain legal-economic status such as, being registered as a 'limited company' or 'charity' implies various (legal-economic) obligations. Within a given CIP ICT PSP consortium there are usually various different types of organisations with different legal-economic status and hence a multitude of legal-economic responsibilities.
- Third, part of the budget of the organisation is indirectly provided by national taxes. So the organisation is responsible to a particular government (that distributes the taxes), and also to the original national tax payers.

- Fourth, these tax payers actually belong to a certain stakeholder group which, in turn, is represented by a specific intermediary (a separate organisation).[27] As the interviewee stressed, his organisation is responsible to this intermediary.
- Fifth, the interviewee's organisation is responsible to older people. Contributing to their well-being is a basic target of the technological innovation developed in the CIP ICT PSP project in which the interviewee participates.
- Sixth, the organisation provides certain certificates to different types of actors. Such certificates for quality assurance are instances of 'governance through norms' (Thévenot 1997). They are 'instruments of trust' (Karpik 1996) designed to raise the trustworthiness of the certified organisations and individuals. So the certificates imply at least one normative horizon: norms of good care held by the interviewee's organisation (the certifying organisation).

CIP ICT PSP interview 9

AG Parameter	Description
Cultural Differences	Does the project take into account cultural differences (of any kind, such as, different organisational cultures)? If yes, in which way?
Assessment	In which way have the technology and the project's results been assessed? Did this assessment involve any reflexivity? If yes, did this reflexive process involve a general normative horizon, or was it only concerned with technological developments or profits?

Main findings
- As in interview 1 and 3, the different languages implied in a project being conducted, and with a technological innovation to be used across Europe, is considered a challenge. This would show in high costs of translation that are usually not accounted for by the funding institution. - Also, similar to interview 3, a tension between different types of consortium partners, that is, between different epistemic cultures (Knorr Cetina 1999), or communities of practice (Wenger 2014), is reported. - Importantly, the range of such relevant but distinct work cultures appears to be even wider than suggested by interviewee 3: apart from academic partners, public institutions or a variety of private sector (commercial) partners, the funding agency's practices – the "paperwork" and "bureaucracy" the EC requires according to the interviewee – further complicate a consortium's work. - These EC practices and expectations towards consortium partners are quite

[27] We cannot specify this group due to the required anonymisation.

legitimate though, as they imply the norm of formal accountability, and hence a certain form of responsible behaviour, towards European tax payers.

These findings are backed by the following quotes:

The interviewee explained that the user interface of an envisaged technological device developed during the project had to be translated into various European languages in order to improve on usability. However, the EC would not help in bearing the related costs of translation; and it wouldn't be possible to include translation costs into a project plan (the DOW):

"Translation costs are not small, and they are never put into projects because they are not small... [laughs] [...] And so you start relying on the good will of partners, and partners already have a ridiculously low contribution so they don't want to spend lots of time translating things. Just in that respect, we've had a lot of problems as well."

The interviewee went on arguing that the EC had a lot of translators, and wondered why project consortia would not be allowed to access those services. Relying on the EC's translators would benefit the project – the "quality" of the innovation could be improved.

The tension between epistemic communities, or communities of practice, in the project was implicit in, for instance, the interviewee's various comments about having both work experience in academia, and with a company – two "different hats" that one could wear at the same time, but that could also provoke "a conflict of interests" in a project.

Apart from different direct consortium partners, the EC was also considered an important force in its own right. The interviewee explained that over the course of the project the DOW had to be changed massively, and that the EC played a crucial role in this. The interviewee both problematised and appreciated these interventions as follows:

"I'm gonna be honest: it has soured a lot of the enthusiasm. [...] And it was all about paperwork rather than what we wanted to get on with. [...] Everybody knows that European projects are full of paperwork. And you can see why! There is a responsibility that we are using tax payers' money. I can totally see that. [...] [Business-oriented consortium partners] must see this as just: what's going on. Because, you know, in business, you generally don't have that kind of bureaucracy. You are allowed the freedom to go off and start, try things – and academia we're used to it [laughs], I'm a bit more used to everything having to have a paper trail. And again it's accountability, I realise that there has to be a balance between them. But there are times when, I do want to pull my hair out on the paperwork side of things."

Local context study (UK): four interviews

In what follows the findings from the semi-structured interviews with four different stakeholders in a particular local context – the UK health care and social services –

are presented. The interviews were conducted with an occupational therapist working for both social services and a charity; a specialist for assistive technology, and former occupational therapist, working for the social services of a city council (thus providing us with a local government's perspective); and an informal family carer whose father has got Alzheimer's disease.[28]

It turned out that some of the findings overlap with the results from certain CIP ICT PSP interviews reported in the preceding sections. Also, in this section some findings from the two additional interviews conducted with two researchers in other international projects (non CIP ICT PSP) – that is, an EUREKA project coordinator and a participant of an FP7-COORDINATION project – can be integrated. Thus, we will occasionally explain or point to such thematic links across different interviews.

While we focus on a particular local context, the findings in this section also have implications for RRI considered at the level of a given project consortium. These implications for RRI will be explained in the main findings related to three AG parameters: 'participatory approach'; 'norm/law relation' and 'assessment'. We also add observations on two RRI pillars, i.e. transparency and responsiveness.

The practical reasoning behind conducting interviews with different local stakeholders is the following: Many CIP ICT PSP projects have piloted their technological innovations at different sites across Europe. For instance, GREAT's D 4.2, Case Study Report, showed that the five CIP ICT PSP projects analysed in the deliverable have conducted pilot studies at four to ten different local pilot sites, and these pilot sites were spread over four to eight European countries (D 4.2, p. 61). Thus, many CIP ICT PSP projects have frequently interacted, or continue to interact with local stakeholders working or living at those pilot sites. This is likely to affect the research and innovation process at the consortium level to some degree, or in some way, as will be argued in the remainder of this section.

There is also a conceptual basis for studying the links between a local context – in this case, care in the UK – and a given research project as part of an RRI analysis. As argued in GREAT's D 2.2, Theoretical Landscape, it is important to avoid a "purely individualistic interpretation of responsibility", and to "move to a conception where the adjective 'responsible' is now also ascribed to *the complex network* of actors, institutions, public policies that is entailed in an innovation process" (p. 11; emphasis in the original). Following up on this theoretical position we argue that a given project consortium and a given local context, that is, an actual or potential local pilot site, are related to one another in the form of a "loosely coupled system of multiple actors", as explained by Weick and Roberts (1993: 359). They have studied collaborative work in an environment that is prone to catastrophes: flight decks. It is argued that the associated high risk could only be managed by help of "heedful

[28] See also section 4 in this report, explaining the related methodology.

interactions" between all actors involved: by people "who act as if they are a group", "interrelat[ing] their actions with more or less care" (Weick/Roberts 1993: 360).

This line of reasoning is applicable to RRI as conceptualised in the GREAT project. Responsible Research and Innovation may be considered as a "global structure" that cannot be created or observed from a single individual point, but is "transindividual" (Weick/Roberts 1993: 365). RRI *emerges* from the numerous heedful interactions between different actors involved, including consortium partners and the various local stakeholders in a project's context. Such an understanding of distinct yet interrelated responsibilities of individual actors is not yet part of GREAT's Analytical Grid (as described in D 2.3), so the latter may need to be refined in the next iteration (e.g. in GREAT's WP 5).

RRI Pillar	Description
Transparency	- Making available and distributing existing knowledge about a given technology, its consequences and forecasted uses. - Making available and distributing the results of any related deliberation processes.

Main findings
- Transparency is an important principle of responsible innovation. However, the empirical data suggests that a high degree of transparency is not always desirable, and can even be experienced as a "tyranny", as pointed out by Strathern (2000). - Firstly, in international projects such as those financed through the European Commission's CIP ICT PSP an COORDINATON programme, or through EUREKA, and aiming at including commercially, profit-oriented enterprises and industry in the consortium, there appears to be a *structural* problem with transparency: commercial and industry partners that intend to develop marketable solutions cannot be expected to fully disclose all their existing, and continuously evolving knowledge about a given technology, its consequences and forecasted uses.[29] This is not (only) a matter of economic self-interest. In the case of the CIP ICT PSP, the programme's overarching goal is to increase the competitiveness of European companies and industry overall. In reality, this can imply that participating commercial and industry partners compete against one another, and that they also cannot risk any leak of (marketable) information from a given consortium to their world-wide competitors.

[29] One may need to specify this problem of transparency further, depending on the type of actor involved. There may be a difference between a university where a lack of transparency might indicate a lack of RRI, whereas for a company this may be acceptable.

- Secondly, there is a range of subjective understandings of transparency – and hence varying perceptions of its benefits and downsides – that can be revealed through an examination of a given local care system. From the local stakeholders' perspectives transparency is not always an ideal to work towards. The related mixed findings are:
  (1) It was perceived by some interviewees that increased transparency would lead to improved care. For instance, current evidence of integration of services for greater transparency in a local government, serves to show that positive connotations are held in practice and being acted upon.
  (2) However, there were also problems raised in terms of transparency, in particular in terms of data and knowledge sharing and a reluctance from some interviewees to do this for reasons such as data privacy.
  (3) It was foreseen by interviewees that the idea of transparency may be unwelcomed as increased knowledge and information could cause an increase in workload for certain stakeholders in the care system. Introducing new information technologies (e.g. Apps for carers sharing information; management information systems connecting existing institutions in new ways) can also require new skills ("a level of education") and shift in work responsibilities ("change") that may be experienced as a "threat" (participant's terms).
  (4) Sharing of the full extent of a condition with a patient was also seen as potentially stress-inducing (for the patient).
  (5) Current practices to make aspects of family life visible to deal with the care system, were difficult for a carer who saw this as a (physical) invasion of family life.

The findings from the local context study appear to have the following implications for RRI at the level of a given project consortium: As conceptualised in earlier GREAT deliverables (D 2.3, Analytical Grid Report; D 3.2, Exemplifying the Typology with relevant RRI Projects), conducting innovation in a responsible way means engaging stakeholders – such as, in this case, local professional and informal carers and patients – in a 'co-constructive', highly participatory way. In doing so consortium members would need to be very attentive to different local stakeholder requirements: From local organisations' and local care professionals' points of view, is it really appropriate and acceptable how an envisaged technology changes existing work relationships and organisational work flows? These may become subject to harsher monitoring once they have been made more transparent. From an informal carer' point of view such as, a family member, what is not considered an "invasion" but an acceptable level of transparency brought about by a new technology? And from the patient's point of view, is the new technology supportive without letting everybody know the details of the disease and the patient's private living conditions?

The tensions associated with transparency at the level of international research projects showed, for instance, in the CIP ICT PSP interview 6. The interviewee explained that it would be difficult to "keep together all the partners to work for the same objective", thus providing "added value not only for the specific company but also for the European Union" (as a whole). This led to the following further discussion, in which the interviewee makes the observation that with two competitors participating in the same consortium, "no one wants to give the other some knowledge".[30]

Question: "So this may be then particularly difficult the more project partners you have, the more different companies you have involved, with their own eh ideas of innovation, their own interests –"

"Yes. I mean – [...] If you want to innovate as a whole group, as a consortium, in order to make, I mean to use all the possible forces, resources, competences which are part of the – of this consortium, to innovate as a whole well in my opinion it is not possible to have big players which are competitor to each other in the same consortium [...]. But they should be complementary [...] the competences which together make an added value, but if there are competitors within the same consortium you see that no one wants to give the other [laughs] some knowledge you know?"

The interviewee with research experience in an FP7-COORDINATION project made similar comments:[31]

"The EU expects that SMEs, that is, companies, get involved in the research process. But the companies have no interest whatsoever in publishing!"

These quotes do not yet exemplify all the important aspects of a company's or industrial partner's systematic reluctance to disclose existing and new knowledge. The following quote from the interview with a EUREKA project coordinator explains the lack of transparency further – and also makes us appreciative of commercial and industrial consortium partners' structural difficulty with fully implementing this RRI principle in practice:

Question: "You said [...] [before that] most companies, when they have produced something really interesting, they will keep it for themselves. Did you actually experience something like this in the [...] [name of EUREKA project]?"

"Not yet, we're still in a too early stage. [...] But I've seen that in previous projects and I think it will happen here as well. It's just a way of protecting your own IPR [intellectual property right]." [...]

Question: Does that affect the project as a whole, this kind of behaviour?" [...]

[30] The sharing of marketable knowledge among project partners that we consider here is one aspect of transparency at the level of a given consortium, which may be distinguished from another aspect: the disclosure of medical information to patients or other scientists, i.e. issues of (medical, private) data protection.

[31] The original German quote is the following: "Die EU erwartet, dass SMEs, also Firmen, in die Forschungsarbeit eingebunden werden. Aber es ist absolut nicht im Interesse der Firmen, zu veröffentlichen!"

"Sometimes it does yes, and especially I would say that the reported results are probably not, not even the most relevant results. The most relevant results are probably those that are not reported."

Question: "And do you know about these results?"

"No I can just guess, so I must be careful here indeed, I cannot prove this. And I think that all my partners also hope that I will never prove that [...] But I have an impression that that happens. Also just by looking at let's say the amount of work that's actually done in the project and the amount of work that is reported. I mean in terms of efforts. Then you would say that partners are very inefficient [laughs]. A lot more should have been produced when we use so much time. [...] There is lot more going on than what is reported in a project."

Question: "And what is your opinion about this?"

"Yeah I've been a bit schizophrenic about it perhaps [...] I'm not sure what to think about it. It is clear that especially this kind of programmes is set up to assist the European industry by taxpayer's money to be more innovative. And in that way I think it serves that goal. So that is good. On the other hand indeed from a project manager point of view I would like to see that everything that is actually going on is reported and that we can have open innovation. That we can really talk about things that we have invented, and see how we can benefit, not just by one partner but by a number of partners. But I understand also the realities behind it. That if you are afraid of losing your IPR you are sensitive to that kind of things."

The notion of transparency also emerged in various ways in the interviews with local stakeholders in the UK's system of health care and social services, and what may be called the 'web' of everyday relationships around care for older people.

Generally the desire to make things more transparent through sharing knowledge was seen as important by the interviewees. It appeared to be felt that such transparency was likely to lead to an improved care. This shows, for instance, in the following two quotes from the interview with the local government's specialist for assistive technology:

> "We're looking at integration at the minute between our health and social care. And there is a project going on in [...] [name of county] at the moment looking at that more closely. But that's at a management level at the moment. But we're always very conscious about how we communicate with each other. Because it's vital. That we know what each other are doing. And it needs to be seamless as possible for our clients."

> "I think it's just about working better. Together. Cause it's about communication really, communication is the key, because we need to know what each other, health need to know what social care is doing and the other way around, so it's just about making it a smoother process […] like for example looking at our IT systems […] at the moment we can't view each other's systems, so there is a lot of work about looking at that and about how – the communication on the IT systems […] make it easier for us to know what each other are doing. So for example a client may see an occupational therapist in the hospital, and at the moment I wouldn't have access to those notes. And that hospital occupational therapist has no idea, can't see the notes that I'm writing about that client [...]. [An integrated system] would be much better for us in terms of time and much better for the client because it's a more joined approach to care."

So this government employee suggests that changes in order to integrate services are already afoot in her local institution, and that these should improve the service offered to clients as well as time efficiency on the part of the providers of care. Her attribution of the benefit of transparency is to reduce asymmetries in relationships, which will lead to an overall greater awareness and communications between participants regarding how care is being provisioned. Her view regarding the potential impact of transparency is largely positive.

The family carer also had a comment about the potential benefits of transparency, calling it a "challenge" though:

> "I guess it's a big challenge to what services and what tools and what knowledge can be shared to enable people with dementia to stay at home, and enable carers to cope more easily, and then carers to share the load more easily."

The interviewee refers to transparency enabling carers like herself and patients to "cope" with their situations with a greater level of ease. Transparency in this case can allow for others involved in the care to share the burden with carers and also allow patients more independence at home despite a degenerating condition. In each case, a move to increasing transparency was denoted as beneficial to the provision and experience of care.

However, the notion of transparency was not seen as entirely unproblematic. The interviewees did also raise concerns regarding this sharing of information between those involved in care.

> "When you make things more open, then that's going to increase work for the people in the care teams, that's going to involve a level of education and eh change which will be a threat potentially if they are not open to it." (Family carer)

Firstly if there is a sharing of information, then this may raise expectations as to what those involved in the care relationships are required to do, given their increased knowledge. It may be that dealing with this knowledge will require extra skills or expertise on their part. In any case the interviewee refers to the fact that there may be a reluctance to make things more transparent given these potential issues in terms of work implications.

Another implication raised by the interviewee regards the preference of her father, the patient in her situation, in regards to transparency regarding his condition.

> "I don't think he wants to acknowledge that these carers come, so he would never have a conversation with the carers. And in the evening he'll say, 'she's coming in, but she comes with the dog', so he knows her as a friend so he'll acknowledge that a little bit, and the fact that she comes with the dog means it's much more social, is quite a therapeutic visit, it's not kind of 'look at me I've got a problem, I need a nurse'."

> "But he's in denial he's got it. I think it's a combination of his Alzheimer's, he can't remember that he's got it, plus it's too stressful for him to think about it. And I can imagine that if you're in a loop of 'what's wrong what's wrong what's wrong' it's easier to say 'I'm fine. My daughter is here to help me'. 'It's a memory problem, I'm just old', so we never have any, we've never had any detailed conversation around him and Alzheimer's." (Family carer)

This interviewee comments that making issues surrounding the illness transparent to her ill father was an emotional stressor. In his case, and to reduce the emotional burden, he shaped the situation in a way that meant care was provided but made less transparent.

In relation to the physical space in which care is provided, this interviewee also commented on the impact of increased transparency (literal openness) on her family life – in this case, it is a perceived negative impact.

> "The very beginning it's a very close family and all of the care that comes in feels like a massive invasion of family life and - I found that particularly difficult to cope with. And the fact that you put a key safe outside of the house so that anybody with a number can come in […] that was a very big step for me and I do think the professionals who suggested it [...] They were a little too used to their own job and not thinking about the experience of the carers and the family, the had become a bit numbed to all of it – which made me have a massive, yeah I became really really cautious of anybody that came into the house – I just didn't trust them because the way that they worked." (Family carer)

The notion of trust seems to be important, in relation to making issues transparent (or sometimes rather not) for this interviewee. She refers to having to allow her family life to be opened to others in the care environment, who perhaps due to experience could not empathise with her sense of difficulty in allowing this to happen, in order for the care of her father to take place. Making aspects of her life transparent was particularly difficult for her, though necessary in order to enable her and others (formal carers) to participate in the care of her father.

In sum, it seems important for us to recognise that transparency, though on the surface a seemingly positive and desirable aim, is perhaps more complex and nuanced in practice (cf. Pavie 2011). Providing all information to everyone may not be desirable for a variety of reasons such as those which the interviewees raise, and instead stimulate problems within the provision of care. This is a practical example of what has been termed the "tyranny of transparency" (Strathern 2000) whereby though it appears that everyone knowing everything can be a positive, it can have many implications. It points to a balance and careful consideration of what is made transparent.

AG Parameter	Description
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*

Main findings

- A strong finding from the analysis of the CIP ICT PSP interviews (see last section) is that for many participants in research projects, making sure that the *internal* stakeholders – their consortium partners – are all engaged actively, and coordinating the different partners activities' successfully, is already a challenge.
- Against this backdrop the local context study suggests that even if these project participants also strive for involving further *external* stakeholders (end-users, civil society, other researchers, NGOs, industry, policy makers), this cannot avoid processes of exclusion. Processes of exclusion already happen in the environment that a given project enters, and hence shape the 'landscape' of actors who might then, in a next step, get involved in the project. These preceding social, political and economic dynamics of inclusion and exclusion appear to be complicated.
- More precisely, the nature of participation in the care system, and the extent to which different care technologies are effectively used, is shaped by various accessibility factors. Upon entering the system there are factors such as:
    - The available budget (of the formal institution(s) providing care);
    - the severity of a patient's situation as perceived through assessments (including formal assessment criteria) conducted by care professionals;
    - the financial means of a patient;
    - his or her ability to physically move around (thus being able, or not, to reach and access the sites and premises where care is provided);
    - preferences of a patient;
    - care professionals' different attitudes towards technological devices. In the case at hand, there were broader concerns including technologically induced isolation.
    - Another important contingency to be discussed in greater detail below is the *capacities* of the main stakeholder group, i.e. the older people (see the subsection on the 'norm/law relation'). Capacities such as, the mental, emotional and physical ability to care for oneself, or the ability to use supportive care technologies, vary considerably from one individual to the next, and also over time.[32] However, having such sufficient capacities, or "capacity responsibility", may be considered

[32] See also the subsection on 'responsiveness', and the problem of change, in this deliverable.

the baseline for other sorts of responsibilities ascribed to an individual such as, "virtue" or "role responsibility" (Vincent 2011: 18-19). It is specific to the domain of care for older people that a frequent monitoring and good understanding of an older person's capacities, also in terms of the use of (new) care technologies, is a duty to all other stakeholders involved. As Vincent has argued, if an individual happens to have a reduced capacity to act responsibly (through no fault of him or herself), this shifts duties to others (Vincent 2011: 22).

The mix of these (and potentially other) factors determines the manner in which a given local care system will be shaped. This shaping is interrelated to how and when certain participants will be able to, or are expected to participate in care as provided in the local context. We argue that this also has consequences for a given project's research and innovation process that affects this context, and is affected by the context.

For instance, an older woman suffering from strongly diminished capacity but extensive experiences with care technologies cannot 'self-select' herself into a given project but strongly depends on others facilitating this selection; and once she participates in the project she may still find it hard to voice her views clearly and quickly. Consortium members would need to make substantial efforts to engage such dependent and yet important stakeholders, and to avoid their 'political' representation by others, which can imply silencing the original concerns (e.g. Callon 1986).[33] In this case the older people's level of influence could be described as "manifestly absent – spectator", or even completely absent (D 2.3, Analytical Grid report, p. 87). Similarly, depending on the financial means of individuals, but also the overall budget available to institutional care providers, financial contingencies shape the extent to which, and the ways in which individuals (patients and their carers) and organisations already know existing care technologies. These differences are likely to influence their judgments of any new technological solutions designed by a given consortium.

Thus, we develop the following hypothesis: the involvement of different stakeholders in a given care system and, next, indirectly also in a given research project entering this context, is variable and shaped according to different contingencies. In order to test this hypothesis a detailed investigation of the care system and of a project interacting with these numerous local stakeholders, as far as possible, would be necessary.

The interviewees commented on how there were various accessibility issues in terms of actually obtaining technological support – in this case, assistive technologies – and

[33] For a similar line of reasoning see D 4.2, Case Study Report, p. 20.

related care. This shaped the nature and extent of the participation of different stakeholders in the web of care relationships.

For instance, there are different criteria that determine your eligibility to access assistive technologies in the first instance, and thus your capacity to participate in the web of care relationships at all. The following quote from the local government's specialist for assistive technology shows how this issue emerges in practice.

> "Because if somebody say for example is on housing benefits, if they've got less then a certain amount of money in the bank, the service would be provided to them free of charge. For some of our clients would be- means-tested and the outcome would be that they would need to pay, sometimes clients can then decide they want to- to have telecare. Is not the same for stand-alone equipment, because that is not means tested in [name of county], if someone is eligible then they are eligible, there is no cost to that. But – for telecare it is means-tested, so it can sometimes have an impact on whether the client decides to take up the service. [...] They would have to contribute to it financially."

This interviewee points to there being criteria determined by local government, to decide whether someone is able to access an assistive technology, this being largely based on their financial situation. It also appears that, since there is explicit reference to the local government which such means-testing is relevant to, that there may be variation in how eligibility for access is determined across the country. There is also some diversity in what needs to be means tested and other technologies such as 'stand-alone equipment' which is available to all. It seems that there are constraints on what care can be provided and this impacts whether a client can or will choose to pursue it. It is not that everyone has immediate access to all avenues of care.

Once accepted as eligible for care, the interviewees pointed to other factors that were deemed as playing a part in determining the nature of care available to patients. For instance, an occupational therapist comments on what affects access to his services:

> "It's county wide. Theoretically anybody from north of [...] [town] to south of [other town] could come here providing they are a [...] [county] resident and they pay their council tax to [...] County Council. Now invariably the people at either ends of the county are hardly likely to travel this very long distance to get here to[...] [town]. But we are open to them should they wish to."

In this case, the locality of the provision of care is interrelated to the locality of those requiring the care. The occupational therapist comments on how finances come into play in this regard, where the payment of council tax is essential to being eligible for his service. Following this, then access to the care is based on the capacity of patients to physically visit the town where the occupational therapist is located. What can be seen is that it is not just being eligible to care that automatically generates a certain chain of care related procedures. There are other variables that come into play. Another interviewee, the local government employee, reflects on such variables affecting access to care further.

> "So it's not about denying people care – or taking care away [...] I've had clients in the past to have medication-only visits, but not everybody wants carers coming in every day, saying take your medication, so what we could look at there is that medication dispensers are filled by pharmacists so that a person can take control of it themselves, and manages their own medication rather than having a carer coming in – so you can see – […] for the client it's a better option because it's that level of independence that they want, and for us, as a County Council, that means we can use money to support other clients that may need the – actual carer visits. It's about using money more effectively. At the same time is supporting our clients in a more independent way, and a way that they want to be supported."

This interviewee points to solutions regarding care that are embedded in the interrelation of budgetary issues, the care of others and the preferences of the particular patients who require care. It may be that participation in care is varied in terms of how far the patient would like to be cared for, or to take control of his or her own care. As with the actual eligibility of entry into the care system, monetary issues also form a part of the decision making process in terms of how care is provided. It may be more desirable, if possible in a situation or in a 'border line' case where a patient is unsure of the care required for instance, for the local government to provide a certain type of care to a patient if it is less costly.

The access to care may also be dependent upon the care providers' formal definition of the situation according to one interviewee, the family carer.

> "But I think there is definitely a space for independent living and then also, consultancy, and an ongoing, what's the care that's needed for/from a more independent body, so this was a really good team that came out, the second team came out […] they did a brilliant job they worked with me, I felt like we were a team, really closely and, and I said when they finished […] 'can we, you know when things develop we can call you back?' And they said: 'No we can only be activated by an emergency.' So my dad would have to have another crisis point before we could get that kind of consultancy and information again."

In this situation, detailed care information regarding her father was provided in an emergency situation. The interviewee found this information highly useful, seemingly necessary in relation to caring for her father. However, the nature of the care was only provided to her as it was an emergency situation, showing how a different valuation of the extent of the situation, affects when certain care can be accessed. The interviewee expressed a desire for more consistent access to such, what appears to be a more personalised care and evaluation of her fathers' condition, which she refers to as "consultancy and information".

The interviewee from local government also provided some insight into how decisions are made regarding access to the nature of care provided to individuals.

> "For us […] I mean in a sense it comes down to again that balance doesn't it between social isolation, human contact and the provision of assistive technology, and the need to save money on care. [...] And it's making sure we get the balance right. And that we don't leave people vulnerable. And at the moment I think as I said we're grounded on that. But it's a key thing. We

> don't want to leave people in a situation where they've got is three gadgets around them that are talking to them. Because that's not necessarily what's right for that person. But that comes back again to what I said about matching – the right outcomes through our clinical reasoning with the right clients. And that's why we have assessment procedures in place. And risk assessment. Is to guide that and to protect us against making those decisions."

This interviewee describes the provision of care as a balancing act, where the nature of access is determined through the requirements of the patient as well as other variables such as cost. There is a reference to the distinct needs of a patient, and assessments to determine what these are. Here a broader concern with social isolation is raised, and a danger of replacing or removing the need for human input, may be detrimental to the care patient. This is interesting in that through allowing a person certain technologies, you may reduce their capacity to directly interact with other members of the care system. It seems there is a tension between providing technologies, and allowing people their independence, but also ensuring that this independence does not exclude them or remove them from society which may also be damaging for their health. A manager of a support team, whose clients were questioned about their views on assistive technologies, echoes this broad concern.

> "Although they valued assistive technology in an emergency so if they had an alarm and they fell over, they could press a pendant, or they had a false trigger or anything like that, they did not want to lose the human contact of the visit. I think they were a bit worried that somehow over time, it would turn into a period where all they had was assistive technology, rather than someone coming in and making sure they were alright whether it be carers, whether it be support services that we offer, that they would be left with nothing but devices."

In this case, it seems clear according to her, that her residents would prefer to have assistive technologies in critical situations rather than at all times. There is clear emphasis on the human element of care from the perspective of the manager.

What we can begin to determine from the interviewees, is that the ability to participate and the nature of participation in a given local care system, is determined by the various issues of the different members within that particular care system. We argue that by extension, the various local contingencies also shape to what extent, and in which ways local stakeholders can participate in the research and innovation process of a given project consortium interacting with this local context. At the local context level, there is, as one interviewee stated, "a balance" in the provision of care, underpinned by issues such as those we have raised here. Accordingly, for a consortium member at the project level, this presents various challenges when considering the undertaking of a participatory approach to research and innovation. When choosing stakeholders to involve in research, for example, then the importance of understanding these different features of the system and what determines participation can play an important part in the development of technologies and undertaking of research. Importantly, it may not be that everyone who a researcher perceives as requiring care or involved in care relationships will actually be eligible for it, or able to participate in providing care.

RRI Pillar	Description
Responsiveness	- The coupling of reflection and deliberation to action, that is, to a potential concrete change in a given research and innovation process. - Adapting a given research and innovation process due to public values, especially socially or ethically desirable values. - Being ready to make adaptations over and over again throughout the entire course of a given technology project.

Main findings

- The care system is underpinned by *change.* This affects the ability of its various participants, and also a given project consortium entering this local context. From an RRI perspective, a consortium would need to be as responsive as possible to the existing, and changing, provision and quality of care in the local context, in order to adjust the project's own technological innovations that are intended to improve the existing local conditions. However, the interviews show that such flexibility is quite a challenge, as there are so many important aspects of a local context that can change.
    - The usually degenerative nature of conditions dealt with hugely affects the need and ability of existing local stakeholders to remain responsive to care requirements. Accordingly, there are measures undertaken by local governments to ongoingly assess and evaluate the nature of care provided to patients. These existing local assessment practices would also need to be taken into account by a new research project entering the context.
    - Aspects of the structure of the care system can change due to various political or resource based issues. As one of the CIP ICT PSP project participants explained (see interview 7 in the previous section), in various European countries (but not all) there is often a move towards integration in the local government considered, foreseen to enable the improvement of responsiveness to care. These integration processes happen in different ways though across countries, which can complicate the situation for a project testing new technologies in various countries.
    - Existing care relationships can also be impacted by more negative change which may adversely affect the response to and quality of care. In the case at hand, staff turnover means that certain elements which are important to care, such as the emotional constitution of relationships, are lost.
    - The technological landscape of a given care system also changes continuously. This complicates the work of existing local stakeholders (care providers, care professionals), and, by implication, perhaps also

the work of a given project consortium if it tries to develop stable, interoperable technological solutions.

- These are elements of continual and nuanced change that may place competing demands on a project. For the planning of a project there is often the requirement to plan and prescribe goals and timelines. The nature of change in the care system may make this difficult to do in practice. Balancing the formal prescription and accounting for the elements of change seems important for researchers, when planning and undertaking research, but it is perhaps also a challenge – especially when research projects such as CIP ICT PSP projects run pilots in different countries.

Each interviewee provided instances regarding how the care system is often in a state of continual change.

The degenerative nature of the health conditions these interviewees dealt with was often mentioned as interrelated to the changing requirements of the care system for patients within it. The interviewee from local government stated the following:

> "Most of our clients are complex that we see now because if they've reached the stage of need in the service, they usually have quite high needs, so it would be somebody for example […] a client where they may have quite advanced stage of dementia, and there are real issues of around safety in the home […] or cases where there is more complex family dynamics […] like this lady is going out of the house 20 times a day and wandering around, they have tried [...] [a certain monitoring device] but that doesn't work, they may have tried a few different things and they are stuck, and that's when they come to me and ask: look is there anything you could suggest [...] whoever the worker would be might offer them other options or solutions they may not have thought about."

In this case, the interviewee is dealing with a person who has lost the large part of her capacity to take care of herself, her condition having deteriorated over time. In this particular case, the change in medical circumstance and its associated risks necessitated a more interventionist approach. It can be seen that in order to provide the appropriate care she or other workers deliberated upon and provided various solutions to help a family or whoever may be referring the patient, to deal with the situation. It emerges from her comment that not all solutions offered to care for patients may immediately 'work', and so there is the notion of having multiple options to try in order to deal with a situation. This appears to be accomplished in close consideration and assessment of the patients needs, thus in a responsive way.

As well as patient needs changing, the institutional structure of the local care providers can also change.

> "We used to be split in terms of adults with physical disabilities and older people, but that's changed, we just sit under one service now. So from the age of 18 until death, our adult services cover, rather than dividing it into separate teams for older people."

> "But at the minute in [...] [county] we're doing a lot of work around integration – so bring Health services and our social care services more closely together. Which is ehm – which is key really."

In each of the situations that the interviewee from government describes, there is a move towards integration, bringing services together. This seemed from her perception to be positive and necessary to improve the quality of the care provided to patients and stay afoot of, and responding well to changing requirements in care driven with a shared awareness of situations rather than fragmented information.

There were other more problematic instances raised by some interviewees in regards to change occurring, and so the ability of those within the care system to remain responsive to change. The family carer refers to the impact of staff turnover on care.

> "Once you've got a good connection with one part of the system, so if it's the telecare team or the heart nurses, within a year or two years the staff turnover – for some strategic need, they've needed to change the staff, and so you've got to start all over again – so the knowledge that would be really helpful to keep is thrown away, and nobody keeps that and the kind of notes that people tale are really the most, it's all clinical it's not the kind of qualitative information […] This is making me feel quite sober [laughs] but that is what it's like."

In her comments she refers to parts of the care system changing due to the "strategic needs" of the system. It does not appear that she is aware of the exact strategic need she is making reference to, but that this change has a detrimental affect on the maintenance of good relations within the system. In particular her delineation between clinical knowledge and what she terms "qualitative information" underpins the impact of this change. It seems that the clinical information lacks some relevant aspects of care developed through practice, most likely aspects of care including relations built with patients and more their carers. These seem important for the care of patients from the perspective of the carer, but do not seem to be taken into regard within the accountability procedures of the care system. The carer refers to having to "start all over again", with new members of staff, most likely in re-establishing those sides of the care relations that are not covered by clinical knowledge.

The family carer also shed light on the challenges of caring for her father when his condition is hugely variable, even within a short time span.

> "I have to create a plan to enable a team of people to apply his care on a daily basis. So I let his care manager know what the plan is, so he's on antibiotics once a day for the next three weeks or – he needs to have steroid cream and then fifteen minutes later have another cream, and you need to do that in the mornings, and you need to do, then you need to do another cream at lunch time another cream in the evening, its – com- coordinating that medication – is something that I get- that's something that I have to do. Because the doctor, the doctor doesn't think twice, they don't even blink, they just give, they just hand me a prescription and

> say: here's your dads prescription and I don't think they realise how much work is then passed on to me."

The carer gives us a small but detailed insight into how the care of her father can vary within a day, and also within different temporal periods, depending on his condition at a particular time. This implies the need for a high degree of responsiveness. She refers to her role as coordinator in this dynamic situation, and a challenge she faces in relation to others in the care system. In particular she points to the lack of sensitivity that the doctor conveys when passing work onto her as a carer, and the challenge she faces in accomplishing it. This shows us that there are different relationships that constitute the care system, and that participants' response and sensitivity to one another is variable, and may at times be problematic when the demands of participants conflict with one another.

The support manager gave another example of possible tension in relations within the care system, in regards to maintaining equipment in her residence.

> "When we started, we started the service in 1999, the alarms that we had then couldn't accept todays assistive technology. It would be very cynical of me to say the alarm manufacturers – what's the best way of putting it – the alarm manufacturers change the way they do things which means that you have to buy a new alarm to go with the increase of equipment. We as I say we have a renewal program, and I think it is important to keep reasonably on top of it. My renewal program is based over replacing everything every five to ten years. So that I am never left behind. I am never left scrambling if somebody needs something [...] and I am never left scrambling for an alarm to which I can fit that bit of kit."

Here there is reference to the changing nature of technology over time, and the tension between the developers of alarms changing their systems, which will not only include the tangible technology, but also other features such as monitoring alarms for incidents such a patient falls. The care manager conveys some suspicion as to the changes being made being deliberately so, in order to engender more costs for care providers. She also gives information regarding her strategy, in some sense a "dual responsiveness" to deal with the change in technological systems. She has developed a strategy to enable her to be responsive to technological developments, to enable her to be responsive in turn to remain responsive to patient requirements. This shows how she has accounted for the tension in the situation and attempts to overcome it, or at the very least deal with it in the best way she is able.

We can see how a given care system, its technological environment, and the conditions of patients change and thus require a high degree of responsiveness. For researchers, this means engaging with different partners in the web of care to determine how responsiveness and associated challenges occur at different levels in the care system, and according to different aspects of care. This is no easy feat. However it is important, for a project this means a tension between setting goals and timelines, and acknowledging the temporal changes and shifts that could affect the overall trajectory of a project.

AG Parameter	Description
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.

Main findings

- Any external party such as, a project consortium entering a local context in order to test or introduce technological innovations to improve on care, faces a complicated situation in terms of existing norms and laws.
- More precisely, there are *various* legal rules that matter in the provision of care, and care technologies; and there are also *various* norms – such as, norms of fairness (treating all clients equally) and very individual, personal norms that are not even specific to care – that shape a given local care system. Consequently, a given consortium would also need to consider this extant variety of norms when (ideally) it tries to develop new technologies that are as sensitive to a local context as possible.
- Also, importantly, the boundary between laws and norms is not clear cut. Among local stakeholders there is an implicit understanding of responsible behaviour as liability, or compliance with law (cf. D 2.2, Theoretical Landscape, p. 8), but there is also interpretative space associated with such compliance. In the frequent, unavoidable situation of assessing whether an older person has the capacity to act responsibly for him- or herself, formal carers cannot just abide to legal rules 'blindly', but need to interpret the law in relation to the specific person and his or her life conditions (cf. Vincent 2011: 19; D 2.2, Theoretical Landscape, p. 14, 52; see the findings related to 'participatory approach' in this section). This subjective interpretation has an ethical dimension, as it directly affects the well-being of the client. The required ethical judgement is also a professional one, as it builds on knowledge the carer has grown over time, 'on the job'.
- Furthermore, a great deal of this professional knowledge at the edge of ethical normative behaviour is embodied and tacit. The interviewees cannot easily make it explicit.
- This embodiment and tacit character of local knowledge is a challenge. While it seems necessary for a project consortium developing technological innovations to 'tap into' such local (technological) knowledge, and the way it is intertwined with existing local laws and norms, in order to provide better tailored solutions, it may be hard (time-consuming) to do so.

The interviewees commented on how the web of care relationships is governed, within an array of laws and what can be considered norms.

The interviewees pointed to the number of laws that are integral in this relationship. For instance, the employee of the local government stated that though there is no specific law associated with assistive technology in the UK, there are others that are.

> "…Not directly around – [...] is not specific to assistive technology in this country, but I guess what we're working around all the time is things like the CSDP, the Chronically Sick and Disabled Persons Act, which cov- so assistive technology sits under access to equipment in general, and there is obviously loads of legislation for clients, you know that they having access to appropriate equipment and adaptations to meet their need."

What emerges from the interviewee's comments is that there are many laws that must be taken into account in order to maintain a provision of assistive care technology that is within the remits of what is legally required. What is important to acknowledge is that there is work done by the interviewee in corresponding to aspects of the various laws.

Importantly and quite distinct to the nature of caring for older people, is legislation dealing with their capacity to take responsibility for their own care as patients. The interviewee from government reflects on this.

> "The Mental Capacity Act is quite important for us and we discuss that quite a lot because a lot of the clients we work with have memory problems, and there are many issues around with dementia, Alzheimer's, questions around capacity, and consent, so we do work a LOT within the Mental Capacity Act and the five key principles there."

> "If you've got somebody where there is a question over capacity you will follow the Mental Capacity Act in terms of determining whether or not somebody is able to make a decision, and what's in their best interest. [...] It's the legislation that leads us to provide the services of clients. It underpins [...] our practice."

According to Vincent (2011: 19), and as emphasised in GREAT's D 2.2, Theoretical Landscape (p. 14, 52), the assumption that individuals have the capacity to take control over their actions – that is, have "moral agency", are able to "mobilise their will to act in a responsible way" –is one of the cornerstones of responsibility, and of RRI in particular. What is problematic, as the interviewee stresses, is that in the case of people within diminishing mental capacities caused by a certain condition, is that they may no longer be able to exercise such responsibility. The Mental Capacity Act seems to be at the core of the work of determining how the care system surrounding a particular patient is shaped. We can see how the interviewee uses it as a guide to steer decisions at the time, and in the future. It seems that we need to take into account that there is an element of subjectivity in interpreting laws, and that it is up to the person(s) assessing the capacity of a patient to determine how far a patient is capable of making decisions in regards to his or her care. Of course, given the degenerative nature of conditions, then it may be that the law may not initially apply, but is required at a particular point. Then we see that it is not just abiding to a law, but interpreting it and also applying it at the 'right' moment'. This particular area, given its subjective interpretation of law, seems to sit at the boundary of law and norms.

We can consider this more informal notion of 'norms' further. It appears to imply an ethical orientation which is very much intertwined with professional experience – the latter being partly embodied and tacit knowledge, so hard to make explicit. This needs further explanation:

As well as laws governing the care system, the interviewee from government also mentions how experience and her subjective perspective drawn from this, plays a role in her decision-making. It is interesting that in this case, she also articulates these norms to his colleagues, attempting to embed them to their work practice as well as her own.

> "If you ask me now – my clinical reasoning is quite instant, because of my experience, so – what I'm doing all the time – is clinically reasoning. So as soon as I walk into somebody's house for example it kick, it would kick in – before I've gone into the house it kicks in. So I'm looking at the environment, I'm looking at the person – looking at the dynamics of a family – so it would be something like – say that medication dispenser. If I went to meet somebody, part of my – reasoning around providing that equipment would be to look at the person. So I would be looking at their diagnosis, for example, so it is – is it that it's a memory problem, where they can/can't retain information, because again there's no point providing a piece of equipment if somebody can't learn how to use it. So part of my clinical reasoning would be – can this person learn how to use this equipment?"

The interviewee draws on the notion of 'clinical reasoning' to convey the nature of her decision making in regards to the provision of care. Her consideration of whether or not to provide certain aspects of care appears to be drawn from a body of experience that she uses to form this reasoning. Its use, as with the interpretation of laws, has a subjective element in that it is her perspective and interpretation of the situation that defines how she will proceed with care. Her reasoning applies to a variety of aspects including as she refers to, the nature of a current situation, and how she feels that it may proceed in terms of a patient being able to learn how to use a technology.

In another interview, an occupational therapist described his approach to clients in a similar way. He also explained his perspective on his professional responsibility, guided by a norm of fairness:

> "I'm employed by [...] [a certain institution], I'm seconded to [...] [certain premises], so wherever the [...] [latter] is based in [...] [county] my post goes with it. The other one-day a week I work directly for [...] [charity]. The job is exactly the same and I endeavour to make sure it is exactly the same. One of the things I'm very acutely aware of is that I don't want clients coming in on a Monday getting a completely different service from those on Wednesday, Thursday, Friday. So I'm very clear in my head with [...] our manager and with social services, that I do the same job or not at all. I wouldn't give someone a lesser service because they happen to walk in on a different day. So I'm very clear and everyone seems very happy with that. And it serves the same purpose and the same function. We're all here to try and help the residents of [...] [county], and if you do more on one day than you do on others, then that is just a completely two tier service and I'm not into that. Nobody would sign up to that."

Similar to the government employee, the occupational therapist has what seems to be a clear normative reasoning (in this case, about fairness) guiding what he feels is appropriate practice. He is very 'clear' in his head, of what he deems as necessary in providing care in the county he is based in, and the standards that should underpin this, the essential one being that everyone should experience the same level of service despite variation of when or where they are treated by him.

As well as such norms at the crossroads of profession and ethics playing a role in the maintenance of the care system, it also appeared that there are other norms that played a part in guiding the behaviour of participants. These appear to be very individual norms, or judgements, specific to a particular person, as the following example from the interview with the family carer shows:

> "And - you see, my brother lives in Switzerland I live in the UK, eh my brother can't practically do stuff, and he's not a natural, ehm, he's not natural at it, and finds kind of more emotionally involving stuff more difficult so I can't enable him to participate, so I always use him for, if I've got some tough decisions to make I present him with the information in quite a clinical way and say: can we be objective here, what do you think, and I just kind of, I kind of need family support at that point, but on other things day to day he is not involved. But I try and keep him up to date with what is going on, just with e-mail and, and then we chat on Skype fairly regularly."

In this case, the interviewee establishes implicit norms about what is needed to be fully involved in everyday care (emotional strength), and when to ask for family support (only for "tough" decisions). These norms are outside of those which may be directly attributed to care, that guide how she steers the care of her father. Her management of her brother's involvement shows how it may be the internal, personal norms of one participant that may override those of another (in this case, of the brother), as she seems to be very much in control over the management of the care network and how her brother *should* be involved. It may be that there is an element of seeing it as her own responsibility to take care of her father, and retain this control over the on-going care. This, in turn, can shape how the system of care is approached (in this case, through her eyes and not those of her brother).

What can be seen here is an interrelation of various laws and various norms in regards to the care system. What is clear is that there is a difficulty in delineating in clear boundaries how laws and norms are applied, as there always seems to be an element of subjectivity involved even where legal guidelines are followed. It may also be that, whilst some of these laws and norms are guiding care towards the positive, there may be other norms in play that contradict this aim, such as issues of control.

For any external parties such as, an EU project consortium entering such a local care context and suggesting new care technologies, the challenge comes in having an understanding of both the norms and laws that govern relationships. This mix of relevant laws and norms may not be so clearly visible, but nevertheless necessary for

understanding the situation, and in particular, for developing technological innovations that are as much locally embedded as possible.

AG Parameter	Description
Assessment	In which way have the technology and the project's results been assessed? Did this assessment involve any reflexivity? If yes, did this reflexive process involve a general normative horizon, or was it only concerned with technological developments or profits?

Main findings
- The data from the interviews with local stakeholders in care suggests that in a given local context – in this case, a particular care system – assessments of various kinds are paramount. These do not concern technologies in isolation but technologies-in-use, i.e. in close relationship with older people's needs and experiences, or, in other words, their quality of life and well-being. Thus, the existing local assessments have clearly an ethical dimension. - This also has implications for a given project aiming at the development of innovative technologies in the domain of care for older people. From an RRI perspective, the project consortium would need to assess the needs of prospective patients using the potential technologies that are to be developed. For the local participants in the context, the assessment is not dissimilar in that it requires an assessment of extant patients, with existing technologies. In each case it is necessary to understand the unique aspects of particular conditions, and the broader features of the care context. In each case undertaking a 'good' assessment through understanding the care system adequately is highly important. - Thus, we suggest that a given project consortium tries to 'tap into' the existing local assessment expertise – which is multi-faceted, as the data suggests – in order not to 'reinvent the wheel', but to develop solutions that are as realistic, and locally embedded, as possible.

A reconsideration of some of the quotes included in this section so far can be used to show how the notion of 'Assessment' (as depicted by the Analytic Grid) is a cross-cutting theme in the local care context. Consequently, as we argue at the end, these empirical observations at the level of the local care context also have important implications for a given project conducting research and innovation in the care domain.

Various quotes included in our analysis related to the AG parameter 'Participatory Approach' are also relevant to the discussion of the parameter 'Assessment'. For instance, the interviewee from local government stated that financial assessments may be used to determine the nature of service available to a client.

> "Because if somebody say for example is on housing benefits, if they've got less than a certain amount of money in the bank, the service would be provided to them free of charge. For some of our clients would be- means-tested and the outcome would be that they would need to pay, sometimes clients can then decide they want to- to have telecare. Is not the same for stand-alone equipment, because that is not means tested in [name of county], if someone is eligible then they are eligible, there is no cost to that. But – for telecare it is means-tested, so it can sometimes have an impact on whether the client decides to take up the service. [...] They would have to contribute to it financially."

The employee suggests that "means testing" is used to assess whether someone is deemed financially able to pay for the care service of telecare. We can see from her comment that assessment forms an integral part in determining the technologies and related services that will be available to someone in need of care. Further to this, as she points out, there is a differentiation in regards to which services clients need to be means testing in regards to. If we consider her comment, this differentiation between what is freely offered to all and what is paid for by some clients seems in relation to the cost of the service and the expense it incurs to the local government.

The interviewee from local government also conveyed how assessments are made regarding the nature of care available, and some of the other factors as well as financial issues, that play a part in shaping the decision.

> "For us […] I mean in a sense it comes down to again that balance doesn't it between social isolation, human contact and the provision of assistive technology, and the need to save money on care. [...] And it's making sure we get the balance right. And that we don't leave people vulnerable. And at the moment I think as I said we're grounded on that. But it's a key thing. We don't want to leave people in a situation where they've got is three gadgets around them that are talking to them. Because that's not necessarily what's right for that person. But that comes back again to what I said about matching – the right outcomes through our clinical reasoning with the right clients. And that's why we have assessment procedures in place. And risk assessment. Is to guide that and to protect us against making those decisions."

A notion that she mentioned in regards to her decision-making and achieving the balance between "social isolation, human contact and provision of assistive technology" is the use of "clinical reasoning". This clinical reasoning which appears to be based on her expertise and experience in the care system, appears to be important for informing the assessment procedures and risk assessments that exist to consider the care needs of a client. The interviewee was emphatic of the importance of these assessment tools in establishing appropriate care for a client, and achieving a necessary "balance" according to the distinct requirements of the patient in relation to the other factors she mentioned. It can be seen that the term 'assessment' is mentioned explicitly here, and so as a tool does not exist solely within the realms of RRI.

The occupational therapist referred to a case where the nature of care provided to a patient had to be reconsidered. Though he did not mention it explicitly, this reconsideration can also be deemed to be a reassessment.

> "Most of our clients are complex that we see now because if they've reached the stage of ehm need in the service, they usually have quite high needs, so it would be somebody for example […] a client where they may have quite advanced stage of dementia, and there are real issues of around safety in the home […] or cases where there is more complex family dynamics […] like this lady is going out of the house 20 times a day and wandering around, they have tried [...] [a certain monitoring device] but that doesn't work, they may have tried a few different things and they are stuck, and that's when they come to me and ask: look is there anything you could suggest [...] whoever the worker would be might offer them other options or solutions they may not have thought about."

From the response of the occupational therapist, it can be seen that there is no guarantee that a particular technology provided to a patient will be 'right' for the care requirements of that patient. It may be that the infrastructure around the use of the technology can be altered so it can be embedded, but where that is not possible, the occupational therapist (or colleagues) can offer alternatives for that care situation.

Considering what the occupational therapist suggests, we can see that (re)assessment will invariably involve assessing the existing situation in terms of various features such as the quality of life of the patient, the care requirements, and the aspects of care such as family care surrounding the patient, in order to determine a new solution. This consideration of an alternative solution will involve the occupational therapist or his colleagues assessing technological solutions in relation to these wider variables of care, and the distinct way they emerge in relation to a particular patient.

These quotes show how assessment, whether mentioned explicitly or implicitly, does exist in the care system, and plays a part in determining the appropriate care for a patient. This assessment is based on the needs of the care system, and will often feature decisions regarding which technology and related service is required for a particular patient. The assessment itself is embedded into not only the distinct features of the care system such as resource allocation and technologies available, but also the unique aspects of care relating to a particular patient.

For the consortium of a given research and innovation project, assessment of technologies would involve assessing the needs of prospective patients using the potential technologies that are to be developed. For the local participants in the context, the assessment is not dissimilar in that it requires an assessment of extant patients, with existing technologies. In each case it is necessary to understand the unique aspects of particular conditions, and the broader features of the care context. In each case undertaking a 'good' assessment through understanding the care system adequately is highly important. It may be that the assessment of the project can be considered broader and related to the treatment of particular conditions; whereas the local assessment is more fine-grained in that it considers the treatment of specific patients who have particular conditions.

5.3 Case 3: Automation in financial markets

Over the last decade we have witnessed at least two severe financial crises: The 'Flash Crash', i.e. a sudden decline in security prices at the New York Stock Exchange (2010), and the global financial crisis (2008), which had important socio-economic repercussions, e.g. rising unemployment. According to some critics, the crises and their broader socio-economic consequences have in part been brought about by computer-based trading such as, 'algorithmic trading' (AT) and 'high frequency trading' (HFT).[34] Such various forms of automating financial markets are believed to contribute to global market instabilities; sometimes it is also argued that HFT has increased market abuse and fraud.[35] Thus, the automation of financial markets is a relevant and interesting case for understanding the opportunities and challenges in realising responsible innovation in practice. In this case, 'responsible' innovation could mean the following: improving on "the (ethical) acceptability [...] and societal desirability of the innovation process" (von Schomberg 2011: 9) by curbing any 'irrational exuberance' of automation in financial markets. Pursuing automation like an unquestioned "ideology" has arguably resulted in "an erosion of the informal norms and human judgement" that characterised, and stabilised, less automated historical markets (Beunza et al. 2011: 5).

However, the academic and public debate on such perceived downsides, but also on the potential benefits of the automation of financial markets is comprehensive and multifaceted. The subsequent analysis cannot cover this entire debate. The complexity shows, for instance, in the fact that in 2012, the UK government commissioned over 50 reports to explore the "future of computer-based trading"[36]. Also, a growing number of academic and non-academic articles discuss the empirical features, the potential benefits and the pitfalls of automation (e.g. Beunza/Millo 2013; Madonna 2013; MacKenze 2014). 'Automation' also manifests in numerous empirical ways and hence cannot be defined easily, which makes any enquiry more challenging.[37]

As this comprehensive and many-voiced body of literature suggests, there are also diverging views in the interview data we gathered for GREAT. For instance, one

[34] "Algorithmic Trading" is an umbrella term for "any form of trading using sophisticated algorithms (programmed systems) to automate all or some parts of the trade (Treleaven et al. 2013: 76). "High-Frequency Trading" is considered a "more specific area [within Algorithmic Trading] where the execution of computerized trading strategies is characterised by extremely short position-holding periods in excess of a few seconds or milliseconds" (Treleaven et al. 2013: 76).

[35] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/289432/12-1087-future-of-computer-trading-in-financial-markets-summary.pdf; p. 4, 10; 29-11-2014

[36] https://www.gov.uk/government/collections/future-of-computer-trading; 23-10-2014

[37] Beunza et al. (2012: 5) argue that „the terms automated trading and automated markets are not easily defined, as they capture events in a decades-long history of technology and politics". Also, the "pace of technological change" in financial markets is high, which implies that new forms auf automation are constantly being developed all around the world. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/289432/12-1087-future-of-computer-trading-in-financial-markets-summary.pdf; p. 4; 29-11-2014

sceptic interviewee explained that there are certain advantages to HFT, which in his view are outweighed by an important disadvantage: a failure to produce the "right price".

"[If] I went to a shop to buy some chocolate, I might pay 50 pence. If I walked another half a mile I might pay 55 pence. There are variations in pricing for the same products. [...] Why the prices vary is very much a case of local issues. Is it near a tube station, is it near a museum, are there tourists there. Now the difference in price may be ten pence. The lowest and the highest point. Now suppose that it wasn't a 50 pence bar of chocolate but a 50 pounds bar of chocolate, and that ten pound difference matters. Suppose I wasn't buying a bar of chocolate every week but every two minutes. What HFT does is it looks for these anomalies in pricing of the same products, it removes them. Because HFT is about – every differential matters. If I can close that pricing. So just to clarify: the same bar of chocolate now costs the same wherever you are. Within a radius of say 2 miles. That's what HFT does very very well. With algorithms.

That isn't the same thing as saying: the bar of chocolate is the right price. [...] Think of shares. The share of a particular company may be traded on a London market, on a New York market, in Hong Kong, in Amsterdam. So what HFT does, it does the same thing for shares as we talked about with chocolate. It unifies the price. [...] we mustn't confuse [...] the single price, the single unified price as being the accurate representation of the share price – of the value [...]. And that's where HFT is misinterpreted. It's a unifier to single price. That's comma rather than a full stop: it's a single price, it's not the right price."

It's an example of a technology being useful up to a point. And then you need analysis – to decide whether that unique – that single price is the equilibrium price, or maybe you simply create a very stubborn [?] desequilibrium." (Chief economist and partner of an asset management firm)

Given these and other mixed views on HFT and Algorithmic Trading more generally, we start our analysis from the following basic assumption, which is one of the key findings of the UK government's studies mentioned previously: there is no clear evidence that automation, and HFT in particular, are overall either detrimental or beneficial to markets and society. Instead, the "key message is mixed": "some of the commonly held negative perceptions surrounding HFT are not supported by the available evidence", but other concerns remain "justified" nevertheless.[38] Thus, in our analysis we do not attempt to 'solve' this Janus-faced ethical debate by, for instance, promoting automation or arguing against it. Instead, we focus on selected empirical data that helps us in exploring specific aspects of the RRI discourse.

What appears to be missing in existing literature is an analysis of automation in financial markets through the 'lens' of the RRI discourse. So far there are only a few such explicit RRI approaches to automation, and financial innovation (including securities) more generally (e.g. Asante/Owen 2012; Muniesa/Lenglet 2013). The subsequent analysis contributes to this nascent field of enquiry by focusing on two Analytical Grid parameters developed in GREAT (see section 3 of this report): the parameters 'Norm/Law Relation' and 'Epistemic Tools'. The latter refers to systems and processes of risk assessment (cf. D 2.3, Analytical Grid Report, p. 87).

[38] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/289432/12-1087-future-of-computer-trading-in-financial-markets-summary.pdf; p. 5; 29-11-2014

A great deal of the findings also concern features of financial markets more generally. At first sight this makes for a loose connection between the subsequent empirical analysis and RRI as studied in GREAT so far. GREAT has a strong focus on *technological* innovation processes. However, contemporary financial markets actually depend on technologies in many ways. From a historical perspective, financial activities such as trading, but also more analytical functions have co-evolved with ICT, a process whereby contemporary markets have turned into virtual realities (cf. Knorr Cetina 2009: 64). Against this backdrop our findings help to improve our conception of responsibility in domains that are very much driven by technology development, and for actors that are involved in this development.

In what follows each Analytical Grid parameter – 'Norm/Law relation' and 'Epistemic Tools' – is described briefly, and the main findings and quotes exemplifying these findings are presented. Normally Analytical Grid parameters focuse on projects. However, the interviewees included in this section have not worked for specific projects but have professional profiles that are quite distinct from one another. These profiles have been explained in section 4 (Methodology) of this report. In contrast to the analysis of CIP ICT PSP interviews in the preceding sections we decided to conduct the analysis in this section across interviews, hence providing insights into a domain rather than a list of projects.

AG Parameter	Description
Norm/Law Relation	Is the innovation process 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.

Main findings
The empirical reality this parameter relates to is quite complex. There are *a variety of legitimate views* related to what (ethical) norms, and normative behaviour, are about, and their relationship with and legal rules: - One view is that law equals ethics; and that *legal compliance* suffices to consider one's behaviour 'responsible'. Thus, reflexivity on ethical behaviour is implicitly delegated to regulators. According to D 2.2, Theoretical Landscape (p. 8), this is a limited understanding of "responsibility as liability" that "only covers a restricted dimension of the problem." - Another view is that 'ethics' characterises specific investment opportunities such as, "ethical funds". On the one hand, this broad trend[39] may be interpreted (and welcomed) as the economic sphere being penetrated with

[39] There is actually a comprehensive interdisciplinary body of literature on responsible, ethical, sustainable or impact investments (cf. Fung et al. 2010).

ethical values. On the other hand, similar to the case of corporate social responsibility (CSR), this "commodification" of ethics[40] perhaps "results in opportunism, leaves institutional blockades intact and drives out the intrinsic motivation for engaging in CSR" (Nijhof/Jeurissen 2010: 18).[41]

- According to a third view, 'responsible behaviour' goes beyond legal compliance and should not be pursued by regulators only. Instead, it is conceptualised as a *much more proactive, forward-looking moral agency* (cf. D 2.2, Theoretical Landscape, p. 62) of core market actors (in this case, traders).
- The fourth view could be considered an extension of the third view: in practice, some financial market actors (traders) appear to closely collaborate with regulators in order to update regulation continuously, given the constant evolvement of financial markets and their technologies – and the resulting problem of persisting *lack of knowledge, let alone the ability to anticipate undesirable outcomes,* among regulators. According to this view, *market and law are two spheres that are much more (dynamically) intertwined* than common sense suggests. Perhaps accordingly, market ethics evolve dynamically.[42]
- According to a fifth view, and perhaps in line with the massive complexity and dynamics of financial markets just described, 'responsible behaviour' should be ensured by various experts (traders, regulators and others) using their *intuition* that "something is wrong".
- Responsibility is also implicitly considered as a *distributed phenomenon*, that is, a number of observations to be made and actions to be taken by different actors in a complex chain, or web, of financial intermediation.
- Finally, there is a view that daily risk assessment procedures have a "normative" dimension. The data suggests that in this context, the term 'normative' refers to making *epistemic value judgements*. This is an understanding of normative behaviour that, according to Hilary Putnam (2002: 4, 7, 8, 19), blurs the (supposed) dichotomy of objective facts versus subjective or ethical values, and characterises much of scientific work (as well as, in this case, finance). Actors make numerous interpretations in understanding reality, and these are never completely neutral.

These findings are backed by the following quotes:

[40] According to Nijhof and Jeurissen (2010: 620), the term „commodification of CSR" paraphrases a particular trend among financial and other economic organisations: the development of a "business case approach to CSR". This approach would be "characterized by the assumption that any CSR effort should be legitimized by instrumental arguments towards increasing corporate profits [if not in the short term, then in the long run]. According to this logic, CSR is best approached through a cost-benefit perspective".

[41] Substantiating this possible pessimistic interpretation would require a more in-depth empirical and theoretical enquiry that goes beyond the scope of this deliverable, and the timescales of GREAT.

[42] This statement on market ethics is food for thought; substantiating the hypothesis would require a more in-depth empirical and theoretical enquiry.

The first finding – a limited view on responsibility as legal compliance – shows in this interviewee's statement:

"The ethics that we have are to remain within the law [...] So yes, we have compliance. The parameters that we have are the parameters set by the regulator. [For instance,] that you mustn't trade information that's inside; that's a legal obligation – and that should be part of your ethical – and that is ethical. If the regulators said tomorrow that that was no longer an illegal manoeuvre – then it would be no longer unethical to do it. Cause everybody is doing it." (Chief economist and partner of an asset management firm)

The second finding is exemplified by the following quote: According to one interviewee, "in finance ethical funds are very clearly delineated". As has been argued in WP 2 (D 2.2, Theoretical Landscape, p. 68), this is an ethical conception of responsibility that does not exclude economic values:

"Ethical requirements can be comparative economic advantages. Consumers agree to pay more for products that comply with ethical norms. They can be sensitive to environmental ethics or to the equitability of the wages of the first producers as illustrated, for instance, by the success of organic food and fair trade. Only narrow utilitarian calculus would have missed these promising possibilities."

Combining this perspective with the insights from the interviews we may argue that responsible behaviour *can* be reconciled with economic motives – at least in some cases.

The third finding is exemplified by this interviewee's statement:

"I do feel, a lot of what happened [when the interviewee still worked as a trader] [...], it's really about ethics, and experience. But there is always bad things you can deal with. Trading is just like driving a car – you can always pull out; you can always speed, you can always do the bad thing that maybe gets your bid ahead – but in the end you're dangerous, and if everyone out there is dealing dangerous stuff then it creates a dangerous environment for everybody. And that is a lot what it's like. [...] [The interviewee adds about the own area of work, the 'buy side']: "they don't take responsibility for anything. And, it's amazing to me – because they are well-paid. [...] They are taking less and less – responsibility for the mistakes they make." (Former trader and hedge fund manager)

The fourth perspective concerning the dynamic relationship between the market sphere on the one hand, and law or regulation on the other, is implied in the following quote:

"We put forward [...] strategic issues how we think our industry or the industry generally could be regulated better." [...]

Question: "Is that something that the regulators ask you to do or how come that –"

"We think we have a responsibility to do that – because the regulators are obviously, they are always somewhat behind developments. [...]Market participants are constantly changing, competitive dynamics are changing, asset classes are changing [...] and [...] regulations often need to change with that and we believe we have a very important role to make sure that the industry is properly regulated and also that the regulators are aware of the things that are going on so that they can anticipate things better." (Managing director of a market-making firm)

This supposed need of continuous collaboration between market actors (traders) and regulators could be considered a reasonable response to the systematic lack of knowledge of regulators, and their systematic difficulties to anticipate undesirable outcomes such as, a crisis, as explained in one of the reports on computer-based trading commissioned by the UK Goverment.[43]

The concept of responsibility as an expert's intuition, and as a distributed phenomenon, shows in the following experiences one of the interviewees made:

"There are warning signs, it's not like these things are polished and ready to go [...] You don't necessarily know what's wrong, but you know something's wrong. [...]

I had a marketing event [at a certain firm] [...] So I went to this meeting at [...] [name of place] and I got there with the person, that had set up the meeting, and I was going there to pitch for capital – and get in the parking lot – there is no cars. Now this is a Friday afternoon in January [...] people should be at work! No cars. Get in the building [...] no security guard. Now financial financial all have security after September 11. [...] This child person [the secretary] comes out – I mean she couldn't have been on a university for more than 10 minutes [...] she said something that was unbelievable. [...] Normally when you go in one of these meetings, if you're the one with the product you start, but she started, and she says: well we've only had 2 down [?] months in the last ten years, and I just wanted to leave. [...] Cause [...] I don't know whether that was her lie, or their lie, but the fact that nobody was there, and this is a big, I mean this entity was a massive, well-known – five star, you want to get a subscription from these guys – and in the end – so the meeting was very short, obviously she wasn't interested in listening to anything that I had to say, so I didn't say very much – and we left, and then [...] [we found out that they were involved in a financial scandal]. And that's why no one was there. They knew what was going on, they weren't showing up to work. [...]

Any regulator that may have shown up there – alarm bells should have gone off [...] But it's one of those things where you sit there and think [?]: 'that's not my responsibility, I don't know how to go about that' – [...] those are the kinds of things were you sit there and go: that shouldn't have happened. Somewhere, someone along the way, somebody who was giving them money – because they were obviously, a fund-of-fund structure – who did the due diligence on them? [...] I didn't know what was wrong, but something was wrong [...]

That's ethics right there. That somebody in there should have said something to someone, somewhere along the way." (Former trader and hedge fund manager)

[43] "A further proposal that is sometimes made is that (various categories of) agents should only be allowed to hold or issue instruments which have been approved by the authorities in advance. This contrasts with the more common position that innovation should be allowed to flourish, but with the authorities retaining the power to ban the uses of instruments where they consider evidence reveals undesirable effects. The former stance, however, not only restricts innovation, but also such official approval may well have unintended consequences. Furthermore, the effectiveness of such official approval is debatable. Officials have no more, and probably less, skill in foreseeing how financial instruments will subsequently fare than credit rating agencies or market agents. Indeed, many, possibly all, of the instruments now condemned in some quarters as having played a part in the recent global financial crisis would, at an earlier time, have probably been given official approval." https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/289431/12-1086-future-of-computer-trading-in-financial-markets-report.pdf; p. 15; 29-11-2014.

Finally, the last view on normative behaviour, which implies making epistemic value judgements (Putnam 2002) that blur the supposed boundary between facts and values, will be discussed further in the next paragraph, as such judgements appear to be part of risk assessments conducted by market actors.

AG Parameter	Description
Epistemic Tools	Does the innovation process implicitly or explicitly rely on risk assessment (only)? Alternatively, do the project participants follow the precautionary principle (only)?

Main findings

- As argued in GREAT's Analytical Grid Report, there are different forms of risk assessment in reality such as, qualitative approaches (e.g. experts inspecting the set-up of organisational infrastructures) and quantitative approaches (involving mathematical calculations).
- The interview data supports this but also suggests that empirical reality is even more multifaceted. There are *many different existing notions and perceptions of risk*.
- Furthermore, empirical data suggests that there are not only different formal risk assessment systems and processes, but also:
    - more *informal*, and *embodied* risk assessment expertise that is entangled with an individual's detailed market knowledge, which has been acquired over time;
    - informal risk assessment expertise that is developed in *groups*, not individuals (only).

  Thus, from an RRI perspective, before asking researchers, innovators and technology developers to not only consider scientific, technical or economic aspects but also ethical and social impacts in their assessments (Analytical Grid report p. 85), we may first need to acknowledge and learn about the various existing empirical concepts of risk in order to develop a more nuanced risk vocabulary for RRI; and we may also need to understand better existing informal risk assessment practices. This would require a deeper analysis of a given domain (in this case, finance), but may finally help in making better 'translations' between the domain's practices and language on the one hand, and the RRI discourse and practical requirements on the other hand.

The interviews show that there numerous different empirical (participants') concepts of risk in financial markets. The following overview combines data from five interviews and provides only a snapshot:[44]

[44] We assume that there are many more types of risk depending on the actor or financial activity considered (for instance, as we know from previous research into microfinance 'country risk' is a type of risk important in certain investment activities). The risk notions listed here are based on our data gathered for GREAT only.

First and perhaps most importantly, there is the risk of financial loss, which is an overarching category. In this regard, the risk 'vocabulary' of financial markets is more limited than the RRI discourse where the focus is not only on financial, but also, and even more, on social or environmental risks, and how these are experienced not only by financial experts, by all kinds of stakeholders in the public domain and civil society. However, in financial markets the other side of the coin is a positive concept of risk. Understanding better such positive connotations could enhance the RRI discourse that appears to be focused mostly on undesirable outcomes and negative hazards.

While, for instance, an investment always entails the risk of losing money, it also implies the chance to win. As the next quotes show, beyond this narrow financial benefit there also appear to be related work experiences that are more multi-faceted. The first quote, for example, shows that taking financial risk may in practice be related to doing "market research" (participant's term).

"I started with a Russian defaulting portfolio, so I started with something that no one wanted [...] nobody knew how to deal with it, there was no procedural manual for it [...] so it was, it was more like: 'okay I have this problem, and I have to figure out how I'm gonna solve it' [...] So we gotta figure out: 'can we get pricing from somewhere [...] so it is a bit of fact-finding right? I have this problem, puzzle if you will, and I'm trying to solve the puzzle, and so some of it is small, so like in the Russian example, there was pricing available, it was a paid service, it was offered through the central bank, and so the cost was 20 Dollars a month [...] and I went to my boss and I'm like: 'look, can we at least try this?' And he's like: 'well they are not going to do this, from the insurance company'. And I said: 'can I send it from my bank?' And he's like: 'oh if you want to' [...] It was one of those things that – a lot of times on the buy side, depending what you're doing, and – that's an extreme example right – you have to just try something and see if it works, and you start with something small. So is risking 20 Dollars worth it to get some pricing? Yes of course, the investment originally was 10 Million Dollars. So [...] you try to use all the resources available, maybe they are traditional, maybe they are non-traditional, but some of it is you just go out and try it, it is a bit of market research. Okay we're gonna give this a try and see what happens." (Former trader and hedge fund manager)

The next quote exemplifies that taking financial risk can be a conscious, deliberate action that, in a specific context, is considered "a good thing" (participant's term). This perception of context-specific, situational 'good' risk is part of what the interviewee considered to be a "normative assessment" of a risk report. In the case at hand, 'normative' implies less a consideration of strong ethical values but rather *epistemic values*, similar to Hilary Putnam's (2002) discussion of epistemic value judgements (see also the last section on the norm/law relationship in finance).

Question: "In your fund, or in your everyday work, are there any assessments [...] of work flows, products, services, whatever – that matter, that are in place and that matter."

"All the time. Every day. So what we have – what we call risk reports. The risk report is an assessment every day. Of the various [?] funds. And these risk reports inform you of your performance, or the fund's performance, and all the diagnostics that you need to understand whether it's performing, as you intended. And if it isn't then you then – try to understand why it is misbehaving. So yes every day. It's always, there is an ongoing review. [...] They are a health check."

Question: "And eh – is there any kind of – is there any kind of normative dimension [...], any type of – low, low key everyday, or not, horizon – of these assessment that you would consider normative?"

"The normative element is the interpretation. If a risk report tells you that there has been – an increase in the risk – within the particular fund or strategy – your response will be: 'yes, that's intentional'. So there are two responses, one is: 'oh dear, I didn't expect that. I'm surprised by that'. Or: 'do you know something? It is picking up exactly what I wanted to pick up. I want to have more risk. Because I think risk is a good thing. In this particular instance'. So you do have [...] a normative assessment." (Chief economist and partner of an asset management firm)

These forms of risk-taking as exemplified in the two previous quotes are not completely 'selfish' as often, market actors invest client's money such as, of pensioners, who would also profit from a gain. The related responsibility of the market actor (e.g. trader) is called "fiduciary responsibility".

There are various other forms of risk that matter to market actors, such as, "liquidity risk", "execution risk", "portfolio risk", "counterparty risk"; "legal risk"; "custody risk"; "credit risk"; the risk to receive unreliable information such as, on prices; risks associated with developing wrong pricing models; or "career risk".

One interviewee, a former trader and hedge fund manager, describes career risk. Keeping this type of risk low seems to be closely related to fulfilling the fiduciary responsibility towards clients. The interviewee stresses that career risk is important for a large part of financial market actors, i.e. those working on the 'buy side'.[45]

> "A huge amount of the buy side is that career risk, because the buy side has x number of meetings, there are so many more meetings, investment committee, you know where you have to go out and pitch your ideas – your responsibility, your fiduciary responsibility to the investors, which the buy side, all the places I've ever worked at [...] have been hyper sensitive to the fiduciary responsibility they have to the investor. So a lot of the stuff that has happened has happened as a consequence of other things, not because of people weren't aware of or, considerate of the investor, but like I said – the layers of risk are – once you go out there with something and you pitch it in a staff meeting there could be – 40 or 50 people in there, then you can't come back the next day and say: [...] 'we're gonna keep this position even though I hate it and I've just given you ten reasons why' [...] It was always whenever I brought somebody new in – the first thing you tell them, and then you tell them every day for the next however many months it takes until that you really feel that they get this: 'when we send money out – yes we've got a trade on[?] that's fantastic - but the thing we need to think about first is how we're gonna get that money back.'"

Apart from these various existing and relevant risk notions, and the interviewees' awareness of such multiple risks, the interview data also suggests that a number of different risk assessment systems and practices are already in place. First, there is

[45] The buy side comprises "the investing institutions such as mutual funds, pension funds and insurance firms that tend to buy large portions of securities for money-management purposes. The buy side is the opposite of the sell-side entities, which provide recommendations for upgrades, downgrades, target prices and opinions to the public market."
http://www.investopedia.com/terms/b/buyside.asp; 25-11-2014

individually embodied expertise acquired over a rather long period of (career) time. This is implied in the next quote, which is a direct response to the interviewer's question on informal risk assessment:

Question: "I also have the impression that sort of a lot of risk assessment takes place in your head, sort of – the way you talk about the different risks, you talk about them in a very, very much – mixed with your own market experience, and the different players you know, the strategies you know, I've got the impression that in your own trading practice, in the accumulation of knowledge there seems to be – sort of an informal assessment knowledge that has been growing up." [...]

"I think that's the biggest – the biggest thing on the buy side versus the sell side. [...] It seems like on the buy side – you don't get handed a massive portfolio day one and say: 'okay we train you to trade interest rate swaps and – you know you've sat next to a junior trader but now we're just gonna give you that assignment, go to it'. You start with something usually that's small. [...] It is an experience thing. I don't know, if I had to write a procedural manual, of all the things you have to think about – I don't know – you would always miss something right? Whatever that thing is [...] I don't know whether you can ever write something that is so comprehensive that you would not make a mistake. I mean the one thing about investing is – everyone makes mistakes. And it's learning how to not to make those catastrophic – for you and everybody else – and to not – some of it is to not – is to recognize that the good days that you have, when things are easy, that you know that they are easy, and that you don't view that as a baseline." (Former trader and hedge fund manager)

Apart from such individual risk assessment expertise, there is also informal risk assessment expertise that is developed in groups, or teamwork, as the following two quotes exemplify. The first quote indicates that that such informal teamwork exists inside a given organisation, with regard to identifying "bugs" in computer-based models (thus diminishing the risk of wrong pricing models). The second quote suggests that informal collective risk assessment also exists across different organisations, in this case, a market-making firm and regulatory agencies.

"In terms of the organisation, everyone talks to each other - there is about 20 or 30 people in the team that I'm with, and we sit on - sort of three long rows of benches and people do wander across to each other and ask questions, and everyone's very eager to learn, to help out when they have sort of specific knowledge, and people are very good at sort of picking up bits of conversation, and wandering over and say 'oh actually I know how to do that', so it's all very - it's a group effort. It's not really the case that one person is given a job to do, and gets on with it, it's very much team [1W]. [...] It's at the back of a trading room, yeah. I mean I don't interact very much with the traders but the other quants certainly do they, they go around, making sure everyone's system is running correctly and - and fast. [...] [About the 'quants':] It's the same people writing the models who make sure that the right person has the right model. That these models are working correctly, and their system is working, and occasionally we get people coming over from the trading floor, saying 'oh I've got this price here, it doesn't seem quite right, can you check it over', and they wander over to their desk and spend a couple of hours figuring out what's going on. Occasionally find some quite nice bugs that way." (IT expert with an international bank)

"Today most of the manual processes are replaced by algorithms. So regulators have to make sure that the algorithms are designed and released in a way that they don't [...] that they operate in a way that is – that doesn't cause risk to the system [...] you need a very different approach in a fully automated market than you need in a market that trades manually. [...] We make proposals [to the regulators] when it comes to risk controls [...], release management, releasing new software on the market." (Managing director of a market-making firm)

5.4 Summary: Themes and concepts emerging from the case studies

In what follows the themes and concepts emerging from the case studies presented in the preceding section are summarised. These main points fall under six headings that relate to six key dimensions (which are not mutually exclusive): participatory approaches; the relationship between ethics, norms and laws; culture; transparency; responsiveness; and risk.

5.4.1 Towards a broader understanding of participatory approaches

5.4.1.1 The challenge of engaging external but also *internal* stakeholders

The analysis of the CIP ICT PSP interviews in the preceding sections suggests that we perhaps need to enhance our understanding of participatory approaches.

Firstly, as the analysis revealed (interview 1, 2 and 5), researchers, innovators and designers make considerable efforts to engage external stakeholders (outside the consortium). The engagement activities are mostly limited to selected stakeholder groups such as, end-users, and their input does not seem to challenge the course of the project radically. Therefore, the level of engagement could be best characterised as 'medium', or as akin to the 'Consultation' governance model (D 2.3, Analytical Grid Report, p. 80, 87). This resonates with the findings in D 4.2, Case Study Report, where four out of five CIP ICT PSP projects analysed appear to neither fully conform to the 'Co-construction' governance model, nor the 'Standard' governance model (D 2.4, p. 64). However, even such a seemingly moderate participatory approach appears to be complex and demanding to realise in practice, as the detailed analysis in this deliverable showed.

Secondly, and importantly, the interviews revealed that there are also many different *internal* stakeholders to which a given project participant needs to respond – the other consortium members. Actually the difficulties involved in ensuring a good, balanced cooperation of the partners of a given consortium[46] might undermine the consortium's overall ability, or its willingness, to also fulfil the classic RRI requirement mentioned previously, that is, to actively engage external stakeholders throughout as many phases of the project as possible, aiming at 'co-construction' (D 2.3, Analytical Grid report p. 87). This may be hard to realise when many efforts are already made (e.g. project time is spent) for ensuring smooth internal collaboration.[47]

[46] Good, balanced cooperation of consortium partners may be understood as collaboration specified in a project's DOW. However, importantly, this formal document cannot detail all aspects of (emerging, future) collaborative work.

[47] Whether the need for internal coordination, i.e. ensuring internal stakeholder engagement, *always*, or *structurally*, diminishes a consortium's ability or willingness to pursue a participatory approach with external stakeholders is a difficult question. Answering it might require further research such as, conducting problem-centred interviews focusing on this particular nexus.

This finding is a follow-up on the research question developed in another GREAT deliverable (D 4.2, Case Study Report, p. 59). Given the size and the heterogeneous composition of many CIP ICT PSP consortia – some consist, or consisted, of more than 30 different partners – we suggested to study the extent to which, and the ways in which a given consortium tries to be as responsive as possible to the expectations of its various internal stakeholders.

For instance, in the case of the CIP ICT PSP interview 1 and 2 (see section 5.1) the data suggests that substantial efforts were made to coordinate the interaction between the heterogeneous consortium partners. Similarly, interviewees 3 and 4 showed a clear awareness of the need to actively involve all stakeholders across the consortium.

Another important finding is that an emphasis on stakeholder inclusion within a given consortium also does not necessarily contradict the pursuit of *economic* interests (CIP ICT PSP interview 4). Different actors may actually have different economic interests, or market power. So some actors are at risk of crowding out others (monopolistic economic power). Balancing these power differences in a way that is as fair as possible to all actors involved may be considered a first important step towards 'responsible innovation'.

The analysis of further data (CIP ICT PSP interview 5) also suggests that an inclination to realise a strong participatory approach in a given project – in this case, by engaging *external* stakeholders through the 'living lab' methodology – does not necessarily exclude a much more controlled, restrictive approach towards two specific groups:

- First, being cautious about interacting with the representatives of media (newspapers, journalists). In the case at hand the interviewees problematised the media's communication of project activities and results. From a conceptual point of view this finding implies that in reality, a project may show elements of two very distinct governance models – the 'Revised Standard Model' and the 'Co-construction' Model (Analytical Grid report p. 81-82). This resonates with findings in an earlier GREAT deliverable (D 4.2, Case Study Report, p. 56).
- Second, taking some time to select appropriate citizens. In the case at hand, the interviewees explained what they considered 'appropriate', hence unpacking the notion of citizen to some degree. This may be interpreted as an empirical instance of the concept of qualitative deliberation – as opposed to quantitative participation – developed in GREAT's D 3.2, Exemplifying the Typology with Relevant RRI Projects (p. 40). There is a tension: engaging a large number of different stakeholders is an important RRI ideal, but pushing it to the extreme may also be counterproductive, e.g. confusing, for research and innovation processes that need to be conducted in a given (short) project time.

We also found that an important limitation to a full-fledged participatory approach with external stakeholders is a limited project budget (CIP ICT PSP interview 2).

5.4.1.2 Complicated processes of inclusion and exclusion in a project's environment

The local context study with different stakeholders in care for older people revealed that even if a project consortium strives for involving external stakeholders, and aims at their profound engagement (such as, according to the 'Co-construction' governance model), this may still imply that these external stakeholders are 'preselected' through complicated processes of inclusion and exclusion in the project's environment.

In a given complex case system such as the UK's (into which we provided a few insights) there are numerous social, political and economic factors that may shape to what extent and in which way an individual has access to care, including technological devices. Such factors include meso and macro dimensions (such as, the budget that is available to a formal institution providing care), and micro dimensions such as, the ways in which individuals are categorised by care professionals, or to what extent individual patients are able to physically move around and hence get in touch with care providers in a literal sense.

These dynamics are likely to also affect research projects, such as those of the CIP ICT PSP. CIP ICT PSP projects test and try to embed innovative technologies at various pilot sites across Europe. These are local contexts similar to the one we studied in this deliverable. A local context includes different stakeholders such as, employees of public institutions or public governments, charities (which may be considered CSOs), and individuals that are part of 'civil society' (in the case at hand older people and their informal carers). We have argued that such a local context and a given project consortium are "loosely coupled" to one another (Weick/ Roberts 1993: 359). RRI may be considered as a "global structure" that cannot be created or observed from a single individual point, but is "transindividual" (Weick/Roberts 1993: 365). RRI *emerges* from the numerous heedful interactions between different actors involved, including consortium partners and the various local stakeholders in a project's context. This interrelation of distinct responsibilities of individual actors could be addressed more explicitly in the next iteration of GREAT's Analytical Grid.

Given the timescales of GREAT we could not study the direct (causal) links between such processes of inclusion and exclusion in a given care environment, and an EU project entering this environment and pursuing a participatory approach. However, we consider this a plausible hypothesis: that a project's participatory approach is considerably preconfigured by processes of inclusion and exclusion in its broader environment. This hypothesis could be tested by a detailed investigation of a given

care system and of a project interacting with the related numerous local stakeholders.

5.4.2 Various cultural differences affecting a consortium's work

One of the eight parameters of the Analytical Grid developed in GREAT's WP 2 refers to culture: Has a project taken into account cultural differences – which could be of any kind such as, different organisational cultures? And if such differences have been considered, in which way has this happened?

The interview data suggests that many CIP ICT PSP project participants are aware of cultural differences that have mattered in their respective projects. Partly, cultural differences are experienced as hindrances that complicate a given project, for instance, when they emerge over the course of the project and affect the consortium's ability to fulfil envisaged tasks (interview 1 and 9). However, interestingly, in at least two cases (interview 1 and 2) cultural differences were also experienced as something positive: as a source for individual learning, and inspiration for better ICT design.

An important further finding is the variety of cultural differences – or concepts of culture – that matter in practice:

- There are different countries and (national) languages represented in a given consortium, requiring a lot of time for translating back and forth between partners (which may be even more challenging the more complex a project's description of work is, and the more nation states are represented in a consortium). The language problem also shows in translation time and costs for different user interfaces of the technologies being developed by a consortium.
- Differences between areas of application are relevant. The 'same' technological solution developed at the consortium level needs to be tailored to different areas as much as possible.
- Similarly, there are different styles of thinking of heterogeneous consortium partners (e.g. academic versus public institutions' versus commercial styles), implying different epistemic cultures (Knorr Cetina 1999), or communities of practice (Wenger 2014). Consortia striving for the provision of a joint project outcome, or overarching 'addedd value', need to reconcile such epistemic and practical differences as far as possible.
- The EC appears to be an important additional epistemic culture, or community of practice, sometimes complicating a consortium's work further. The EC may have legitimate, but time-consuming reporting requirements related to ensuring its own formal accountability towards tax payers. This is a rationalistic form of responsible behaviour; it is also a cultural practice in the

sense of Max Weber, who interprets rationalisation as cultural (and historical) process (cf. Kalberg 1980: 115).[48]

5.4.3 Ethics, norms and laws: many existing expectations project partners need to juggle

Our findings suggest that there are many norms – of which some are legal norms – complicating a given consortium's work. Consortia need to comply with different jurisdictions as well as different types of existing local organisations and institutions. This multitude of legal rules and related extant local responsibilities to which a project needs to respond appear to be a challenge, even more so as these conditions can also change.

We have exemplified the variety of legal and non-legal norms that are directly or indirectly relevant to project work through the analysis of a CIP ICT PSP interview (interview 8), the local context study on care and the case study on automation on financial markets. Some relevant non-legal norms are, for instance: the norm of fairness (treating patients served by different institutions equally); norms materialised in certificates, or 'instruments of trust' (Karpik 1996; Thévenot 1997); and the numerous 'small' norms that are part of everyday interpretive work – in this case, the interpretive work of financial actors studying and judging every day the risks they take. This slight normative aspect of interpretive work seems not only to apply to finance, but also science, as Hilary Putnam's (2002) discussion of epistemic value judgements suggests.

Interpretation also appears to be crucial in the relationship between laws and ethics. The boundary between the two dimensions is not clear cut. As the local context study on care showed, local stakeholders consider responsible behaviour as liability, or compliance with law (cf. D 2.2, Theoretical Landscape, p. 8). However, there is also interpretative space associated with such compliance. When a person's capacity to act responsibly for him- or herself needs to be assessed (cf. Vincent 2011: 19; D 2.2, Theoretical Landscape, p. 14, 52), formal carers cannot just abide to legal rules 'blindly', but need to interpret the law in relation to the specific person and his or her life conditions. This subjective interpretation has a strong ethical dimension, as it directly affects the well-being of the client. The required ethical judgement is also a professional one, as it builds on knowledge the carer has grown over time, 'on the job'.

Also, such existing relevant knowledge among local professionals is to a great deal embodied and tacit. We consider this a challenge to new projects entering a local context. It is important for a project consortium to develop technological

[48] Another specific finding is the following: There may be different understandings of 'what matters' in a projects focusing on environmental issues due to project partners living in different climate zones across Europe (see interview 3). This can also complicate a given project.

innovations that are tailored to local needs as much as possible, but this may be difficult (time-consuming) when the existing knowledge is tacit and embodied.

In terms of the Analytical Grid parameter 'tools', which focuses on a given project consortium and asks for organisational units such as, an ethical board or committee, or comparable practices for supporting (ethical) reflexivity, we found the following: There are different formal and informal 'solutions' that are already in place in some projects for ensuring ethical reflection, or at least, for supporting ethical reflection to some degree. These solutions come under different names and show in different forms. Thus, they are not necessarily explicitly labelled as 'ethical committee' (for a formal organisational unit) or 'ethical procedures' (for certain organisational processes and practices). The functional equivalents can be, for instance, 'advisory boards', or more informal processes of a consortium and its local representatives or partners communicating back and forth to ensure that the requirements by an ethical committee at a (local) pilot site are met. The second approach, which may be considered a decentralised approach of ethical screening, is akin to 'polycentric' governance (Ostrom 2010).

5.4.4 Avoiding that transparency becomes 'tyranny'

Transparency is an important principle of responsible innovation, but as already argued in WP 2, it needs to be considered in close connection with the other – existing or evolving – norms of participants in a given context (cf. D 2.2, Theoretical Landscape p. 17, 18). The interview data supports this view, and helps us further in developing a nuanced understanding.

Depending on the context there is the need to strike a balance, and to carefully consider what can and should be made transparent to whom.

Project consortia often include commercial and industry partners that intend to develop marketable solutions, and these cannot be expected to fully disclose all their existing, and continuously evolving knowledge about a given technology, its consequences and forecasted uses. The reason is that they also need to sufficiently safeguard their intellectual property rights. So there is a structural problem with asking market actors to be transparent.[49]

Apart from the market place being a particular context where transparency cannot easily be achieved, mixed views were also revealed through our local context study

[49] In a next analytical step, which goes beyond the scope of this deliverable, the context of RRI could be specified further: by identifying the types of actors and the types of projects involved in the entire CIP ICT PSP pool (so all funded actors and projects). This could help us to develop a better understanding of the different 'flavours' of RRI such as, certain actors that can realistically be expected to be more transparent (generally, or about certain parts of their work) than others. For instance, academic actors can be expected to inform the public about important findings through academic publications; so in this particular regard they can be expected to fulfil the RRI requirement of transparency to a considerable extent.

on care. On the one hand, transparency was considered positive, as it could improve care, for instance, when integrating formerly separated information systems providing care professionals with more holistic pictures of patients. On the other hand, there were also problems raised: data and knowledge sharing would not always be desirable as it also infringes on data privacy; being fully transparent towards a patient about his or her condition can cause emotional distress; in a work setting, introducing systems and methods for knowledge and information sharing changes the expectations of care professionals, and could increase the workload for care professionals; and current care institutions' practices to make aspects of family life visible were difficult for an informal carer who saw this as a (physical) invasion of family life.

5.4.5 Responsiveness: the challenge of coping with many forms of change

The local context study on care suggests that research projects are challenged by various kinds of change. Change is conceptually tied to 'responsiveness', the latter being defined as 'being ready to make adaptations over and over again throughout the entire course of a given technology project' (see section 3.1 in this deliverable). However, manifold changes also make continuous responsiveness – of local stakeholders and a given project consortium – hard to realise in practice. In our view there is, for instance, the following nexus: the health of the primary stakeholder group, older people, changes continuously; as far as possible local care providers try to respond to this by repeated assessment practices; and a given project consortium entering this context would need to understand, and respond, to these existing forms of (local) responsiveness as much as possible, in order to provide technological solutions that are sufficiently locally embedded. Also, the (macro) structures of entire national care systems change over time. A consortium running pilots at different national sites (which has been a feature of many CIP ICT PSP projects) needs to understand and cope with these different forms of structural change in limited project time. Finally, the technological landscape of a given care system also changes continuously. This complicates the work of existing local stakeholders (including local care providers), and, by implication, perhaps also the work of a given project consortium trying to develop stable, interoperable solutions.

Maintaining a high degree of responsiveness related to these (and perhaps other) dimensions of change appears to be particularly challenging since a research project usually *also* needs to fulfil original targets, and needs to reach certain milestones according to the contractual commitment to its funding institution. Thus, a careful balancing of following prescriptions on the one hand, and responding to change on the other hand, seems necessary but difficult. One may wonder to what extent this tension, and striking the right balance, is also a feature of other projects and domains, apart from the domain of care studied here.

5.4.6 Broadening our understanding of risk and risk assessments

The finance case study showed that 'risk' is a key term for financial and IT experts, but has many different meanings, and is perceived in many different ways. For instance, while the RRI discourse is perhaps mostly concerned with a negative concept of risk as implied in undesired outcomes, or hazards, experts in the financial domain also have a positive concept of risk. It means the chance to win; and 'risk' can also be closely associated with work that is experienced as positive, such as, doing 'market research' before taking, and during holding a certain market position. Understanding such different participants' perceptions of risk – not only in finance but perhaps also other domains – might be important from an RRI perspective, if the aim is to make better 'translations' between the RRI discourse and practical RRI requirements on the one hand, and a given domain's practices and language on the other hand.

In the discussion of the relationship between laws and (ethical) norms (section 5.4.3) we have argued that some local stakeholders rely on embodied and tacit knowledge (such as, in judging the health of a patient), and that a project entering the local context might need to 'tap into' into this kind of knowledge in order to develop technological innovations that fit in the context. Similarly, the finance case study suggests that there is informal, and embodied risk assessment expertise that is entangled with a detailed market knowledge that an individual has acquired over time. Also, there is informal risk assessment expertise that is developed by groups, in teamwork, not only by individuals. While this finding is limited to the financial case study it is food for thought for other domains as well.

6. The context of RRI: empirical findings (focus groups and workshop)

6.1 Focus group on RRI and robotics development

6.1.1 Introduction

The discussion of the focus group conducted by VTT was facilitated to cover four themes: first thoughts of responsibility, citizen engagement, foresight and reflection, and transparency and openness. In the analysis of the discussion data, it was found that the last category included only a few comments which also overlapped with other categories. Therefore, this category as such is omitted from the analysis below and the comments are included in other categories.

6.1.2 Participants' spontaneous thoughts about RRI

The participants' spontaneous views of responsibility in research and innovation can be categorised under the following five themes:

6.1.2.1 Responsibility as collaboration and sharing

This category included such issues as networking with people, information sharing, co-design and developing shared themes in research and innovation.

"*Networking, sharing information is responsibility*." (Participant 5)

6.1.2.2 Responsibility as transparency and openness

The participants agreed that development in robotics should be transparent. Transparency should cover also how information is shared. Another perspective to transparency was the one of open (computer) systems and open software to boost development work in new fields. A third view of transparency related to tax money, how it is used and what kind of results are achieved with the money.

"*How do we get smart profit from tax money*?" (Participant 3)

In the interviews (see summary in section 5.4.4.) there were doubts raised about the goodness of transparency, related to e.g. threats to privacy and emotional distress for patients and increased expectations and workload for professionals. This kind of thoughts did not emerge in this focus group – which mainly did not work with end users of robotics. Interesting is that the group did not raise the issue of threat that demand for transparency sets for innovation as commercial secrecy.

6.1.2.3 Responsibility as advancing human wellbeing

The participants recognised human conditions as a baseline for developing and applying technology. For example, a participant from robotics industry (7) perceived responsibility as advancing human wellbeing "on the factory floor" and supporting human action and motivation through the factory system. Another perspective of responsibility related to the ethics of piloting: a person suffering from dementia had been delighted of wearing a new safety wrist in a 3 month pilot. The person had been miserable when the pilot has ended and the product had been taken away without a possibility to keep it.

"*Irresponsible research in piloting. Ethicality of piloting should be peremptory*." (Participant 4)

6.1.2.4 Responsibility as customer orientation

For the participants, responsibility seemed to mean also customer-driven design and developing "what the customer wants". Responsibility also covered including the end-user to the development and design from the beginning of the development.

"*How do we get added value to the customer*?" (Participant 3)

6.1.2.5 Responsibility to the society

This category included mostly comments related to the impact of robotisation on jobs and employment. In between the lines, the discussion can be read so that bringing new jobs is a responsible action, and robotisation is necessary because of that. Taking the possibilities (of technology) into use is a responsibility of the whole society.

"*Robotisation helps keeping the jobs in homeland*." (Participant 2)

Other issues related to the requirement to get sound profit for the tax payers' money used in the technology development and transparency of using and the results of the money (overlapping with "responsibility as transparency"). Still another perspective was directing public development money for "observation": it is responsible behaviour to develop the ability to perceive big and common problems, and develop shared themes for better focusing the research and innovation work.

6.1.3 Citizen engagement in robotics

The focus group participants well agreed that citizens should not be let to make decisions in research funding. The engagement of citizens was seen as Facebook type of "liking" things, which would not end well.

"*A civilised dictator is better than citizens in sharing funding*" (Participant 7)
"*True democracy would bring down this country*" (Participant 5)

In addition, citizen engagement was experienced making the research and innovation work too slow, in comparison to the *fail fast* development culture needed now (in a bad economic situation).

"*No citizen engagement to development, it becomes too slow. The citizens should engage in public discussion though*." (Participant 6)

The participants saw the role of the citizen to be in public discussion but also as a feeder of information, ideas and knowledge to the decision makers. Participant 4, who travels around the country to meet citizens and decision makers, thought that the citizens sometimes know the development of technology better than the decision makers so they should be given means to educate the decision makers.

"*Citizens see possibilities in technology. What keeps our innovation system in the past?*" (Participant 4)

Participant 7 saw that observing the citizens is more important than engaging them in development or co-creation.

6.1.4 Foresight and reflection

Foresight and reflection was understood as quite "technical" foresight activities and trying to estimate the future impacts of current actions or non-actions.

The participants said that valuing a longer-term perspective in development work overall is responsible, compared to the "instant profit society" of today. In practice, long-term perspective should be applied e.g. in planning the tax money use to make companies to advance robotics (in the end, to advance industry and employment). Responsible research should feed decision making and help decision makers to understand the future impacts and also what is done elsewhere i.e. benchmarking.

Responsible innovation was also perceived to relate to forbearance: the innovation system (decision makers, funders) should have patience so that they gather understanding all around and not expect results too early from the financial input in research and innovation activities.

6.1.5 Summary and conclusion

The understanding of what is responsibility in robotics research and innovation varied among the seven participants from responsible actions (e.g. networking) to responsible aims of the actions (transparency in using the tax payers' money).

Furthermore, responsibility could take place at the level of individuals (worker wellbeing, customer orientation), the society (employment) or the innovation system and colleagues (networking, sharing information).

When it comes to three of the five key principles of RRI – citizen engagement; foresight and reflection; transparency and openness – the citizen engagement raised the longest discussion. The participants had trouble in giving citizens a role in decision making but they should participate in public discussion instead and educate the decision makers for them to be able to make better decisions. Customer orientation in innovation was seen as a current basic form of citizen engagement in development of robotics or any technology. Foresight was valued as a long-term perspective to development in robotics but the society of today supports and requires "instant profit" actions only. Transparency should be improved at many levels, as open systems and software, transparent development work and as transparency of using the tax money.

These conceptions differ from the descriptions of the related three pillars of RRI described in Section 3.1. Participation, for this innovation-geared focus group, was a limited activity in terms of participants: customers and end-users but not civil society. Participation was also limited in terms of process and results: focused contribution to product development is expected but not e.g. questions related to ethics or social impacts of the development as such. There were no indicators in the

discussion that responsible innovation should 'co-build' technology and ensure co-responsibility of the outcomes.

Anticipation was not related to forecasting social outcomes or reflecting ethical issues but rather about long-term, systematic development programs of technology to ensure that the quality of innovation (in Finland) is in the leading edge of the global (business) competition.

The concept of transparency articulated in the focus group was perhaps the closest to the GREAT perspective of RRI. Transparency emphasised distributing existing knowledge about robotic development and the related deliberation processes (at least being open of that what is shared to whom).

Overall, the discussion was coloured with financial perspectives, which is natural considering the composition of the focus group: only 2 persons worked mainly in research whilst the other 5 persons dealt with business issues on a daily basis. We could say that the group was more concerned with 'innovation' than 'research' if we define innovation to refer to the commercialisation of the outcomes of research and development work.

'Responsible innovation' then seems to include other issues than 'responsible research'. Responsibility in innovation, according to the results of this focus group, is responsibility to the customer needs as well as the needs of the society in the form of conscientious use of tax money and creation of new jobs – which implies new business. (This result may not be universal or even applicable to other European countries. In Finland nowadays the public discussion is very concerned on jobs, taxes and economics.) These aspects can be seen as the norms of innovation.

Ethical and social issues or impacts of robotics development that might be unwanted were largely absent in the discussion. However, based on this single focus group, It is difficult to say what is the role of ethical and social considerations in innovation in general.

As a conclusion, based on this focus group result, it seems that the analytical grid should better take into account the different nature of responsible *innovation* compared to responsible *research*. Innovation seems to take place in tight economical context – at least for this specific focus group in Finland in the challenging economical situation. Responsibility is articulated within the discourse of business, competition and economy, and whilst responsible innovation includes responsibility to society, it does so in quite a focused way – as new jobs and new business.

6.2 Focus group on RRI and EU research

6.2.1 Introduction

The discussion of the focus group conducted by DMU was facilitated to cover three themes: Initially the participants were asked to consider their thoughts regarding privacy and data protection, governance and responsibility, from a personal and societal perspective. This was to gain insight into their norms and expectations as individuals. They were then asked to re-consider these themes from the perspective of their professional experiences and expectations of EU projects. This was to examine how closely their working practices were related to the participants' personal beliefs on the issues discussed. Reflective thematic analysis of the discourse resulting from this focus group has provided valuable insight which can be used to inform the approach to RRI in EU projects in the future.

6.2.2 Participants' initial responses

6.2.2.1 Privacy and data protection from a personal and societal perspective

The participants' first thoughts about privacy and data protection from a personal/societal perspective can be categorised under the following three themes:

6.2.2.1.1 Safeguarding and security of information

The participants agreed that personal information should be kept safe and secure. This refers to not only physical security of where and how the information is kept, but also the security of access to and by individuals and organisations

"*Safeguarding one's information, security of information and access to one's information*." (Participant 1)

The discussion reflected on taking personal responsibility for safeguarding one's own information including concerns about future use of personal information uncritically put on social media when an individual is young, which then may cause concerns in later life (Participant 5).

6.2.2.1.2 Controlling personal information

This was also discussed at some length and was seen as highly important. Concerns were raised about not only who has access to personal information, but also how far that information is disseminated to other people and organisations. In this vein, trust was discussed in broad terms, and was considered in light of access to personal information, including who gains access, what is done with the data and how it is stored and used"*…the ability to keep information about you in restricted circulation"* (Participant 3). Participants were acutely aware of the implications of inappropriate

data access and the discussion included perspectives of trust in security and corporate use that may be misplaced.

The participants also discussed the importance of being able to control data accuracy and the ability to modify, correct and delete personal information *"…in a structured and sensible way"* (Participant 4). This was also discussed in light of policies, laws and regulations and the difficulties of maintaining the integrity of data. Legal regulation was also considered to be sometimes used *"as a blunt stick"* (Participant 4) and that this did not necessarily lead to greater protection for the individual. Further, it was considered that the right to privacy is not an absolute as it is not possible to restrict all data.

6.2.2.1.3 Cultural and societal norms

The participants indicated that cultural and societal norms may change over time and that the concept of privacy was not necessarily a personal or historical constant. It was also noted that not all societies have a word for privacy, sometimes substituting this for 'solitude' and that the concept of privacy therefore was likely to have very different interpretations across the world. For example, when considering the importance of privacy it was expressed that *"developing countries may be different"* (Participant 1) and that a 'one size fits all' approach may be inappropriate where cultural differences may create unintended conflict or data breach.

6.2.2.2 Governance from a personal and societal perspective

Governance was defined as *"the mechanism by which things are governed"* (Participant 3) and yet was also considered to be a difficult concept to define. In simple terms, governance was described as *"top down regulation"* (Participant 4) that could be seen as a way to restrict or restrain behaviour in practice. However, the participants also considered that governance from a personal perspective may be seen as something to be avoided and that people may behave differently from the prescribed rules. In this analysis, it was considered that people were happy to have the rules in place provided that *"it doesn't affect me as a person"* (Participant 4) indicating that the concept of governance is not only in some ways confusing and contentious, it is also something that people will try to avoid being constrained by personally.

6.2.2.3 Responsibility from a personal and societal perspective

Responsibility from a personal/societal perspective was discussed in forms of obligation and the expectation of others. It was also identified as problematic on occasion where there are conflicting responsibilities.

6.2.2.3.1 Responsibility for family

Parents may make *"unpopular but necessary"* (Participant 1) decisions on behalf of a child as their responsibility to safeguard, protect and guide may override a child's

immediate happiness or privacy for what they see as being their own good. However, in the case when a parent is taking responsibility for a child it was acknowledged that sometimes parents and children may also negotiate rules and decisions. In addition, the concerns about privacy online discussed above were also extended to parental responsibility and concerns regarding the potential future impact of teenage social media use.

"*As a mother of 3 children aged between 18-24, though I think that everything they put on... say Facebook is true and not bitchy, I just feel that they let themselves in for something that in years to come they will regret.*" (Participant 5)

It was discussed that responsibility may have different meanings and result in different obligations. It was also recognised that family responsibilities in particular may vary within contexts and that such responsibilities could be implicit as well as defined meaning that some people may 'feel' responsible without being directly advised of their responsibility.

6.2.2.3.2 Responsibility, the state and society

The participants felt that there were certain societal responsibilities that individuals may find difficult to fulfil. Whilst there is a *"positive social obligation"* (Participant 2) towards certain responsibilities, there may not be obvious or easy ways to address them e.g when considering environmental concerns or addressing global issues. In this way, individuals may feel powerless to take responsibility in any direct or meaningful way.

The role of the state was argued to have some responsibility for protecting its citizens and yet it was also seen to have no mandate for protecting adult citizens from their own bad decisions and thus *"treat us like children"* (Participant 1). In this context, the state's responsibility to protect was felt to be necessarily constrained by a need to negotiate the extent to which that protection leads to restrictions on citizens.

One participant also stated concerns that *"the state imposes responsibility on people…they need to consider stereotypes which may not apply to the majority of people"* (Participant 4) and which could lead to individual harms in addition to societal benefits. Further, negotiations with the state could be largely inadequate as a way to ensure that there are mechanisms to protect its citizens without overly restricting the individuals.

6.2.2.3.3 Professional responsibility

As individuals, the participants considered that there are differences between professional and personal responsibilities which need to be recognised. In this respect *"organisational responsibility is related but different from legal responsibility and moral responsibility"* (Participant 3). The discussion considered that professional

responsibility may be able to bridge the gap between legal and moral responsibility. A connection between stakeholders and shareholders within corporate social responsibility for example (D2.2, Theoretical Landscape, p. 7) would involve a more ethical approach rather than the current trend towards a consequentialist cause and blame culture (instead of a proactive approach). In fact, responsibility in a professional sense is often more to do with process, sanction and risk than genuine understanding of ethical concerns (see a detailed discussion of responsibility in D2.2, Theoretical landscape). However, professional responsibility was sometimes seen as being in direct conflict with family or societal responsibilities which may mean that there are still some significant gaps which may lead to compromise and pacification rather than resolution of conflicting needs.

Within the workplace, individual responsibilities were able to be more directly defined and were also sometimes translatable into an individual's personal sphere *"…life in general, doing what is given to me to do to the best of my ability and looking out for other people and stakeholders"* (Participant 5).

6.2.3 Participants' insights from paired discussions on perspectives of EU research followed by round-table discussion

It was notable that the participants had many of the same perspectives on the three themes from both a personal and EU researcher view, albeit with some additional considerations that was specific to their work.

6.2.3.1 Privacy and data protection from the perspective of EU research

The first consideration raised was that of the data being collected, stored and used within EU projects. In particular concerns were raised about the data being used without consent particularly regarding predictions of future use and access. It was noted that some data may not be capable of being anonymized and there may unforeseen (or possibly foreseen) uses that may go beyond what was initially intended leading to data use without explicit consent. The concept of implied consent from data subjects in research was also considered to be potentially problematic in this case. The future use and privacy of products arising from research and a discussion of privacy by design concepts were all considered to be important considerations. It was suggested that the future evolution of the principles of RRI and future EU research and innovations projects would both benefit from the use of privacy by design concepts.

6.2.3.2 Governance from the perspective of EU research

When considering governance from the perspective of EU research, the participants discussed the difficulty of finding clarity in how projects are governed. An explanation for this was that often there may be many hands involved in decision making which may in some cases be overly formalised or lead to too much scrutiny

or be unnecessarily restrictive. As it was acknowledged that in general EU projects are externally governed, this puts particular pressure on time management within projects and may directly affect the effective functioning of the project itself. This is because technocratic approaches to governance can result in arbitrary bureaucracy and excessive or inaccurate reporting. In addition, external governance may not work well alongside other established governance mechanisms thereby creating further tensions or time constraints. In addition, it was discussed that there were concerns that the act of external, top-down governance imposition may conflict with or lead to a reduction in personal responsibility.

A number of the participants were involved in RRI projects or those with RRI elements, and it was noted that that individuals *"look at other projects but not always consider RRI in their own projects"* (Participant 6). Governance was also linked to responsibility in that there are questions as to where the responsibility lies for reporting and evaluation of projects where it is possible to produce reports that appear to adhere to governance procedures, but are actually a means to tick the boxes of externally moderated requirements.

6.2.3.3 Responsibility from the perspective of EU research

The discussion considered who should be ultimately responsible and what were the chains of command in the decision and evaluation processes within EU research projects? An example of this concern was raised by participant 1 when she explained that when engaging with civil society organisations in research, there were concerns about who sets the agenda for involvement and who is accountable or responsible for that research. The concern here was also raised that often research is 'being done to' people or that involvement is a mere 'tick box' exercise to give the appearance of engagement. In this example, it was felt that not only researchers themselves should take responsibility, but also those who fund the research. Responsibility is then seen less as a mechanistic way to delegate roles for taking responsibility and therefore divorcing others from this role, but as a way to fulfil obligations at all levels of the research process and its governance.

In addition, there was a tension recognised by the participants between governance and responsibility whereby if governance is not well defined, then incentives to do things responsibly may also not be clearly defined.

Finally, the difference between social science and technical projects in taking responsibility was discussed. Participant 6 expressed his concerns that in technical projects, an error or problem can often be discovered when something goes wrong or it does not work correctly. This can then be rectified in a technical way. In a social science project, it is not easy to define or identify a problem, particularly when the unforeseen consequences of for example, an inappropriate statement, question or approach, may not be felt for many years, and may not ever be reported never mind resolved.

6.2.4 Summary and conclusion

It was understood by the participants that responsibility, privacy and data protection and governance are indelibly linked and that this is particularly important to take into account when considering approaches to RRI and working within an EU research project (as was the focus of the participants in this focus group). The concept of responsibility in particular was considerably interwoven with the other discussions during the focus group. It was recognised that responsibilities are important across all areas of life and that the levels of responsibility and the nature of responsibility could be different or conflicting depending on context. There were considerable tensions revealed between responsibility on a personal level, (including that of protecting privacy and personal information, and of governing behaviour), and responsibility on a professional level. This was particularly evident with regards to the current approaches to EU project governance which were seen as being overly restrictive and lacking in true oversight.

In this way the values and perspectives held in one's personal life were often translated into approaches to professional life, including the frustrations of state intervention in the personal sphere and governance in the professional one. Further, it was identified that there is a conflict, in particular between how individuals cope with addressing governance and responsibility and not only their personal ethos, but also in their potentially conflicting obligations in the personal and professional spheres.

Gaining understanding of the participants personal and societal views and considering the ways that these may impact on project based responsibilities, provided a valuable connection between the development of artefacts such as robotics, and the perceptions of the importance of privacy, data protection governance and responsibility of those creating them. In addition, as discussed in D2.2, Theoretical Landscape, p. 48-49, in some cases, responsibility for aspects such as privacy and data protection may not be known until after the product or service has become successful and therefore the responsibility and the governance of research and innovation needs to consider privacy and data protection. Thus, RRI approaches from the design phase and throughout a given project are necessary.

The five pillars of RRI as outlined in section 3.1 were addressed throughout the focus group in several ways. An *anticipatory* approach was taken as different scenarios developed whereby the participants were invited to reflect on their personal and professional approaches and understanding of the issues being discussed. *Transparency* was achieved by providing detailed information about the project and reasons for the focus group. In addition, all participants were invited to provide their further thoughts after the event. Taking into consideration the perspectives of the participants in the on-going development and understanding of RRI within the GREAT project provides the *responsiveness* requirement of RRI and which ensures that *participation* is seen to have value. At each stage of the focus group, a period of

reflection and discussion enabled the participants to engage with others' opinions on the issues. Further, reflexivity was an integral part of the thematic analysis of the insights achieved from the focus group.

Within the terms of the analytical grid (D2.3, Analytic Grid Report, section 3.2 above), whilst products were not discussed in detail, one of the participants was involved in the production of software artefacts which included the adherence to risk assessment and outcomes based assessment rather than the opportunity for much reflexivity in the process. Others however were involved in social science research and tended towards a more reflexive and medium participatory approach.

The focus group investigated the established norms of behaviour from both a professional and personal perspective to gain insight into the likely compliance regarding the issues and found that established personal norms regarding responsibility, governance and privacy and data protection influence the ways that researchers approach the processes and management decisions within their own projects.

6.3 Cross-disciplinary Cross-nation Context Workshop

6.3.1 Introduction

The subsequent sections present the findings from the Cross-disciplinary Cross-Context Workshop conducted at the University of Oxford, 4th September 2014. The methodology for this workshop has been explained in section 4.

Following up on the 'pillars' of RRI identified and analysed in previous GREAT deliverables of WP 2 (D 2.2, Theoretical Landscape; D 2.3, Analytical Grid Report), at the beginning of the workshop the participants were briefly introduced to four out of these five key terms of RRI: anticipation, participation (or inclusion), reflexivity and responsiveness.[50] Thus, in the subsequent discussion the participants repeatedly referred to these four terms explicitly. Alternatively, participants also discussed their experiences in a way that allowed *us*, GREAT researchers, to interpret their views according to the theoretical concepts of WP 2. Accordingly, the following report combines both participants' explicit and implicit accounts of RRI.

The findings are presented as follows: First, participants' general views on technology and science are reported (section 6.2.2). Next, we report on participants' perceptions of existing responsibilities and responsible behaviour (6.2.3). This includes perceptions related to responsibility in general, the RRI pillar 'participation' in particular, and also to the parameter 'Tools' as defined in GREAT's Analytical Grid Report (D 2.3). In the subsequent section (6.2.4) difficulties in realising RRI are discussed. These issues are related to the pillars 'anticipation' and 'participation'.

[50] As already explained in the introduction, the fifth pillar of RRI, 'transparency', has been omitted from the workshop discussion in order to keep this data gathering exercise feasible in the given time.

6.3.2 Two classic concepts: the neutrality of technology and the autonomy of science

There was a concern by many of the participants that technology is effectively neutral – neither "good" nor "bad" until people use it. It was felt that it is at the point when people actually use technology where it can be used for "good" or for "bad", and that engineers cannot foresee how technology will be used once embedded into society.

> "We focus on building something that works, we don't think enough about how it can be used, which it not really how we think people should use. People might actually use it for the good or for the bad. Even if they use it for the good, the kind of intended usage, this might actually affect some – what do we call them – of the stakeholders – it's a term I hate, but some categories of people, what we just didn't think of in the design phase."

The views the participants present, can be related by us to the pillars of reflexivity and anticipation, and in drawing upon how far researchers have responsibility for the application of their research, if they consider their work neutral. How do we know and determine to what extent researchers can foresee different aspects relating to the wider usage of their product? We return to this question when discussing further workshop data related to the difficulties researchers face when realising RRI, again focusing on the concept of anticipation (section 6.3.4).

The issue of the neutrality of the technology relates to who should be held responsible for the outcome or the research. One participant elaborated on this concisely.

> "Engineers build solutions but are not responsible for the use that people do."

In his comment there is a separation between the research itself and the embedding of the research into society. There was an indication through this quote and proceeding discussion that engineers, scientists or technologists have an obligation to meet the requirements of public funding through the quality of their research in its own right. For example, it was felt that if a researcher is funded using public money to produce a particular product, then it is most important that this product is delivered to their best capacity. It was seen that in their existing practice given this focus on delivering good research which could be a product of some sort, or a particular outcome, then researchers do not, and in many cases cannot – or should not have the obligation – to think about how it will be used. This was intertwined with the feeling amongst participants that technologies, or technological products, are neutral, and that scientists cannot be held responsible for their use. Most participants felt that through their work they fulfil their role as scientists; one participant stated that "potential consequences of science are not our fault".

The participants were interested in elaborating on how RRI may conflict with what they consider to be the role of science. There was a concern shared by most

participants in the group that RRI may stagnate science. A participant explained that the very purpose of science is to provide breakthroughs. He was concerned that a program such as RRI that requires 'too much' analysis of potential consequences, may risk undermining progress, change – or "evolution", as the following quote exemplifies:

> "You're looking historically down the line at the affect of some action carried out in the past, and you say well if in the past they had knowledge of the action that came out as a side effect, then they would not research, they could have stopped it. But I think that is the worst type of logic because if you go enough in the past then we should kill the person that invented the wheel because after all, all sorts of weapons depend on the wheel. And we should stop people producing fire. Actually we should stop the human beings from ever existing or any evolution to ever take place. Where do you draw the line? There is a level of immediate foreseeable hazards [...] and a level of hazards that are imponderable."

Based on this and other comments from participants we may need to consider whether in regards to RRI there is such a thing as 'too much' analysis of outcomes, and deliberate on how to draw a balance that this participant refers to.

A participant raised that science is historically filled with "dilemmas" in areas such as genetics, and that despite these, this should not stop science.

"Einstein knew, or rather was fully aware of the potential use of the theory of relativity, and yet that didn't stop him from working [on] it."

The participant seemed to delineate science from the concerns of RRI. Another in the session commented that whilst scientists *should be* reflexive that there were challenges to accomplishing reflexivity in practice. There was, from the perspectives of the interviewees, a separation between the ideal of RRI and the actual practice of it.

One participant raised that it may be the case that the loyalty of a researcher to science can override their desire to be responsible. He drew on the case of Artificial Intelligence (AI), where he explained that most of the research is funded by the American military:

> "I don't think the problem is lack of knowledge. So, the field of AI has been funded, sponsored almost primarily by the American army. I think it all comes from the American army. Although the scientists are doing basic research they know very well who is driving the research and what those methods are going to be used for and yet there are a miniscule of American scientists who say no to getting funding from the army. So I think we know about these risks. But scientists care about science."

This and the previous comments can perhaps been seen by us, as aligning to a classic understanding of science where it is seen as a sphere in its own right. If we consider that according to the participants, such an understanding may still pervade scientific

practice, than it is maybe not surprising that RRI may cause concern amongst practitioners, in an attempt to chisel away some of the autonomy of science.

6.3.3 Perceptions of existing responsibilities and responsible behaviour

In some respects, the participants of the workshop did not see the idea of being 'responsible' as an entirely new endeavour or consideration in regards to their research projects. There were various ways in which it was seen by them that responsibility was already embedded in their current work practices.

6.3.3.1 Responsibility is already embedded in the grant application process, and in applied research

A participant raised that there are elements of responsibility within the existing grant application process.

> "When I write a grant I need to specify what are the potential hazards concerning my grant, that is what challenges I foresee could prevent me from delivering my objectives and to also state how I plan to deal with those potential hazards and to provide some contingency plan."

The participant emphasised that when researchers compose applications for funding they will generally be asked to specify any potentially problematic issues that they "foresee", and further outline alternative plans that they could put in place to deal with these. This demand on researchers to consider the potential obstacles to accomplishing their research can be seen to show the existence of elements of anticipation and reflexivity embedded in the production of research proposals. This is not in the comprehensive sense of the notions as depicted by the exemplary pillars of RRI underpinning the discussion, however his comment shows that these notions, and so 'responsibility' does exist. The incorporation of responsibility is depicted by the participant in a narrower sense, based around issues in direct relation to the planning and completion of the project proposal itself, and concerning aspects directly related to the conducting of that project.

This further brings to light that anticipation and reflexivity may already be an important part of the research application process but termed differently, and appearing in various degrees in relation to the pillars of RRI discussed during the workshop. This is important to recognise, as we should be careful not to overstate that responsible practices do not exist *at all* if they do not fully concur with the ideal given by the exemplary definitions of the pillars of RRI.

An interesting addition to the previous comment was that a participant felt that researchers should not have to display additional responsibility to that depicted by the submitting of a research proposal.

> "When the EU funding is given, there are some people selecting the criteria for giving the criteria or not to one project or not. People have to decide why a project is given funding or not given funding. It means these people they have to select if these projects, they have some benefit for society, or for the science depending on what criteria they use. But once they are giving money to you, to your proposal, I think you don't need a second jury internal saying your thing it works or not, I never wonder about such things."

He pointed out, related to the previous comment regarding grant proposals, that there is a process that research projects have to go through in order to be accepted. Through this process, it will be determined whether the project is considered feasible, which includes a consideration of ethical dimensions, challenges and contingencies of the research design. He felt that this was "enough" for researchers to deal with, shifting final responsibility over the project to those that decide whether to award funding. His response is particularly interesting, as it brings forth the narrow conceptualisation of the notion of being 'responsible' that seemed to be shared by other researchers in the group, applying it to a particular project and the process directly related to applying for the project. For RRI, this is potentially problematic, as additional demands on the researchers could be seen as a burden, if they themselves deem they are already 'judged' as responsible through the grant application process.

Another example of what was seen to be the integration of responsibility in practice related to applied research. The following comment was provided by another member of the workshop:

> "If I look at reflexivity and inclusion… I believe these two principles fit very well some types of projects. Projects in which you have empirical activities, projects which are typically more applied research, in which you are trying to foster some co-design and or solution with stakeholders. And ideally you would have the stakeholders, whatever this means, involved officially into the projects. For instance we had a project on smart [...] mobility, and we had transport agencies, municipalities, we had environmental associations because they were actually part of the design process. And in that case it made perfect sense."

He explained that in some projects, specifically in applied research, stakeholders could be formally embedded into the planning and undertaking of the project, as the project will be contextualized. The researcher saw this as being responsible, as there was the broader inclusion of stakeholders. He did state, that some projects may be more amenable to the incorporation of stakeholders than others.

Thus, through the discussion surrounding RRI, some participants emphasised that what they would consider responsible practice does currently exist, especially in the grant application process which occurs from the outset of any project, and in applied research. We acknowledge that this may not be according to the comprehensive extent which the four pillars of RRI convey, but we saw from the discussion with the participants that elements of reflexivity and anticipation – where researchers are asked to consider the trajectory of their research project and suggest contingency plans – and participation – where stakeholders may be deliberately included within

research plans for applied research projects – are present without the explicit implementation of RRI. For researchers this responsibility seems to be largely oriented to the planning for and undertaking of research itself, rather than resonating with the broader concerns of the program of RRI.

6.3.3.2 Consultation: Controlled stakeholder engagement exists in Citizen Science

Responsibility was largely seen by participants to be a notion that exists within and is steered within the remits of a research project, rather than a driving force in its own right within which projects are embedded.

One respondent commented on a situation where he felt responsibility had been exercised within a project he had recently undertaken.

> "From thinking of my own work, I'll just mention inclusion…one aspect of our project actually embeds that by looking at data that emerges from Citizen Science projects, and trying to identify individuals who are disengaged within that community and to intervene in order to invite them back into the community in various ways. As I said we were looking at incentives so various ways of trying to get them to come back in ways that are both unobtrusive and helps the community."

He felt that the use of citizen science data constituted the wider inclusion of stakeholders in a project. Citizen Science data is obtained through crowd sourcing or crowd funding scientific research to the 'wider public', generally enabled by online interfaces and associated infrastructures. Since the resulting data is generated from a broad range of stakeholders, then the participant considered it as a means by which his research was 'inclusive'.

This is an interesting outlook from the respondent particularly in regards to the consideration of the participation pillar of RRI. Here we can see that to some level citizens beyond the realms of the officially designated researchers were able to contribute to the generation of data. However, we must consider that the use of citizen science data still falls within the remit of the infrastructure and requirements of the project, and the particular scientific endeavour. The collection of the data, and so the inclusivity, is being essentially steered by the research rather than the stakeholders having the capacity to reflect on the project as a whole, and elements surrounding its impact on society and such broader issues. What the participant perceives as inclusivity, the cooperation of citizens, happens in a controlled and circumscribed manner. This seems to be a different orientation to and perception of responsibility to the goal of RRI which perceives participation and reflexivity not just within a project, but also surrounding the broader aims of the project or programs of research, including whether they should be allowed to be conducted in the first place.

Thus, comparing this take on Citizen Science projects to the four governance models explained in GREAT's D 2.3, Analytical Grid Report (pp. 79-82), we may conclude that the participant is to some extent geared towards the 'Consultation' model. According to this model, stakeholders of the public have valid views and opinions to contribute, and their insights are respected. However, they are not allowed to influence the research activities up to a point where the entire project may be radically questioned (substantially changed or even abandoned).

6.3.3.3 AG parameter 'Tools': Negative experiences of existing ethical review procedures

Some respondents expressed concern regarding their experience of current ethical procedures. Review processes that they have been through were used to illustrate their negative experiences of these.

In particular a respondent commented that during ethical processes they are judged by reviewers who do not have expertise in their area and so cannot 'possibly understand' what they are doing:

> "During the negotiation the commission might require you to go through an ethical review process. Which I can tell you is quite painful. Just because, it's really about this issue of stakeholder involvement and what's inclusion and what's reflexivity. And it was very hard for us as a project to go through it because we were talking to people, basically ethicists and philosophers, without any knowledge at all. So we had a hard time in communicating to them what we wanted to do, which of course we knew we had to do for the wider public but it was really really (tough)."

There was mention of one experience where reviewers are drawn from entirely different fields to those associated with science. The underlying concern of the participant appeared to be that science and research, which are valuable endeavours in their own right, suffer as a result of this lack of understanding. One participant commented that at one point, there was a unit within the EU that was responsible for ethical reviews, which could not possibly understand the needs of every project, particularly without scientific expertise.

The participants do raise an important point. What may be seen to be unfeasible or 'dangerous' could engender a situation whereby we lose out on potentially invaluable scientific contributions. Another issue that surfaces according to some of the participants, is that whilst there are extant procedures in place that ask researchers to be what we can interpret from their responses and consider through an RRI lens to be reflexive, anticipatory and transparent, they state that these procedures have to be "fit for purpose" and "support science", otherwise they detriment the overall purpose of being responsible.

6.3.4 Difficulties researchers face in realising RRI

During discussion, a participant stated that whilst the notion of RRI "looks good" on initial reaction, a more in-depth consideration could raise issues surrounding the implementation of RRI, and even opposition to proceed with it.

> "It's not about the principles, I think the principles are fine, it is about how the principles are applied."

This view was shared by some other participants, as discussion proceeded there was increasing concern regarding what the different pillars mean in and for practice. We now go on to elaborate on some key issues that were raised.

6.3.4.1 Anticipation: Researchers cannot have control or understanding over everything

There was a concern amongst the participants that there are issues with and regarding research that may or may not be within the remits of control of a researcher.

> "We know that we can invent a method; we can create a method that can be used in different contexts. But I think we are at many times quite limited by the borders of our research field."

There was also substantial deliberation in the group regarding the delineation of the terms 'hazard' and 'risk', in relation to what exactly RRI wanted them to 'foresee'.

> "When I look at the term hazard in this context, I tend to think of some kind of unwanted and unplanned consequences, of maybe an application that builds upon the research that we do."

The participants generally associated with the fact that a hazard is something that the researcher has little control over, and is actually harmful, whereas a risk can be mitigated. Words such as "unwanted" or "unplanned" as in this participant's response, and others including "highly unpredictable" or "external", were used in relation to a hazard. Underpinning the discussion was the sense that researchers cannot control everything associated to their projects. One participant stated that

> "Researchers cannot understand every scenario involving stakeholders."

If we take into account these considerations of the participants, then it can draw us to the expectations of RRI and whether they can be fulfilled in practice, given the nuances in regards to different genres of situation and their related unpredictability the researchers point to. There is a sense that researchers feel that some elements of research have the potential to be problematic, and can be prepared for – and others simply cannot be foreseen. It was further felt by some participants that different types of projects are more amenable to considering and anticipating problems than others.

> "I think that most of the EU funded projects many types they don't obtain an output-final product- that most people are going to use, because they are more on our research.... because in my case it was only a prototype. And this prototype was only used in a limited scientific world it is not going to have any consequence in this way."

The discussion was focused around the differentiation between fundamental and applied research. In the quote above the participant has a view that since his project is 'research-centric', then he does not consider the wider impacts to be related to any ethical instances outside of the project itself. It was suggested that since applied research is contextualised, then it would be easier to take into consideration the wider elements surrounding research as depicted by RRI, since there is a clearer indication of who stakeholders are. Fundamental research on the other hand is undertaken without a particular context in mind, and therefore without application it is more difficult to consider the embedding of it within society.

The discussion of the differences between research projects draws us to ask ourselves, whether it is possible or even 'fair' to place the demands of RRI on all researchers alike, or whether we take into account the differences and nuances presented by the variability between fundamental and applied research. Even extending this consideration to the notions of hazard and risk, it seems that as the participant suggest, the foreseeability of some issues may be more probable than others. Perhaps this needs to be accounted for within the pillars of RRI. An issue that we face is how to determine in RRI what can be foreseen and cannot. How do we hold researchers accountable for issues that emerge which they may not have been able to predict, bearing in mind they cannot have control over the entirety of their research endeavour? Importantly, given the subjectivity of projects and perceptions, how can we determine what researchers *should* be able to anticipate and what they cannot?

6.3.4.2 The dilemma of 'quantitative' stakeholder engagement and 'qualitative' deliberation

Discussion in regards to the autonomy of science (see section 6.3.2) was particularly related to the involvement of stakeholders in research, determined primarily by the RRI pillar of 'participation'. For instance, there was some discussion surrounding what a stakeholder is. Moreover, certain comments of participants merit closer attention, as they help us to understand the difference between – what we tentatively called – 'quantitative' stakeholder engagement and 'qualitative' deliberation. GREAT's D 3.2, Exemplifying the Typology with Relevant RRI Projects, has alluded to this difference, and practical problem (p. 40): "What type of [participatory] devices most favour quality deliberation?"). While engaging a large number of different stakeholders is an important goal in making research and innovation processes more responsible, pursuing this very ideal, and pushing it to the extreme, may also become counterproductive and confuse or distort research and innovation processes in undesirable ways.

One participant explained that he felt there is a growing recognition that due to the Internet and Ubiquitous Computing, that people should be made "partners in the scientific process". However, he felt that there was "a dilemma" in actually accomplishing this.

There was a concern surrounding the notion of 'expertise', and it became clear that most of the researchers see themselves and were protective over their role as experts in relation to making decisions regarding research, and effectively 'knowing what is best' for the progression of the research. This view resonates with the 'Standard' governance model explained in GREAT's D 2.3, Analytical Grid Report (p. 79). For instance, one member of the group stated,

> "I am the scientist, why should stakeholder requirements dictate the nature of my practice."

Another participant stated that the prospect of stakeholder inclusion "terrified" him. He elaborated on this further commenting that his disconcertment with stakeholder inclusion was given that the other pillars of RRI which require continual consideration of stakeholder views may engender a state of flux and constant change in stakeholder requirements, causing huge problems for the progression of research. He had particular concern regarding the nature of knowledge that such stakeholders would hold in relation to research.

> "And I'm terrified what you were saying about the wider public, we all know the affects of majorities, or uniformed majorities, or vocal organised minorities. For example if everybody was exposed to scientific research in the United States, biology would come to a grinding halt. Because the majority of people it is well reported, hate genetics..."

It is important that we shed light on the fact that this is not wholly negative, as it does embody an aim to make breakthroughs which benefit our world; and to avoid acting in the heat of the moment (as implied in the expression "affects of majorities"). In order to accomplish this, the participants felt that they as experts should be responsible for 'the science' as they have the knowledge to make informed decisions. One participant said that inclusion as a principle is not feasible given the dilemma of being able to conduct science and move forward with the science – it was said that a misinformed public will panic (over issues which they cannot fully grasp).

In a similar vein, another participant reported that certain stakeholders' interests and goals were not compatible with his own. The following quote suggests that in refusing to cooperate with these stakeholders any further, he actually defended a particular ethical norm, the protection of data:

> "Inclusion might contradict scientific practice… so from my perspective, I remember we were working with the student union agency at [...] University and at some point last year they told us that they wanted to work with Facebook, and Facebook wanted our data. So that was an unexpected requirement I couldn't agree with. And we stopped working with the student

> union. So the stakeholder again raised an issue that conflicted with my ideals as a scientist, and I had to make a decision."

Another participant pointed out the difference between communication and engagement, and how communication (a one way dialogue) is important but engagement is problematic. There seemed to be reluctance as pointed out before to let stakeholders steer research. In other words, this participant was perhaps implicitly geared towards the 'Standard' governance model, as explained in GREAT's D 2.3, Analytical Grid Report (p. 80): he appeared to prefer a 'one-way method of communication'. Similarly, most members of the group had attributed or felt that a different conceptualisation of participation to that depicted in the exemplary definition of RRI would be more appropriate.

There was further concern over how stakeholder inclusion would be managed as it could require extra expertise or specialists.

> "... including wider public participation, including stakeholder, including changes in stakeholders needs, who manages it, and that question is not very nicely put in definition… for every definition there must be a chain of command, so to speak."

It seems that the researchers did not see themselves as able to manage stakeholders. The participant in the quote above alludes to changing stakeholder requirements. This implies an added a layer of complexity: How could such changing requirements be taken into account and managed through a research project? Some participants pointed to the fact that this could place demands on researchers and the budgets they work with – that are publicly funded. This again alludes to their responsibility as scientists in using public funds, and how they perceive this to be in the endeavour of science as opposed to being related for wider purposes.

Though most were opposed to full participation- limiting the involvement to stakeholders largely to communication- or positions where they as researchers are very much in control over the involvement embedded in the wider infrastructure of their projects, one participant did suggest that a difficulty in how we implement the involvement should not be confused with stakeholder involvement not being useful – as these are two different things. Though not stating specific examples he said he was aware of situations where stakeholder involvement has been used successfully.

6.3.5 Summary

The findings from the Cross-disciplinary Cross-Context Workshop present some insightful views from interviewees in the realm of science and technology, in regards to responsibility research and innovation (RRI), and their existing practices. These views concern their perceptions of what responsibility and responsible behaviour are in a general sense and related to their professional roles, the challenges they consider to implementing RRI in practice in relation to scientific developments, and

as emerged through discussion, whether they consider RRI to be a desirable ideal to work towards in the first place.

During the workshop much discussion tended towards potentially problematic issues surrounding the conceptualisation of RRI and the practical implementation of it. The researchers in most cases seemed to be keen to defend the autonomy of science and almost oppose this against the ideal of RRI which they had been presented with. The responsibility afforded to them as scientists, and producing 'science', was seen by them as related to but separate to RRI. Many shared that science is neutral and the meaning given to it is ascribed through the use of the products of science by society, something which they felt scientists cannot or should not be expected to anticipate. The danger of RRI hindering the progression of science was discussed through present examples and also historic innovations which may have ceased to develop if RRI has been present in the time of their inception. RRI was in some regard seen as a potential threat to the accomplishment of scientific endeavour.

It was further felt by most interviewees that responsibility was not something new, but a feature that pervaded their existing work practices. The grant application process was pointed to as an area where they are asked to consider the implications (positive and negative) of their work. One interviewee commented on particularly negative experiences with existing responsible practice, including ethical reviews – whereby those without expertise in science were judging whether it would be good or bad to proceed with. It was also felt by some interviewees that citizen science already allows stakeholders to be a part of research in some cases, making science inclusive. It was interesting for us to note, that where the interviewees showed evidence of participation, were situations where the participation existed very much within the boundaries of the scientific endeavour; steered by it, rather than steering it (as RRI would denote). Stakeholder involvement was determined in a manner in which they were working areas pre-determined by researchers, and contributing to research rather than having a second order reflexivity on the nature of the research as a whole. There seemed very much to be a general feeling that the scientists, given their expertise, were placed in the primary position to make decisions regarding science.

As well as showing some signs of disdain for the notion of RRI, the researchers were also keen in many instances to direct attention to where it may be difficult to realise the ideals of RRI in practice. It was felt that they would certainly not be able to have control over all aspects of scientific endeavour in practice, particularly given their application and use by a diverse society.

Furthermore, there was a concern about allowing potentially 'uninformed' stakeholders to make important decisions regarding scientific endeavour and the detrimental impact this could have on the future of science. There was also concern for the practicalities of managing the demands of stakeholder inclusion, from a pragmatic perspective within the existing obligations of conducting a project. These

(empirical) views match the conceptual perspective developed in another GREAT deliverable, according to which there is a difference, and actually a tension that is difficult to solve, between 'quantitative' stakeholder engagement and 'quality' deliberation (D 3.2, Exemplifying the Typology with Relevant RRI Projects, p. 40).

The discussion with the interviewees in the workshop shows at a broader level some of the challenges to us in realising RRI in practice. This in particular relates to how given the subjective nature of what 'responsibility' is perceived as by participants (here their responsibility as scientists, rather than in the sense that the ideal of RRI depicts), they may see no need for the additional demands of RRI, or as conveyed by some, see them as a detriment to the responsibility of their professional role.[51]

7. Conclusions

This report has presented themes and concepts related to RRI (Responsible Research and Innovation) that emerged from the empirical data collected and analysed in GREAT's WP 3. Through semi-structured interviews, two focus groups and a workshop different participants' perceptions of RRI have been considered, and how these participants contextualise RRI ideals against the backdrop of their own existing experiences in research, innovation, IT development, business and other areas, including public institutions' work, but also private and family life.

A great deal of the interview-based case study analysis was focused on CIP ICT PSP projects (section 5), whereas the two focus groups and the workshop (reported in section 6) also involved other EU funded researchers further experts such as, representatives of industry, as in the focus group on the development of robotics. Apart from robotics, the report also provided insights into other domains: care for the environment, care for older people, and automation in financial markets.

The main findings have been summarised in the following sections: 5.4 (themes and concepts emerging from the three interview-based case studies); 6.1.5 (results from the focus group on RRI and robotics development); 6.2.4 (results from the focus group on RRI and EU research); and 6.3.5 (findings from the Cross-disciplinary Cross-nation Context workshop with EU researchers).

Some general conclusions can be drawn:

[51] A further step could be to analyse in greater detail the types of actors and types of EU projects represented in the workshop discussion, although this seems hard to reconcile with the requirement of anonymisation. Depending on the types of actors and projects, an 'RRI scale' might emerge: At one end, basic research might relax the inclusion constraint (as implied by the RRI pillar 'participation', or the AG parameter 'participatory approach) in order to avoid stiffening the scientific research. This inclusion constraint would be less relaxed in cases of applied research. In purely commercial projects involving innovation and research this constraint might take a more important role, especially in some industries.

First, many key concepts of the RRI debate such as, responsibility, transparency and risk have multiple meanings in practice. It appears advisable that proponents of RRI continuously learn about such semantic differences, and engage with participants from different contexts where RRI is to be implemented, in an ongoing process of mutual learning.

Second, the analysis revealed various tensions, dilemmas or trade-offs. This resonates with the conclusions drawn in GREAT's D 4.1, Database and Survey Report, which problematised "RRI trade-offs" (p. 106). The following examples emerged from the preceding analysis:

- In care for older people (and health care more generally) a high degree of transparency about a patient's condition may help both professional carers and family members in providing care in a well coordinated way; but it can also be experienced as infringement of privacy (*finding from the local context case study 'care for older people')*.
- Furthermore, transparency is a difficult requirement for commercial, profit-oriented partners who also need to preserve their intellectual property right (*finding from the interviews with CIP ICT PSP, EUREKA and FP 7-COORDINATION project participants*).
- Also, a given research project may strive for being as responsive as possible to its continuously changing environment. However, the very notion of 'project' also implies limited time and resources, as well as formal accountability (a certain type of responsibility) to the funding agency, which is usually reflected in an explicit work plan with prescribed activities, goals and timelines (*conclusion from various interviews*).
- Participants explained that while it may be desirable to engage many different public stakeholders, this could also undermine the quality of the deliberation process (*finding from workshop*).
- Finally, there are considerable tensions between responsibilities in the personal versus the professional sphere (*finding from focus group on RRI and EU research)*.

Third, based on all types of data analysed in this deliverable (interviews, focus group and workshop), an important conclusion can be drawn with regard to the governance approach that is favoured by most of the participants, or deemed the most realistic and appropriate one (explicitly or implicitly). Basically, it is the steering of a given project according to the 'Consultation' governance model (D 2.3, Analytical Grid Report, p. 80). Or, to put it differently: from the participants' perspectives neither a pure 'Standard' governance approach nor a radical 'Co-construction' approach appear to be favourable, realistic and appropriate. This resonates with the results from an earlier document-based analysis of five CIP ICT PSP projects (GREAT's D 4.2, Case Study Report, p. 64).

Taking these findings together, one may conclude that the RRI ideals of participation, responsiveness, and transparency, and perhaps also other RRI principles, are not easily applicable when considered within complex empirical contexts. 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, as it is implicit in Kjølberg's (2010: 8) view of "responsible development" in the field of nanosciences and nanotechnologies (nanoST):

"Responsible development of nanoST can never mean a guarantee of 'good' nanoST for all. Rather, it involves acknowledging precisely how this is unachievable."

This does not mean being fatalistic and abandoning the RRI initiative altogether, but perhaps turning it into a more realistic endeavour. Proponents of RRI may need to take quite some time to study 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.

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APPENDIX I: Consent form for interviews and 'Cross-disciplinary Cross-nation Context' workshop

Department of Computer Science
University of Oxford
Wolfson Building
Parks Road
OX1 3QD
Oxford

Governance for Responsible Innovation

Please read and initial those points below you agree with.

Please confirm your consent to participating in this research by signing the form below.

	Initials
1. I confirm that the purpose of the study has been explained to me and I have had the opportunity to ask questions about the research and have had these answered satisfactorily.	--------
2. I understand that my participation is voluntary, and that I am free to withdraw at any time without giving any reason and without any implications for my legal rights.	--------
3. I am allowing the researcher to audio record me and take handwritten notes as part of the study. The recording will be transcribed. I understand that anonymised quotes may be used in presentations or publications stemming from the research but not in any way that might allow for identification of individual participants.	--------
4. I am allowing the researcher to video record or photograph me as part of this study. Recordings will be transcribed. I understand that still images may be used in publications stemming from the research but that faces and other identifying features will be pixilated.	--------
5. I understand the data will be kept confidential at all times.	--------
6. I agree to take part in this research.	--------

Name of participant: Name of researcher:

Signature: Signature:

Date: Date:

If you have questions or concerns about any aspect of this project you may contact the principle investigator: Marina Jirotka, Oxford e-Research Centre, 7 Keble Road, Oxford, OX1 3QG, UK, +44 (0) 1865 601613, or by e-mail at marina.jirotka@cs.ox.ac.uk who will do her best to answer your query. Alternatively, you may contact the research assistant of Marina Jirotka: Barbara Grimpe, Department of Computer Science, University of Oxford, Wolfson Building, Parks Road, Oxford, OX1 3QD, UK, +44 (0) 1865 610607, or by e-mail at barbara.grimpe@cs.ox.ac.uk. If you remain unhappy and wish to make a formal complaint, please contact the Research Ethics Committee at the University of Oxford at ethics@socsci.ox.ac.uk; +44 (0)1865 614871; Social Sciences & Humanities Inter-Divisional Research Ethics Committee, Oxford University, Hayes House, 75 George Street, Oxford, OX1 2BQ, UK.

APPENDIX II: Consent form for focus groups[52]

GREAT (Governance of responsible innovation) Focus Group and Workshop

Consent form

Issue	Respondent's initial
I have read the information presented in the participant information document about the Focus group and workshop	
I am aware that the language of sessions will be English. I understand that the focus group and workshop will be conducted in English and that the transcript will be made available to me in that language, should I request it.	
I have had the opportunity to ask any questions related to this research, and received satisfactory answers to my questions, and any additional details I wanted.	
I am aware that excerpts from the focus group and workshop may be included in publications to come from this research. Anonymous quotations will also be used in publications where these refer to material not otherwise published.	
I give permission for the interview to be recorded using audio recording equipment	
I am aware that I have the right to change my mind about the use of the information provided up to the moment of publication. I am aware that I can inform the researchers via email of my change of intentions up to this point.	
I understand that every reasonable effort will be made to keep	

[52] This consent form has not only been used for one of the focus groups conducted in GREAT's WP 3, but also for a workshop conducted in WP 6 (that is why the heading also refers to a workshop). The WP 6 workshop was concerned with developing requirements for guidelines; it was a data gathering exercise separate from WP3's 'Cross-disciplinary Cross-nation Context Workshop' reported in this deliverable.

confidential data securely. Any recordings or transcripts will only be viewed by the research team at De Montfort University and their collaborating partners from the GREAT project. Neither De Montfort University nor their collaborating partners will use the recordings or transcripts for any other purpose than the study describes. Understanding this, I give permission for these individuals to have access to my interview data.	

With full knowledge of all foregoing, I agree to participate in this interview.

Participant Name:	
Participant Signature:	
Date	

APPENDIX III: Interview schedules

Qualitative interview schedule CIP ICT PSP Pool, adapted after delivery of the Analytical Grid (DEL 2.3; end of February 2013); to be used for the remaining interviews in 2014.

The cursive comments in the brackets indicate the links to the Analytical Grid.

A. *Understanding the type of organisation involved*

Please describe and characterize your organization.

B. *Understanding the interviewee's position and concrete daily work; understanding the processes and products of the project; exploring part of the governance structure within the project.*

1. What is your role, and what are your concrete tasks? Please give some examples.

2. How is this work of yours steered, who do you orient to? What/who are important drivers in your concrete work?

3. How would you describe the products, outcomes or effects of your project? Are there any ethical implications that you or any other partner, or stakeholder, have raised? *('Product' in Analytical Grid)*

    i. How do or did you identify these issues?

    ii. Has there been any discussion of these issues with other project partners?

    iii. Did your discussion have an influence on the design of the product or the research (e.g. positively, by opening up new possibilities, or negatively, by inhibiting/slowing down the development of some characteristics/properties or even products)?

4. Would you please describe the processes in place to achieve the project's goals? Who participates in these? Do these processes involve any form of reflexivity? *('Process' in Analytical Grid)*

5. Before, during and after the project: did/do you communicate with your different project partners – if yes, how, and how often? (e.g. e-mails, meetings, ...). About what, for example?

6. Are any assessment procedures in place? If yes, please describe these. *('Assessment' in Analytical Grid)*

7. In particular, are any risk assessment procedures in place? If yes, please describe these. *('Risk Assessment' in Analytical Grid)*

8. General question: what are other relevant project participants? Their role? List of such other relevant actors (actor types):

    i. Project coordinator

    ii. Grantor (Funder)

    iii. Beneficiaries

    iv. Co-developers

    v. Complementary partners

    vi. Interested parties

    vii. Provider, supplier

    viii. RRI parties checking that project is conducted correctly

        - checking only occasionally: auditor/monitor
        - being directly involved as project partner

    ix. Any follow-up in this regard after the project?

C. *Understanding the existing legal, institutional and other governance structures, and how these influenced the project partner's work –*

including deliverables/milestones and the final innovative product – as well as his/her collaboration with the other partners.

1. Would you please explain to me the conditions under which you do/did your work – like legal, institutional ones. *('Norm/law relation' in Analytical Grid)*

2. Is or was there any kind of formal body checking the ethical 'making'/running of the project (like ethical committee at university)? *('Tools/epistemic tools' in Analytical Grid)*

3. And/or any such procedures (e.g. 'stage-gating')? *('Tools/epistemic tools' in Analytical Grid)*

4. At what (organisational) level?

5. In R&D process (code of responsible research and development):

    i. Any rules and regulations that people were bound to follow?

    ii. Any relevant codes of conduct?

6. Has the grantor/funder installed any kind of (a) auditing/monitoring actor, or (b) procedures?

(Combining the answers from B and C: Does the project's governance structure resemble one of the four models in the Analytical Grid – or how does it relate to these?)

D. *Understanding how the funding structures – EU and others – have shaped the project partner's work. This includes deliverables/milestones and the final innovative product, as well as his collaboration with others. This explores the dimension of 'norms' in the Analytical Grid parameter 'norm/law' relation.*

1. Would you please explain to me your relationship with the EU (as a funder) and other sources of funding?

2. How do the funders, or funding structures, influence the course of your work and/or the software tool, or have done so, in the past?

3. Any funders apart from the EU?

4. Maybe for non-monetary assets?

5. If yes, what kind of role/function in the project?

6. If such additional monetary and non-monetary support existed – were there any mechanisms in place to manage these ('properly' - responsibility/ethical behaviour question)?

E. *Understanding innovation management; relationships with primary and 'locally embedded' stakeholders; and possible elements of participatory approaches. ('Participatory approach' in Analytical Grid)*

1. Do or did you have any kind of innovation management methodology in place? If yes, could you elaborate on that?

2. Is or was any client or user active in your project, e.g. paying client, non-paying client, users engaged by a client, users engaged by a government body, other users engaged by other project partners?

3. If yes, at which moment of the project were they brought in/participated, and how? (stakeholder and user engagement)

    i. Consulting function or more?

    ii. How did you use the results of this consultation/ participation process?

    iii. Any kind of 'anticipatory work' being done together?

4. Where there any other important influences in the way you did your work over the course of the project?

F. *Understanding the outcomes and impacts of the project, if any; understanding problems, dilemmas. (This explores further the 'product' and 'process' dimensions in the Analytical Grid; and the parameter 'cultural differences')*

1. Have you encountered any problems during or after the project?
2. Has 'culture' mattered in your project – in any sense, in any way?
3. If the project has already been finished: Are you still in any way in contact with the project site(s)?
4. Do you know whether and how the tool/product/service is still used?
5. Value creation/innovation management:
    i. Was the project finished in the time and with the money provided?
    ii. If yes, what were these project outcomes?
    iii. Has this been transferred (to the client)? Commercial solution? Or only 'proof of concept'? Any publications, patents?
    iv. Any wider dissemination, outreach activities, general public, how?
    v. Any capacities, skills, competences created? (Human resources, organisational factors/improvements)

G. *Questions related to the development of recommendations and guidelines in GREAT, WP 6*

1. Was there anything difficult or problematic about this project?
2. In your view, is there anything that may have improved your work or the overall project?

3. Would you make any recommendations for future EU projects in this area? (This may concern all the different partners and stakeholders involved, and the funders).

Oxford – GREAT project

Basic interview schedule

Case study ICT in financial markets
18/03/2014

Through these interviews we aim at gaining a practice-oriented understanding of extant responsibilities, forms of responsible innovation, and governance, related to ICT in financial markets (automation). Every interviewee has different experiences and a different perspective, and works in a different environment. We try to capture this situatedness and variety, i.e. the relevance of *contextual* aspects of governance and responsible innovation, as far as this is feasible. We also try to explore whether there is room for further responsibilities and forms of governance, as far as possible. Most of our questions aim at establishing links with dimensions of the analytical grid, WP 2 (see green keywords). Moreover, the last section aims at providing empirical data for WP 6, Guidelines and Recommendations.

Interviewee details (partly confidential/to be anonymised)
Name
Job title/post
Current institution, department
Former jobs/institutions, in case this reflects experience relevant for our research focus

Introduction
The interviewee receives the participant information sheet about the GREAT project prior to the interview. Where necessary, BG explains the project further, and the interviewee has the opportunity to ask further questions.

1. Your current work (existing responsibilities/distributed responsibilities)

- What are your tasks/duties, exactly (on every day basis)? Please provide me with a picture of the full spectrum of your work, as we try to understand *existing* responsibilities of FM participants.
- Any examples of routine, and not routine work, from your everyday experience would be very interesting.
- How would you describe your responsibilities (again, in the sense of: everyday duties, work, interrelated work steps), within your wider work environment – like between you and colleagues, or anything/anybody else I may not think of yet?

2. The products and services you are concerned with

Product

- What are the 'products'/services – output/outcome – of your work, and your team/organisation? (Please give some examples you consider important)
- What are the reasons for developing these?
- In your view, do these products/services have any ethical implications?

3. Focus on automation (and your related work, related products/services etc.)

3.1 Introductory questions

You have worked as .....

- Over all this time, what part of your work would you associate with 'automation'? ... *'Automation' in various senses*, e.g. 'algorithmic trading'; any kind of information and communication technology that contributed to/facilitated your work; or that you depended on; or that was difficult to handle etc.
- Have you witnessed significant change in the kind, and degree of automation related to your work?
- In your view, has automation helped or hindered?
    - In what ways?

3.2 Assessment

- Given the various technological systems you have worked with – were there any assessments carried out?
    - If yes, what were these about (normative horizon)?
- Any assessments of other aspects – workflows, products, services?
    - If yes, what were these about (normative horizon)?
- What is your view of assessments?
    - Are they useful? Why or why not?

3.3 Cultural differences

(*this item is related to 'norms'; norms being relative to contexts*)

- Were there any issues in your work you had to cope with related to culture?
    - ... FMs are global, but culture may still matter in some way, and this may become manifest in concrete every day work...

3.4 Process

- In the companies/organisations, and teams, you have worked so far – in your view, are there any procedures or measures in place to
    - monitor the work process?
    - support reflexivity among the staff, about the daily tasks, decisions taken etc.?

3.5 (Epistemic) tools

- Any sort of 'ethical' board, review, committee to check work processes, products, services, outcomes?

- Any formal or informal ways/measures to open the discussion of whatever critical/difficult issues? (ethical approach)

- Any risk assessment in place? If yes, please describe it.
- Are there any precautions put in place – in whatever way, against/for whatever may have been relevant in your work/organisation?

3.6 Participation, deliberation; stakeholder involvement
(this item is related to 'governance', and 'models' of governance)

- Any form of involving various stakeholders – people directly concerned with the products/services of your organisations/team's work, and people that may be concerned more indirectly (indirect stakeholders)?

3.7 Relevant legal rules, regulatory requirements --- other norms --- existing governance/steering processes (Governance; norm/law relation)

- Are any legal rules, laws, regulatory requirements relevant for your work?
- Are there any other norms that play an important role?
- When you hear 'governance' – what would you say, what kind of governance processes, rules, standards, also informal ways of steering your work are relevant?
- More simply said, what kind of rules/expectations/management/organisational steering processes do you have to cope with on an everyday basis?

5min

3.8 Recommendations and Guidelines (for WP 6, GREAT Project)

- Given your experience with different forms/types of automation: what do YOU think would be important points in guidelines for responsible innovation?
- More precisely, do you have any suggestions regarding the governance of automation, and how to innovate responsibly in the area of automation?
- More generally, do you see any need for (other) change or improvement in your domain?

- Is there anything that we haven't talked about yet – that you think is important, that you would like to add when thinking about governance and responsible innovation in FM?

Where possible, BG asks for contacts/ potential interviewees the interviewee may know about