Governance of Responsible Innovation

GREAT – 321480

Exemplifying the typology with relevant RRI Projects			
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Executive Summary

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

Introduction

WP3 is devoted to an empirical analysis of the context of responsible innovation that will complement and adjust the theoretical work achieved in WP2 by implementing both a deductive top-down and an inductive bottom-up approach. Supported by the Analytical Grid (hereafter AG; *c.f.* del 2.3.), a baseline study of ICT design, 15 case studies (of single projects as well as entire application domains) and a field trial of a real world case are conducted in

WP3, focusing on their processes of reflexivity and on their tools of governance. Within this work, the aim of del 3.2. is to exemplify the typologies of RRI models provided in del 2.4., i.e. to illustrate the different role that innovation and research projects allocate to participation and deliberation, the types of reflexivity and the relation between norms and contexts they elaborate. To this attempt we selected a small number of cases (7) along the specific criteria given by the AG. Each case was selected because it exemplified one or several aspects of RRI governance that have been *a priori* identified in WP2. This methodology helped us to identify if some crucial aspects were still missing in the AG and also to draw some conclusions about the implementation of RRI.

It must be noted that the work presented in this deliverable slightly differs from the empirical analysis summarized in forthcoming del 3.4. and del 4.2. In these deliverables projects and domains related to the CIP ICT PSP (Competitiveness and Innovation Framework Programme, ICT Policy Support Program) are analysed, and a top-down approach (informed by the Analytical Grid, del 2.3) is supplemented by a bottom-up approach informed by grounded theory. Compared to that dual approach, the present deliverable applied a top-down approach and selected relevant cases according to their ability to highlight one or more of the relevant aspects and issues of RRI, determined in WP2.

Methodology

Five cases have been proposed by GREAT partners as relevant projects for RRI study. The two remaining cases have been selected though a research on the Cordis EU website[1] among FP6 projects with the help of key words. We conducted a document-based analysis of 7 cases (1 national project and 6 EU projects), out of public deliverables downloaded in the project's website or provided by the project's coordinator[2]. Most of the time (5 cases out of

[1] http://cordis.europa.eu/search/index.cfm?fuseaction=search.simple

[2] Of course this is the main limitation of our work since publicly available documents cannot always give a precise account of the whole governance process of projects. In only relying on documents, we might miss some important steps of discussion that were not reported thereafter and would have only appear through interviews or surveys. However, as we mentioned it in the introduction, a sound empirical analysis with in-depth case studies (including interviews) is conducted in del 3.4. In the present deliverable, we aimed at illustrating the different models highlighted in WP2, and the document-based study gave us already meaningful

7) the projects were developing a specific technology (or a set of technologies) and included a reflection about how to deal with and address ethical issues. In two cases, the projects were driven by Social Science and Humanities (SSH) scientists and aimed at reflecting about the development of a given technology. Hence, these SSH projects did not develop any technological innovation. Yet, they were relevant to our study as they were closely connected with the development of a precise innovation.

To each case, we applied an analysis directly deduced from the AG and more generally from the theoretical work conducted in WP2 (del 2.2., 2.3 and 2.4.). It is not our purpose here to sum up this work. Let us only recall that GREAT's approach of responsibility in research and innovation is centered on the way in which norms are constructed in relation with their contexts. In GREAT, we sought to go beyond current definitions of RRI that too often are reduced to some under-theoretically conceived ingredients such as participation, deliberation or responsiveness – which are necessary but not sufficient conditions[3]. Adopting a different perspective, we aimed at reflecting upon the conditions that will enable an implementation of responsiveness or deliberation gearing towards responsible innovation and research. In other words, WP2 made clear that strengthening current RRI approaches required to focus on how to empower processes of participation and deliberation and how to implement responsiveness. To move from a general conception of RRI towards a framework sensitive to the context, capable of producing norms of responsibility in relation with each context, we identified several conditions. Among these, the reflexive construction of social actors (innovators, engineers, scientists, end-users, civil society, CSO, NGO's), the learning capacities of social actors and of institutions (i.e. the capacity of learning from previous failures to continuously improve a governance process) and finally the way in which the context is (reflexively or not) constructed and taken into account in the production of norms, played a major role in our conception of responsibility. Consistently with this general theoretical background, analyzing responsibility in innovation and research required us to focus on the relation with the context projects establish, on the governance tools they put forward in order to deal with the complex issues that a given

information to illustrate the relations between norms and contexts. For all projects, the available documents already gave a precise picture of the way in which the context has been taken into account to elaborate norms.

[3] Cf. del 2.2. and 2.4, for an analysis of this point.

technology can raise and on the degree of reflexivity associated with these tools. More precisely, our methodology materialized in 5 steps.

- **Step 1**: Identifying governance tools (how ethical or complex issues are dealt with: ethical committee, workshops, *etc.*? How participation and deliberation are introduced: survey, focus group, interactive technology assessment, *etc.*?)
- **Step 2**: Identifying the type of norm production in relation with the context: to which degree the context is taken into account and helps to shape the content of norms (Context ignored, Decontextualised, Restricted Contextualised, Fully Contextualised, cf. del 2.3.).
- **Step 3**: Identifying the use of each governance tool determined in step 1, i.e. what for the tool has been designed to, what kind of purpose does it explicitly or implicitly serve? Relying on the methodology developed in the previous FP7 Science in Society (SIS) EU project EGAIS[4], we have identified several purposes that are targeted by the different governance tools put forward by each project. Governance devices can aim at avoiding future obstacles, complying with existing legal and ethical norms and laws, identifying and answering ethical issues, increasing social acceptance and meeting social expectations, co-shaping technology, providing a consulting procedure and finally pushing the start or stop of a project[5].
- **Step 4**: Identifying the Schematizing, Intentionalist and Mentalist (SIM) presuppositions of each use of the tools to have a clear picture of the relation of norms with their contexts (cf. del 2.3 and 2.4).
- **Step 5:** Identifying the model of governance (Standard, Revised Standard, Consultation, Co-construction, cf. del 2.3.).

[4] The Ethical GovernAnce of EmergIng technologieS. C.f. del 3.1. Ethical Governance Model, Paradigm Recognition and Interpretation.

[5] This step is useful to distinguish the different purposes attributed to governance tools. It does not provide yet with a whole picture of the type of responsibility achieved by each project. Indeed, GREAT's conception of responsibility rests on the kind of relation to the context a project adopts in producing norms and on the degree of reflexivity it shows in this process. Hence, the assessment of responsibility corresponds to the final step of our methodology (step 5, identifying the governance model).

The deliverable divides in two parts: chapter 1 applies the afore mentioned steps to each case, presents the results and highlights the possible blind spots of each implementation of RRI. Chapter 2 offers a synthetic summary of the results and draw some conclusions for future implementation of RRI.

Chapter 1: Description and Analysis of RRI governance in practice

For each case, we provide with a short description of the project, in order to highlight relevant differences. Projects are presented according to the increasing role they give to participation and deliberation related with the responsible development of innovation.

Case 1 - Revised Standard Model with only few answers to deep questions.

The project (BEAMING[6]) aims at developing a new type of communication technology based on virtual and augmented reality. With the help of avatars, holograms or robots a person that is not physically present in a room could interact (discursively and physically), with other persons. Compared to traditional remote communication technologies, BEAMING seeks to increase the quality of perceptions associated with communication. This project raises several traditional ethical issues related to data protection and privacy but also new questions concerning, for instance, the privacy of emotions (that could be recorded in the process of communication). The most interesting questions, however, came from the legal implications of the project. For instance, which types of law will apply if a person is "controlling" an avatar causing a damage, located in a different country than the avatar? More generally, are current sets of laws and norms able to regulate the proliferation of other selves, were the use of avatars to be generalized in a professional environment? In this project the issue of responsibility is only connected with the discrepancies existing between a real person's action and her or his avatar. In other words, the question of who is responsible when damage occurs (users, designers of the technology, *etc*.) is posed with no connection with the idea of responsibly developing an innovation.

[6] http://beaming-eu.org/

Now, if we turn to the governance characteristics of this project, all ethical and legal issues have been dealt with by a group of experts (2 psychologists and 2 law people) whose main task was to identify key issues. Legal issues were investigated in depth: the authors proposed possible answers and reviewed existing set of national and international laws to select relevant grounds on which to elaborate new norms, mainly legal. Yet, there was no clear attempt to provide with ethical answers. Probably because a lack of background on ethics (no philosopher or ethicist in the group of experts), ethical issues were only briefly mentioned, without leading to discussions about the shape of the technology at stake. In other words, there was no deep internal deliberation (that would have involved the "natural" and computer scientists of the project, for instance). There was no external participation or deliberation as no other stakeholders were involved in a reflection about this technology.

This case is a good example of a Revised Standard Model with no inclusion of social actors (complex issues are delegated to experts[7]) and with an objectivist view on risks (assessed by the experts). Although, the technology developed in this project could deeply modify our relations with the world (an increasing part of our actions would be realized by avatars), opening the reflection to civil society has not been identified as a need by this project. Interestingly and paradoxically, while the range of the issues raised was very large, the ethical reflection remained quite superficial and did not really address the possible changes of paradigms (of communication and of actions) that the technology at stake could imply.

Step 1: Identifying Governance tools

- Law compliance.
- Ethical Board (2 psychologists from an institute of neuroscience, one author with unknown affiliation, helped by two fellows of a Law department).
- Deliverable on Legal issues (What will be the relevant norms? How to interpret them in this specific case?)
- Deliverable on ethical and legal issues assessment (What are the key ethical and legal issues? Possible line of answer are sketched).

[7] Who are not specifically trained into ethics, as we mentioned it.

Step 2: Identify the relationship with the context

The relation with the context is rather *Decontextualised*:

- Ethical issues are identified by the authors of the mentioned deliverables and their work does not include a deep overview of the literature on these issues.
- No involvement of ethicists or philosophers to discuss ethical issues.
- No inclusion of other stakeholders. No participation, poor deliberation.

Step 3: Use of the tools (contextual implementation)

Tool	Use
Set of national and international regulations	Law compliance
Ethical deliverable	Identifying ethical issues (mostly privacy and safety, but also informed consent, perception of ourselves, changes of our identity by use of avatars). Only very few answer given.
Legal deliverable	Identifying Legal issues (relevant set of EU norms, how to interpret them, conflicts between international and national laws). Avoidance of future obstacles.

Step 4: On which presupposition each tool relies on?

Set of national and international regulation

Tool/presupposition	Mentalist	Schematizing	Intentionalist
Law compliance		×	
Obstacle avoidance			×

Social acceptance		×	

Legal deliverable

Tool/presupposition	Mentalist	Schematizing	Intentionalist
Law compliance		×	
Identification of legal issues	×		×
Obstacle avoidance			×
Social acceptance		×	

Ethical deliverable

Tool/presupposition	Mentalist	Schematizing	Intentionalist
Identification of ethical issues	×		×
Obstacle avoidance			×
Social acceptance		×	

Step 5: Governance Model

This case belongs to the Revised Standard Model of governance of innovation. The dealing of problematic issues is delegated to a small group of experts who have the full responsibility of framing the problem and offering possible answers. Responsibility in this project is only tackled on the side of possible liability in case of misuse or failures of the technology. There is no awareness neither of the visions of the world brought forward by this very challenging new mode of communication nor about the values it promotes or undermines. In the end, available deliverables show little concern for ethical problems emerging from the deep social transformation such a technology could entail.

Conclusion

This case illustrates how a technological push can lead to undermine social and ethical issues. The analysis of ethical aspects conducted in this project, which would be part of a responsible process of innovating, only covers the very direct dangers (criminal misuse, identity, thievery, *etc*.) related to the technology. Three crucial aspects of responsibility are missing here. First the reflexive construction of the context: issues are identified by a small number of experts, with no possibilities of discussion and modification and with no possibility of co-constructing them in a pluralist way. Many problems and questions raised by this technology are therefore left in the dark. Second, ethics is reduced to risk assessment meaning that social and ethical questions are not really investigated in depth. For instance, identifying the vision of the worlds and the values carried by the technology (inspired by the work of John Dewey (1939)[8] or John Verbeek (2011)[9]) could help to bring into light hidden normative and axiological choices and favor quality deliberation. However, ethics here is only addressed through the prism of possible risks and their prevention. Finally, the whole ethical assessment of technology is expert driven. Here again, the possibility for civil society to shape the technology according to society members' or stakeholders' values is completely neglected, in spite of the breakthrough character of this technology. The evaluation suffers from all the blind spots that participation and deliberation tries to overcome: it is monist, only "locally" justified and incomplete.

Case 2 – When the shaping of the technology by ethics only applies at the margin

This project (INDECT[10]) seeks to develop a set of detection technology, based among others, on the identification of suspicious behaviors leading to thievery or terrorism, meant to support human decision in a security context. This project, too, included an ethical committee, which mainly focused on the various issues (privacy, data protection, or informed consent) raised by the experimentation on human beings conducted to test the set of technologies developed.

[8] Dewey J. (1939) Theory of valuation. In Neurath O., Carnap R. & C.W. Morris (eds.), International Encyclopedia of Unified Science, 2(4), (pp. 1–66). Chicago: University of Chicago Press.

[9] Verbeek P.-P. (2011) *Moralizing Technology*, Chicago: University of Chicago Press.

[10] http://www.indect-project.eu/

Compared to case 1, the expert committee gathered more people and included an ethicist. Also, ethical issues were analyzed with more depth than in the precedent case, through ethical deliverables produced each year, which focused on a wide range of problems and questions associated with such a security technology. However, the project did not include any form of participation. Natural and computer scientists were consulted internally to reflect on ethical issues implementing a form of internal deliberation, broadly considered though, since it did not include an explicit presentations of arguments, to only mention one of the main requirements of deliberation (Steiner *et al*., 2004; Steiner, 2012)[11]. In addition, no other (external) stakeholders (CSO, for instance) were involved in the process. Also, if the project had to follow normative constraints (mostly related with the respect of privacy of participants involved in testing phases), it did not really address the ethical issues that the technology would raise, were it be generalized in the EU for instance. In other words, the ethical concern of the project only focused on the ethics of experimentation and not on the complex questions related to the characterization of normal/abnormal behavior and more generally to the growth of surveillance technologies. Finally, key philosophical questions such as the development of a security paradigm or the trade-off between security and liberty were not addressed. The task of the experts has been to identify key ethical and legal issues to ensure a greater acceptability and to avoid possible future obstacles. But these tasks lacked a deep reflection on the transformations implied by the generalization of the technology at stake.

Step 1: Identifying Governance tools

- Law compliance.
- Ethical Board (initially : two police officers and one retired police officer, one human rights lawyer, one Professor of law and of human computer interaction, one Professor specialized in ethics in scientific research, one technical specialist, three researchers in the domain of security related technologies). Then it evolves to add a

[11] Steiner, J., Bächtiger, A., Spörndli M., Steenbergen M. R. (2004). *Deliberative Politics in Action. Analysing Parliamentary Discourse,* Cambridge (UK), Cambridge University Press.

Steiner, J. (2012). *The Foundations of Deliberative Democracy*. *Empirical Research and Normative Implications*, Cambridge (UK), Cambridge University Press.

Professor of ethics, while one police officer and two other members internal to the project left.

- Ethical deliverables: each year of the project, a deliverable focused on ethical issues was produced.

Step 2: Identify the relationship with the context

The relation between norms and context is here gain rather *Decontextualised*:

- Ethical issues are only identified by the authors of the ethical and legal deliverables.
- No inclusion of other stakeholders. No participation.
- Deliberation is limited to the members of the project.

Step 3: Use of the tools (contextual implementation)

Tool	Use
Set of national and international regulations	Law compliance (privacy, experiments on human beings). Avoiding obstacles.
Ethical Board	Ensuring compliance with existing norms. Providing norms regulating the experimentation on human subjects. Identifying ethical issues related to the technology.
Ethical deliverable	Identifying ethical issues (mostly privacy, data protection, data storage, definition of normal behaviour etc.) Reshaping of some aspects of technology according to normative constraints.

Step 4: On which presupposition each tool relies on?

Law compliance

Tool/presupposition	Mentalist	Schematizing	Intentionalist
Law compliance		×	
Identification of legal issues	×		×
Obstacle avoidance			×
Social acceptance		×	

Ethical Board

Tool/presupposition	Mentalist	Schematizing	Intentionalist
Law compliance		×	
Identification of ethical issues	×		×
Modifying the project		×	×
Obstacle avoidance			×
Social acceptance		×	

Ethical Deliverables

Tool/presupposition	Mentalist	Schematizing	Intentionalist
Law compliance		×	
Identification of ethical issues	×		×
Providing answers to ethical issues		×	×
Obstacle avoidance			×
Social acceptance		×	

Step 5: Governance Model

This case is another good illustration of the Revised Standard Model in which all the possible issues are delegated to a group of experts and reduced to risk assessment. However, compared to the previous project (BEAMING), the analysis reaches a deeper level of understanding. Important risks and dangers associated with the use of the technology at stake are identified and anticipated and technological constraints (deduced from normative constraints) are proposed to reduce those risks. However, what would be a higher step of ethical reflection – the reflexive construction of the visions of the world and of the values associated with a technology – is completely missing in such a project. The responsibility of researchers that seek to enhance security to the possible detriment of individual privacy and freedom is never expressed nor discussed. More generally the conditions by which such a controverted technology could be developed in a responsible way are not even mentioned.

Conclusion

This case is similar to the precedent one in its avoidance of pluralist[12] assessment. Ethical thinking is purely expert driven and the contribution of "laypeople" is not expected to lead to more legitimate and grounded outcomes. Also, ethics is reduced to risk assessment. The deep understanding of the normativity of technology (how a precise technology ontologically modifies our being in the world) does not belong to the ethical analysis conducted here. This draws a very minimal line of responsibility where possible key issues are identified. But what is missing – and this would hold for case 1 as well – is a conception of responsibility focused on reflexivity, where, among others, the possibility of discussing the ethical validity of such a technology or even the conditions by which the technology could be conceived as ethically valid, plays a central role. Responsibility is reduced to the awareness of potential issues with a little attempt to sketch some possible lines of answers and justifications. Also, the possibility of responsiveness and learning, through a mutual adjustment between norms and context, is blocked by the lack of participation and deliberation.

[12] The avoidance takes place at two levels: a) a plurality of expertise; b) a moral pluralism inside the ethical expertise as such. Since there was only one ethical expert, and considering what is written in the delivrables, it is obvious that only one position was defended (monist perspective).

Case 3 - Participation as Consultation

Compared to the two preceding cases, the third project (HUMABIO[13]) introduces a first level of participation. The project aims at developing several technologies that could help to evaluate the emotional and physiological state of human beings, and more particularly their aptitude to achieve their respective tasks (driving a truck, piloting a plane, among others). Like the two afore mentioned projects, the first way of dealing with possible ethical issues implied an ethical board gathering different disciplines and including one ethicist. Through ethical deliverables and a memorandum, the ethical board addressed key issues, which, here again, were related with privacy, data protection, but also with the ethical validity of assessing aptitudes through physiological measurement. Compared to case 1 and 2, this project attempted to introduce a form of participation with the help of questionnaires belonging to the user cases' study.

To ensure a high level of acceptance that conditions the good functioning of the technology, asking possible users about their preferences, the limits by which they accept to be submitted to physiological control (facial recognition, electrocardiogram, etc.) has been considered as a necessary step. The shaping of technology has been then adjusted to the results of this consultation. Also, it was expected that the process would gain social acceptability and legitimacy.

However, this form of participation as consultation did not intrinsically favor a deep process of deliberation. The purposes under which consultation has been introduced has to be taken into account: it aimed at increasing the will of possible end-users to be controlled and tested in reducing their fears and enhancing their trust. The opening of the frame to a wide discussion about the ethical issues generated by the technology and about its possible social transformations did not belong to the objectives of this inclusion. This case illustrates how it is possible to implement a co-shaping of technology in introducing participation through the

[13] http://www.humabio-eu.org/

collection of possible end-users' needs, wants and fears, without addressing the moral aspects of responsibility.

Step 1: Identifying Governance tools

- **Law compliance** (Charter of Fundamental rights, World Medical Association Guidelines, European directives on good medical practices or on the use of personal data).
- **Texts on ethics:**
    - **Ethical guidelines** (Ethical Manual) written by two researchers focused on applied technologies in neuroscience.
    - **Memorandum of understanding**: "contract" between the project, participants and end-users. This document tries to answer some of potential issues raised in the ethical manual.
- **Ethical board:**
    - 1 Expert in justice psychology,
    - 3 Researchers in natural sciences (Physicians, Professor in psychiatry, sleep researcher).
    - 1 "Experts" in ethics.
- **End-user consultation** (through questionnaires):
    - *In situ* survey: 16 participants, focused on ethical issues.
    - Questionnaire based survey: 290 participants, 30 relevant organizations, 7 countries, which belongs to the user cases' task (i.e. ensure higher acceptance of a specific design in collecting participants' opinion).

Step 2: Identify the relationship with the context

The relation between norms and contexts is rather *Decontextualised*:

- Ethical issues are only identified by the authors of the ethical manual.
- There is little space for end-user participation. However, the scope of inclusion is here limited to identifying ethical issues and potential obstacles.

Step 3: Use of the tools (contextual implementation)

Tool	Use
Set of national and international regulations	Law compliance.
Ethical manual/ Ethical Memorandum	Identifying ethical issues (privacy, security, informed consent). Answering some of the issues to reduce fears (obstacles avoidance).
Ethical Board	Assess the adequacy of the experiences (obstacles avoidance).
End-users consultation	Identify fears and issues, increase social acceptance.

Step 4: On which presupposition each tool relies on?

Set of national and international regulations

Tool/presupposition	Mentalist	Schematizing	Intentionalist
Law compliance		×	
Identification of ethical issues	×		×
Obstacle avoidance			×
Social acceptance		×	

Ethical Guidelines

Tool/presupposition	Mentalist	Schematizing	Intentionalist
Law compliance		×	
Identification of ethical issues	×		×
Obstacle avoidance			×
Social acceptance		×	

Ethical Board

Tool/presupposition	Mentalist	Schematizing	Intentionalist
Law compliance		×	
Identification of ethical issues	×		×
Obstacle avoidance			×
Social acceptance		×	

End-user consultation

Tool/presupposition	Mentalist	Schematizing	Intentionalist
Identification of ethical issues	×		×
Obstacle avoidance			×
Social acceptance		×	

Step 5: Governance Model

This project illustrates the Consultation model. It included the collection of possible users' opinions that were meant to increase the social acceptability and legitimacy of the given technology. There is no attempt to open a wide discussion on the values and visions of the world associated with this technology. Also, the latter has been modified or adapted according to surveys on a purpose of avoiding market failures (cf. bellow). There were no ethical constraints involved.

Conclusion

The project only implements an economic dimension of responsibility: innovators and scientists are committed to develop a market-driven technology that has to successfully answer a need. Close from an interpretation of responsibility in terms of accountability, the outcome of the project has to show economic efficiency and participation is meant to ensure

that this target will be met (innovators are accountable for the investment made). However, the moral dimension of responsibility is not addressed. Innovators and scientists – at least, as it is demonstrated by available documents – did not open the question of their responsibility for the more profound transformations the technology they develop entails: for instance, the increasing tendency to rely on technology to assess human capacities, and the correlative mistrust for human assessment. This limited approach of responsibility is worsened by the absence of reflexive construction of the context and by the limited form in which it has been taken into account (economic context, only).

Case 4: Participation as a co-shaping of technology. Yet, without ethics.

This project (BestEnergy[14]) aimed at reducing energy consumption in work buildings and street lighting by implementing a set of ICT devices. From the very beginning, the project insisted on the need to establish a close collaboration with social actors impacted by the given technology since any attempt in changing energy consumption has to be supported by changes in individual behavior. Several pilots were selected: work buildings and cities' area located in different EU countries. Participation and deliberation were, then, included at the early stages of each pilot as a necessary tool to ensure social acceptability.

However, similarly as case 3, inclusion was designed to ensure market success. Several deliverables highlights that implementing new ICT devices is only worth if costs are offset by the gains generated through energy savings. Yet, to achieve a formerly agreed objective, workers in a building, for instance, have to accept (in the sense of tolerating) the new technology and cooperate in changing their practices. Participation and deliberation (again, very broadly conceived) where then designed to ensure acceptance and cooperation.

This project involved several phases of questionnaire (baseline, follow up and final assessment) collecting data about users' preferences and tolerance. Users were regularly asked about the evaluations of the technology. Moreover, in most of the places, the project also included various and regular workshops gathering user's various representatives. The

[14] http://www.bestenergyproject.eu/

workshops were aimed at explaining the different objectives of energy saving and at presenting the technology. Beyond the pure education and training objective, they also were designed to leave room for discussion, enabling a close adjustment to each context (i.e. identifying needs and preferences, but also fears and areas of mistrust).

Participation has been implemented all along the project and explicitly aimed at co-shaping the design of the technology. However, ethical issues (such as privacy, or data storage and protection, for instance) were never addressed neither as elements of deliverables nor as elements in the discussions' agenda. In a way, although the project showed a deep commitment to participation – for the sake of its own success – it did not include a reflexive construction of norms. Neither the issues' agenda nor the possibility to raise ethical questions and further expose justifications were in the hands of end-users.

Step 1: Identifying Governance tools

- Law compliance.
- Socio-economic deliverables:
    - Identifying what are the current practices and behaviors concerning energy consumption.
    - What is the level of comfort of users?
    - What are their level of acceptance of an intervention?
- Participation:
    - Through surveys that ensure a constant assessment of the acceptance of the technology to improve its efficiency.
    - With the help of workshops groups (training, adaptation to each context, increased acceptance and efficiency).

Step 2: Identify the relationship with the context

The development of this ICT devices for energy consumption savings is made in a *Restricted Contextualized Context*. The involvement of stakeholders is a core element of success in this project because it is deemed to directly influence the efficiency of energy consumption policies. In this sense, the technology has been adapted to each specific context (countries,

workplaces, cities, etc.), differing in their needs, they level of ICT knowledge or their acceptance of measurement and disclosure devices. However none of the key ethical issues associated with such a project, such as the future use of data related to individual or team's energy consumption level, for instance, were identified or discussed. The context taken into account was only related to economic success and efficiency neglecting main social and ethical dimensions also at stake in such an innovation.

Step 3: Use of the tools (contextual implementation)

Tool	Use
Set of national and international regulations	Law compliance (privacy, experiments on human beings). Avoiding obstacles.
Socio economic deliverables	Identifying the needs of end-users. Identifying their practices and usual behaviours. Identifying their acceptance of transformation.
Participation (survey + workshops)	Identifying the needs of end-users. Identifying their practices and usual behaviours. Identifying their acceptance of transformation. Co-shaping of technology. Transforming their practices.

Step 4: On which presupposition each tool relies on?

Law compliance

Tool/presupposition	Mentalist	Schematizing	Intentionalist
Law compliance		×	
Identification of legal issues	×		×

Obstacle avoidance			×
Social acceptance		×	

Socio-economic deliverables

Tool/presupposition	**Mentalist**	**Schematizing**	**Intentionalist**
Law compliance		×	
Identification of ethical issues	×		×
Modifying the project		×	×
Obstacle avoidance			×
Social acceptance		×	

Participation

Tool/presupposition	**Mentalist**	**Schematizing**	**Intentionalist**
Law compliance		×	
Identification of ethical issues			
Providing answers to ethical issues		×	×
Obstacle avoidance			×
Social acceptance		×	

Step 5: Governance Model

This project is another interesting example of the Consultation model where end-users' involvement is crucial, yet, not leading to any form of reflexivity. Once again, participation and deliberation are not meant to open the framing or to express one's own value and

visions of the world but rather to identify preferences and enhance efficiency (market success).

Conclusion

Responsibility is here, too, addressed in an economic way. Scientists and engineers of the project felt responsible to implement ICT devices that efficiently would lead to savings in energy consumption and that would be welcomed by the persons they impact. In a way, they contributed to develop a "responsible" innovation because they were motivated by a "good" objective. In contributing to the reduction of energy consumption, this project helped to meet a prominent norm of sustainable development. Compared to case 3 which was aimed to increase security and control technologies, this project achieved a goal that is widely recognized as ethically valid. However, like previous projects, its governance structure fostered neither reflexivity nor the opening of the context. Taking only case 3 and 4 could let think that the use of technology fully determines its normative goodness: some purposes could be assessed as responsible, others not. GREAT project precisely focuses on the governance of RRI to avoid reenacting the unfruitful debate of the alleged neutrality of technology: responsibility in research and innovation does not only come from following widely accepted norms, it requires a pluralist and open construction of the issues identified, and of the answers and justifications proposed. The remaining cases will offer illustrations of more qualitative attempts towards reflexivity.

Case 5 – Deliberation and ethics with no prescription

This case (COWAM[15]) differs from the others since its main aim was not technology driven. This SSH project attempted to study the common elaboration of norms related to the management of nuclear waste and addressed the issue of location, among others. The project is interesting for several reasons: it gathered several communities (NGO's, local communities, local or national authorities, regulators and experts from research and public institutes, implementers) to discuss and eventually agree about good practices for the

[15] http://www.cowam.com/

governance of this complex kind of waste. Through regular workshops and during almost 10 years (2000-2009), this project sought to elaborate common norms of governance that would identify the specificities of each context (across countries, communities, time, *etc*.). This project highlighted the need of including relevant stakeholders in the decision-making process while facing complex issues directly affecting their lives.

Of course, in this project, social acceptance is a core element of the inclusion process. However, the scope of the process is wider than in the previous cases. It is not only a matter of efficiently designing a product that will then best meet its market. This project was about accompanying local communities whose well-being could be directly (and possibly negatively) affected by the storage of radioactive waste in their neighborhood, to involve and empower them, in an attempt to improve the overall management of this controverted waste.

Step 1: Identifying Governance tools

- State-of-the-art deliverables recalling the failures of previous attempts of waste management, without including relevant stakeholders.
- Participation and deliberation: international and pluralist work groups gathered around specific issues to elaborate common norms of governance. Evolution during the different phases of the project toward less *ad hoc* participation and more empowerment of stakeholders.

Step 2: Identify the relationship with the context

The development of common norms of waste management is made in a *restricted contextualized context*. Indeed, actors involved in this project agreed on ethical guidelines that were given a general scope (supposed to be relevant for all European countries), while at the same time, they try to take into consideration the specificity of the contexts (each country's culture, types of actors, historical background, etc.) However, the explicit scope of the project was not to give a prescriptive content to the norms produced but rather to promote a shared reflection. In this sense, the interpretation of norms was left to each nation, and postponed to further investigation, meaning that the context of application of norms was not integrated at the stage of the rational elaboration of norms.

Step 3: Use of the tools (contextual implementation)

Tool	Use
Assessment of past failures	Identifying past failures and lacks.
Guideline deliverables	Identifying best practices for waste management. Establishing norms of good governance (inclusion, transparency, etc.).
Participation: work groups	Sharing different experiences to identify good practices and failures to avoid. Agreeing on different principles of good governance.

Step 4: On which presupposition each tool relies on?

Assessment of past failures

Tool/presupposition	Mentalist	Schematizing	Intentionalist
Obstacle avoidance			×
Social acceptance		×	

Guidelines deliverable

Tool/presupposition	Mentalist	Schematizing	Intentionalist
Law compliance		×	
Identification of ethical issues	×		×
Identification of norms		×	×
Obstacle avoidance			×
Social acceptance		×	

Participation

Tool/presupposition	Mentalist	Schematizing	Intentionalist
Law compliance		×	
Identification of ethical issues			
Providing answers to ethical issues		×	×
Obstacle avoidance			×
Social acceptance		×	

Step 5: Governance Model

This project exemplifies a process of norms *Co-construction* where a wide range of actors concerned by the management of radioactive waste were included. The issue of the implementation of norms was present all along the project. However, the recommendations and guidelines proposed at the end of the study were not fully binding, limiting the scope of this process of norm's elaboration.

Conclusion

Here, the inclusion of impacted stakeholders was acknowledged as being fundamental because of the failures of past experiences of waste management. If local communities have to accept to store nuclear waste in their neighborhood, they cannot be excluded from the decision-making process. The case is a plea in favor of active inclusion in the context of controverted situations. Therefore responsibility did not emerge only from the objective of this project (improving the management of waste), but from the process it set up: a reflexive construction of the issues at stake, the possible answers and justifications allowed by the numerous workshops that partly favored the elaboration of norms in relation with their context. The limitation of this contextualization of norms came from their restricted impact, since the outcomes of the project were not compulsory.

Case 6 - When responsible innovation emerges through deliberation

This project (MIAUCE[16]) was devoted to the development of Ambient Intelligence techniques to analyze the multi-modal behavior of users within the context of real applications (eye gaze/fixation, eye blink and body move). To address and discuss ethical issues, the project included a team of SSH researchers (coming from the fields of philosophy, ICT and sociology), which produced several deliverables. This ethical workgroup followed a threefold process by which the discussion (loose deliberation) would first only gather the SSH team. Then deliberation has been opened to the engineers as well as the computer and natural scientists involved in the project so that all members could share and discuss their visions of the world and their evaluation of what the ethical issues were. The final step involved a survey and focus groups to include the so called "civil society" in this reflection.

Results of the discussions led during these different phases were summarized in three public deliverables. Some elements are of particular interest for our research. First, the SSH team studied in depth the normative background of ambient intelligence, and multi-modal techniques: what type of vision of the world is the technology promoting? Which values does it bring forward, which values are neglected? Does it imply paradigmatic changes, and if yes, what kind? After this extensive review of current issues associated with ambient intelligence technologies, the SSH researchers also sought to uncover the different valuation (in John Dewey's sense) held by the scientists of the project and by members of the civil society involved in the process. Through internal workshops, and with the help of surveys and focus groups, they sought to uncover the different values attached to the technology, in order to increase the transparency of choices. In revealing the fears and distrusts of social actors, the idea was to confront the researchers involved with the development of such a technology with, at least, some of the possible dangers it entails.

Finally, another interesting characteristic of this project is that the SSH team was perfectly aware of its situated position: inside a project and therefore with a limited power of

[16] http://www.ist world.org/ProjectDetails.aspx?ProjectId=3a83f64010bb49dbb68dde32668c2cf9&SourceDatabaseId=7cff9226e582440894200b751bab883f

criticism, but at the same time, as closest as possible of all the relevant information to provide with an extensive and constructive ethical assessment of the given technology. This case is our first example of a quality deliberation that goes beyond the mere identification of ethical issues to highlight the values and value systems that more or less explicitly shape the design of technology.

Step 1: Identifying Governance tools

- **Law compliance**: analysis of existing and relevant set of national and international norms. Analysis of responsibility (as liability) in cases of failures of the technology or of its users.
- **Embedded SHS scientists**: group of experts mainly composed of philosophers and sociologists, and members of the law department.
- **Ethical deliverables**: each year a deliverable devoted to ELSI issues.
- **Online Surveys**: 500 emails sent to "experts" from which 106 international men and women answered + 84 answers from "activists" chosen from their concern for ethical issues, possible misuses of technology, etc. The survey aimed at making participants to express their values about three different scenarios (corresponding to three different applications) divided into normal situation and dark scenarios and also at defining the social acceptability of the technologies developed by the project.
- **Focus Group**: 6 focus groups gathering people from trade unions, recent immigrants, members from a Club devoted to social actions, prison staff and prisoners (around 60 people) were organized. Through the focus group, they also explored the different scenarios.

Step 2: Identify the relationship with the context

This case is an example of a *Restricted Contextualized* process: deliberation between members of the project, participation through online survey and deliberation through focus group, allow for a first order reflexive construction of the context.

Step 3: Use of the tools (contextual implementation)

Tool	Use
Set of national and international regulations.	Law compliance.
Ethical manual.	Identifying ethical issues (privacy, security, informed consent). Answering some of the issues to reduce fears (obstacles avoidance).
Embedded SHS scientist.	Analysis of the social paradigm associated with the technology produced by the project. Extensive analysis of the social and ethical significance of this technology. Identify key ethical issues.
Online surveys.	Identify fears and issues, evaluate the knowledge of social actors about the legal and ethical dimensions of the technology at stake. Evaluate social acceptability.
Focus Groups.	Identify fears and issues, evaluate the knowledge of social actors about the legal and ethical dimensions of the technology at stake. Evaluate social acceptability

Step 4: On which presupposition each tool relies on?

Law compliance.

Tool/presupposition	Mentalist	Schematizing	Intentionalist
Law compliance		×	
Identification of legal issues	×		×
Obstacle avoidance			×
Social acceptance		×	

Embedded SHS scientists and the deliverables on ethical and legal issues

Tool/presupposition	Mentalist	Schematizing	Intentionalist
Law compliance		×	
Identification of ethical and legal issues	×		×
Obstacle avoidance			×
Unfolding values		×	
Social acceptance		×	

Online survey

Tool/presupposition	Mentalist	Schematizing	Intentionalist
Identification of ethical and legal issues	×		×
Obstacle avoidance			×
Unfolding values		×	
Social acceptance		×	

Focus group

Tool/presupposition	Mentalist	Schematizing	Intentionalist
Identification of ethical and legal issues	×		×
Obstacle avoidance			×
Unfolding values		×	
Social acceptance		×	

Step 5: Governance Model

This project illustrates another aspect of the *Consultation model*. Compared to case 3 and 4 the scope of participation was wider. Indeed, the discussions conducted during the project helped the scientists involved in the development of the technology to learn about ethical issues and achieved, at least, a first level of co-construction of these ethical issues. Also, the reflection of SSH scientists and the inclusion of society members offered a good opportunity for a quality deliberation that helped to make decisions in a transparent way, unfolding the values hidden in technological choices. However, the process of participation did not deeply lead to a re-shaping of technology. Moreover, if the reflection led among SSH researchers on the one side, and with the civil society on the other, proposed a critical assessment of the type of technology developed by the project, they were never given the power to influence its development.

Conclusion

This case illustrates the limits of participation and deliberation when decision-making is not tied to these inclusive processes. In other words, this project achieved a form of second order reflexivity in the co-construction of the issues at stake. But it did not achieve a co-shaping of technology because, in the end, the power of transformation given to the conclusions of both the ethical workgroups and inclusion was rather low. Nevertheless, compared to other projects, it benefited from a critical ethical assessment that highlighted the limits of the technology at stake (and implicitly the reason to develop it with caution). Ethics, has been taken seriously[17] far beyond mere risk assessment, including a work on social actors' valuation and an analysis of the values underlying such a technology. Some of the conditions for responsible innovation were, then, gathered: the co-construction of the issues to be considered, and the possibility of reflexively assessing the ethical dimensions of technology. An important step was missing, though: the very condition for responsiveness, a causal chain that would go from outcomes of deliberation and participation to the design of technology.

[17] To paraphrase the title of an article of Daniel M. Hausman and Michael S. McPherson, published in the *Journal of Economic Literature*, Vol. 31, No. 2 (Jun., 1993), pp. 671-731: "Taking Ethics Seriously: Economics and Contemporary Moral Philosophy".

Case 7 - Deliberation through interactive technology assessment

Hosted and led by the French National Institute for Agricultural Research (INRA), this project was meant to accompany the development of experiments on genetically modified vines (GM vines) in France[18]. A team of SSH researchers (mainly sociologists) was asked to lead a qualitative process of deliberation related to the social acceptability of these experiments. The researchers gathered various people in relation with the technology at stake. The selection of these stakeholders aimed at maximizing the variety of profiles in order to ensure a pluralist deliberation. Some categories of stakeholders traditionally involved in similar deliberations, such as spokesman of NGO's, were excluded on the ground of their poor skills to be part in a discussion (compared to their propensity to enter in strategic interactions). The other stakeholders involved included actors of the vine world (four researchers on vine disease, four vine growers, one extension worker, and one owner of a vine nursery) but also "lay people". This process was not intended to be demographically representative (as the number of participants – 14 – was insufficient) but a qualitative deliberation where a wide range of conflicting points of views could be expressed.

Here too, the SSH team was "embedded": the two project leaders belonged to the INRA. This situation raised independency issues that were clearly identified by the team. To counterbalance this possible bias an evaluation committee gathering outside experts was in charge of assessing the whole procedure and its results.

The results of the deliberation conducted within the workgroup were advisory, meaning that they could not lead to stop the development of experiment on GM vines. This aspect can be understood as a main limit of the project, since many activists fought for the suppression of the technology itself, even at a regulated testing phase. However, the INRA committed to justify its final decision, especially in the case where its decision would go against the participation process' recommendations.

[18] Most of the project's description and results are summarized in Claire Marris, Pierre-Benoit Joly and Arie Rip, "Interactive Technology Assessment in the Real World: DualDynamics in an iTA Exercise on Genetically Modified Vines", *Science Technology Human Values* 2008; 33; 77-100

The project team reported a qualitative and in-depth deliberation on several issues (that where co-constructed by the participants). Many recommendations where produced, mainly identifying the conditions under which the technology could be developed. The final results of this deliberation process have had a direct (but limited) impact on the design of the experiences to be conducted to develop the given technology (cf. below). Yet, this project is a good example of a qualitative deliberation that helps co-constructing an innovation.

Step 1: Identifying Governance tools

- Law compliance.
- Interactive technology assessment process: workshops gathering people related with the technology produced. The diversity of the visions of the world and of the assessments of the technology was a key element of the selection of participants.

Step 2: Identify the relationship with the context

The process of norms' construction is *Restricted Contextualized*. Indeed, there is a co-construction of the issues at stake with the participants. But, there is no attempt to reach representativeness.

Step 3: Use of the tools (contextual implementation)

Tool	Use
Set of national regulations.	Law compliance.
Interactive technology assessment.	Identifying ethical issues. Identify fears and issues. Unfold the values and the visions of the world associated with alternative technologies. Evaluate social acceptability. Evaluate the conditions under which the technology is acceptable.

Step 4: **On which presupposition each tool relies on?**

Law compliance

Tool/presupposition	Mentalist	Schematizing	Intentionalist
Law compliance		×	
Identification of legal issues	×		×
Obstacle avoidance			×
Social acceptance		×	

Interactive technological assessment process

Tool/presupposition	Mentalist	Schematizing	Intentionalist
Identification of legal issues	×		×
Providing recommendations			×
Unfolding values		×	×
Obstacle avoidance			×
Social acceptance and social legitimacy		×	

Step 5: Governance Model

This project illustrates an attempt towards *Co-construction*. The research institute developing the technology did not commit to automatically stop the projects, would the results of the deliberation have asked for it. However, the INRA committed to publicly answer the recommendations of the workgroup, and more particularly in the case where it would decide not to follow these recommendations. This commitment increased the level of justification and the rationality of the final decision. As clearly stated by published

documents[19], the INRA decided to continue the experiments on GM vines, although two voices within the participatory workgroup explicitly required to stop it. However, this experience of participation and deliberation offered the opportunity to co-construct the normative issues under discussion, avoiding the top down governance of ethical committees.

Conclusion

This project offered the possibility of responsibly developing a controversial technology. Responsibility came from the pluralist construction of the frame, the issues to be discussed the answers and the justifications to be given, with a power – even if limited – of influencing the development of the technology. Although the idea of RRI was not invoked, the commitment of the research institute to take into account the recommendations of an external assessment (a pluralist workgroup with different and changing areas of expertise and legitimacy) went a step further in the implementation of responsiveness, compared to other cases. Through a reflexive construction of the context, a pluralist co-determination of norms in relation with their context, and an in-depth reflection about the values and visions of the worlds associated with the technology, this project responsibility engaged in a critical process of adjustment where innovation pathways are collectively decided and reflected.

Chapter 2: synthetic results

Step 1: Identifying governance tools

Law compliance.	All projects tackled the issue of complying with existing sets of national or international regulations
Ethical committee.	3 projects included an ethical committee that produced deliverables focused on ethical (and for some of them legal) issues.
End-users consultation (survey).	3 projects included surveys for end-users

[19] Marris, Joly and Rip (2008), mentioned in note 18.

	consultation.
Focus group.	2
Workgroup.	2

Step 2: Identifying the relation with the context

Context ignored	Decontextualised	Restricted contextualised	Fully contextualized
0	3	4	0

Step 3: Identifying the use of each tool

Tool	Use	Number of cases
Sets of national and international regulations.	Law compliance: avoiding obstacles.	7
	Some projects, for instance, had to comply with existing law about data protection.	4
	Projects had to comply with existing law about experiments on human beings (informed consent, data protection, etc.).	5
	Obstacles avoidance.	7
Ethical committee or ethical (or legal) manual.	Ensuring compliance with existing norms	6
	Providing specific norms suitable for the project.	4
	Identifying ethical/legal issues related to the technology developed.	6

	Offering possible answers to these ethical/legal issues.	5
	Obstacles avoidance.	5
	Attempt of reshaping of technology according to normative constraints	5
	Increase social acceptability.	7
End-user consultation (survey).	Identify needs of end-users.	2
	Identify their practices and behaviour.	2
	Identify fears and issues.	3
	Increase social acceptance.	5
Participation and deliberation (focus group or workshops).	Identifying the needs of end-users.	3
	Identifying their practices and usual behaviours.	1
	Identifying their acceptance of transformation.	1
	Identifying fears and issues.	3
	Co-shaping of technology.	4

Step 4: Identifying the relation with the context

Use of each tool	Schematizing	Intentionalist	Mentalist

Complying with existing laws and norms.	×		
Obstacles avoidance.			×
Providing specific norms suitable for the project.	×	×	
Identifying ethical/legal issues related to the technology developed.	×		×
Offering possible answers to these ethical/legal issues.	×	×	
Attempt of reshaping of technology according to normative constraints.	×	×	
Increase social acceptability.	×		
Identifying end-users' needs.		×	
Identifying their practices and usual behaviours.	×		×
Identifying their acceptance of transformation.		×	
Identifying fears and issues.	×		×
Co-shaping of technology.		×	×

Step 5: Governance Models

Standard Model	0
Revised Standard Model	2
Consultation	3
Co-construction	2

Conclusion

The seven cases we analyzed in this deliverable highlight, in a negative way, what are the most crucial conditions to implement RRI. The two first projects we considered show what kind of issues emerge when there is no participation and only internal discussion/deliberation while developing complex innovations. Case 1 and 2 suffer from top down approaches, which most of modern technology management devices (such as participatory technology assessment, for instance) have tried to overcome. First, they hold a reductive perspective of ethics where what matters only concerns the risks and dangers of innovation. This approach neglects the "essence" of ethics, which consists in normatively assessing innovation. This task would include – but is not reduced to – a study of social actors' understandings and interpretations of innovation, an investigation about their own normative assessments. Such a study is a preliminary step for deliberation as it allows to reveal the different valuations associated with innovation. Then the ethical assessment would require to perceive the "goodness", the "rightness" or the "fairness", amongst other things, of innovation in order to determine its ethical validity.

Second, case 1 and 2 develop a monist evaluation of the innovation they carry, drawn out of an internal deliberation among experts in charge of dealing with ethical issues. The possibility to confront different normative perspectives, to argue, interpret and reconstruct a common normative framework that can adapt to the context in order to accompany the development of innovation is left no room in such approaches. Context is closed once for all. Innovation develops out of society's dynamics, with low legitimacy, reducing the possibility for continuous adjustment, i.e. responsiveness.

Compared to the above examples of pure delegation of ethical questions to expert's assessment, case 3 and 4 were central to our study for they implemented participation and deliberation in the restricted context of economic success. In these cases, social actors are end-users whose preferences, fears, expectations and opinions have to be scrutinized and satisfied by the innovation at stake. Inclusion devices are marketing tools set up to adjust the design of innovation as close as possible to its target. Yet, it is not always easy to distinguish between participatory approaches meant to improve the economic or technological

efficiency of innovation and inclusion devices intended to instigate discussion (sharing and confronting perspectives, arguments, narratives, interpretations, *etc*.). In case 3 and 4, the use of survey, questionnaires or workshops was explicitly set up to adapt the design of technology to its future users. Participatory tools were neither intended to explore complex ethical issues (related with the social transformations entailed by technology) nor to achieve a pluralist normative assessment. For instance, although case 4 could raise some data protection issues and in spite of the large space given to discussion through repeated workshops, no ethical issues (related to privacy, among others) were reported in the conclusions of the workshops[20]. In case 3, participants were asked about their fears of privacy intrusion and their reluctance in increasingly relying on technology to evaluate professional aptitudes. However, this consultation process was market-driven only.

To sum up, participation and deliberation (especially when the latter is only broadly considered and does not include the characteristic of deliberative democracy theory we have mentioned in del 2.4.) do not lead by themselves to responsibility. These two cases confirm and strengthen the conclusion we already draw in WP2 (del 2.2. 2.3. and 2.4): a successfully implementation of RRI requires to scrutinize participatory devices much more closely than RRI approaches currently do. What type of devices most favor quality deliberation? To what extent are topics discussed in a participatory approach constructed in a reflexive way? How binding are the outcomes of inclusion devices? Finally, at another level, what do participatory devices aim at: avoiding market-failures or opening the possibility for a common normative assessment of innovation allowing different kind of agreements: compromise, deliberative dissensus, modus vivendi, accommodation, *etc.*? These questions need to be raised and answered as early as possible for a project being conducted in a responsible way.

Finally, as contrapuntal voices, case 5, 6 and 7 illustrate the benefits gained from a reflexive construction of the context: first, ethical judgments emerges from a pluralist confrontation in which involved and active social actors are more inclined to follow the resulting norms if they participate in their elaboration. Second, ethics is given its full meaning and is invoked to

[20] At least in the deliverables presenting those conclusions.

provide normative assessments of innovation, far beyond a cost/benefit analysis often implied by risk assessment. However, these three cases did not offer a fully contextualized framework for norm's construction, mainly due to the fact that the outcomes of deliberative processes were not made compulsory. If norms do not practically condition action, their power to affect a living form is considerably reduced. The elaboration of norms might have been pluralist, gathering various and sometimes conflicting voices in an attempt to achieve a common normative horizon. If norms do not concretely lead to a co-shaping of technology, it means than part of the context was closed. This conclusion highlights a last prominent condition for implementing RRI: real weight has to be given to responsiveness and inclusion devices, so that they have a practical impact on the design of innovation. The outcomes of deliberation/participation need to be turned into a form of prescription that can inform specific innovation policies.

The study of these different cases allowed us to emphasize the conditions under which the "ingredients" identified by the RRI literature can be successfully implemented and gear projects towards RRI. The analysis of concrete projects illustrated and supports the theoretical conclusions of WP2: responsibility emerges out of a context reflexively constructed, with the possibility to co-determine the issues to be discussed and answered, and with inclusive processes which are given some effective power to shape innovation pathways.