Governance of Responsible Innovation

GREAT – 321480

Glossary			
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1. Introduction

This document contains the definitions of terms authored and reviewed by the GREAT consortium members, during the first three months of the GREAT project implementation. Over the lifetime of the project, it is expected that this glossary will be revised and will eventually be incorporated into a glossary that will be common across the four related RRI projects of GREAT, RESPONSIBILITY, Res Agora and PROGRESS. Each term indicates the author, Definitions and Controversy, Relevance to the GREAT project and the Recommendations and Practical Consequences of that term. Each term also includes a brief set of indicative references.

The definitions focus on concepts, definitions and terms that are of particular relevance, and to provide a common understanding across the work in the GREAT project. At this stage, only concepts or notions specific to GREAT or of wider relevance to Responsible Research and Innovation (RRI) are reported in the glossary. Each partner is referenced thus: VTT, UOXF (University of Oxford), DMU (De Montfort University), SIGNOSIS, NAMUR (Namur Notre Dame de la Paix University) UPD (University of Paris, Descartes) NUID (Independent simulation group).

The glossary is to be used as a reflexive tool that will assist the consortium to identify blind spots and to raise awareness of interdisciplinary challenges and issues in mutual understanding. Therefore, the glossary will go some way towards enabling the consortium partners to integrate an accepted understanding of these terms into their construction and analysis of the elements of the GREAT project. However, each term may be subject to further scientific discussion and may be revised during the course of the project. Therefore this glossary should be seen as a work in progress.

Construction of the glossary therefore is to establish a common set of terms and concepts for the project, permitting the definition of key terms and concepts to be thought of as critical by each partner and allowing efficient communication between partners. The glossary therefore is an ongoing and revisable repository of meanings of terms as they are used between the partners in order to foreclose on the possibility of radical misunderstandings.

As there is a wide spread of expertise within the consortium, we may employ terms in different ways. The glossary therefore is a means to deal with that issue.

The purpose of the glossary is to facilitate efficient communication via creating definitions and explanations of important or unusual terms that arise in the normative analysis (for instance) in order to allow their deployment throughout – the efficiency comes in the sense that the glossary will permit partners to be ‘speaking the same language’. Not merely this, however, but the glossary is expected to elucidate the fundamental concepts used within the GREAT project. By doing so the glossary will not just facilitate the progress of research via supplying definitions of terms, but allow for greater understanding of the work by all stakeholders and will be a good source for subsequent understanding of the research by interested parties and ‘Glossary’ should be taken simply as a term to denote this.

2. Background

The glossary aims to be a tool for improved understanding of the partners. It does not aim to be a comprehensive collection of academic definition reflecting the full breadth of the discourse. In a second step (after submission of the glossary as a GREAT deliverable), it can serve the purpose of facilitating communication across the four RRI projects.

The glossary should be a living document and can therefore be updated throughout the lifetime of the project.

'A glossary, also known as a vocabulary, or clavis, is an alphabetical list of terms in a particular domain of knowledge with the definitions for those terms' (Wikipedia). Glossaries are used throughout a wide range of fields and disciplines and are created in order to standardise understanding of specific terms within a particular context or where the meaning is not obvious. Sometimes, terms may be defined for a particular field and yet has a different understanding or meaning in another. The importance of a glossary therefore cannot be understated. To achieve a glossary that is likely to fulfil requirements of the GREAT project therefore, it was felt to be important to involve all partners in its creation as 'The most effective way of producing one is by committee procedure…no one lexicographer, however skilled and well-informed, can compile a glossary that is sensibly complete and devoid of inaccuracies' (Holland 2002 p. 299).

3. Method

The aim of this deliverable is to achieve a high quality document in the short time available. It was decided that this would be facilitated by utilising a peer review system that would include all the partners in the project, and thus ensuring that all terms were exposed to some discussion and review between partners.

Utilising the expertise of the consortium members, an initial document containing the table below, was made available to all partners, who were then invited to contribute suggestions of terms to include in the glossary.

In order to ensure that the glossary is useful and specific to the project, the following principles of selecting terms and developing entries was conducted:

- Glossary terms were initially discussed within the consortium and the workshop during the kick-off event.
- Terms were then suggested by all consortium members
- A template was devised following a standard format that included the following headings:
    - Definition(s) and controversies
    - Relevance of the term for the GREAT project
    - Recommendations and practical consequences

- References / attribution / further reading

- In order for the glossary to be useful as a communication tool, it was considered necessary to be read and referred to by the partners. Glossary entries therefore needed to be short and concise and limited to around 1000 words per entry.
- Each entry has a lead author and was reviewed by the consortium members.
- DMU facilitated the review process and completed the final report.

Two categories of terms were included, firstly 'general terms' that were likely to be considered within the project, and secondly a set of project specific terms.

All partners contributed to the initial selection of terms, and a template (Appendix B) was sent to each partner for each term. Further, an email was sent asking for partners to indicate which terms they felt that their expertise would enable them to provide a definition of the term. Remaining terms were then allocated to partners for them to be written.

Partners were also invited to indicate which terms they wished to review and remaining reviews were allocated. Once the terms were received, they were sent out to the reviewers who then uploaded them to the Alfresco portal. Authors were then invited to revise their submissions before their final inclusion in this glossary.

4. Timeline

04/02/13 – Initial exploratory document distributed to all partners which contained the principles of the construction of the glossary (D2.1). Agreement in principle was requested ahead of the initial kick-off meeting. This document was utilised during the initial development period, in particular, the population of the table below with terms to be written and reviewed.

12/02/13 - Kick-off meeting in Brussels – initial discussion about the Glossary and development and review/development process agreed.

13/02/13 – Initial invitation to contribute terms was sent by email to all partners with first deadline set at 18/03/13

15/02/13 – Further discussion and clarification of procedures etc with partners

25/03/13 - Terms and authors agreed

26/03/13 – Terms templates sent to all authors for completion and initial timetable for completion of the glossary indicated as below:

- 26th March - Initial email to all partners setting out the process, what was agreed, and requesting confirmation
- 27th March - Templates sent to all lead authors
- 15th April - Deadline for submission of terms
- 16th April - Definition of terms to be sent to reviewers

- 22nd April - Reviews sent back to authors (the terms and reviews could then be discussed during the Paris meeting)
- 25th April - Authors to revise and re-submit
- 30th April - Glossary delivery

16/04/13 – Deadline for submission of terms extended

24/04/13 – discussion of Glossary at Paris Methodological Meeting, agreed extension of terms, reviews and revisions.

30/04/13 – 10/05/13 - House-keeping and finalising of terms, reviews and revised terms. It was decided that some terms will not be included in the current iteration of the glossary due to lack of time to develop their definitions, but they will be included in future versions.

10/04/13 - Delivery of Glossary to Signosis for onward submission to the EC.

5. Evaluation criteria

The purpose of the reviews was not so much to come to the "correct" definition of the glossary terms but to ensure their relevance and readability. Reviewers were able to suggest changes to the glossary entry directly or to provide the author(s) with questions or comments. To ensure consistency in the review process the following criteria was adopted:

- Appropriate discussion of definition(s) and controversies
- Quality of the text (grammar, spelling, readability)
- Academic rigour of the entry (structure of the argument, quality and completeness of references)
- Demonstration of the relevance of the text for the GREAT project
- Plausibility of the consequences of the glossary entry for the GREAT project.

6. Glossary Terms

Note: * indicates no term received, **term sent for review not received ***term reviewed not revised.

Term	Author	Reviewer
Accountability	SIGNOSIS	NAMUR
Actor	DMU	NUID
Actor Network	VTT	UOXF
Agent(s)/ Agent based modeling	NUID	NUID
*Civil Society	NAMUR	DMU
***Co-Design	VTT	UOXF
*Cognitive Framing	NAMUR	UPD
Context	UOXF	NAMUR
Corporate Social Responsibility (CSR)	UPD	DMU
Culture	UOXF	VTT
Deliberation	UPD	DMU
Ecosystem	VTT	NUID

Term	Author	Reviewer
***Effectiveness	VTT	UOXF
Efficiency	NAMUR	UPD
Ethics/Ethical/Moral	UPD	DMU
Evaluation	VTT	UPD
*Governance	NAMUR	UOXF
Innovation/Innovation networks	NUID	NUID
Moral Pluralism	UPD	NAMUR
New Public Management	VTT	DMU
***Normativity/Norm	NAMUR	UPD
Participation	VTT	UPD
Participatory Technological Assessment	UPD	NUID
Policy	VTT	DMU
Power	UOXF	DMU
Precaution	SIGNOSIS	UPD
Precautionary Principle	UPD	SIGNOSIS
Privacy	DMU	UPD
***Reflexivity	NAMUR	UPD
Research	DMU	NUID
Responsibility	DMU	NAMUR
Responsible Research and Innovation	All	All
Stakeholder	UOXF	DMU
Sustainability	UPD	NAMUR
Taxonomy	UOXF	NAMUR
*Technoscience	NAMUR	VTT
***Theory	NAMUR	DMU
Transparency	UOXF	DMU

Table 1: General Academic Terms

Term	Author	Reviewer
**Analytical Model	DMU	NAMUR
Case Study	VTT	DMU
**Grid of Analysis	UPD	NAMUR
***Methodology Meeting	NAMUR	SIGNOSIS
Recommendations and Guidelines	DMU	NAMUR
Simulation Model	NUID	NUID
Workshop	VTT	SIGNOSIS

Table 2: Specific terms relevant to the GREAT project

6.1. Glossary Terms Definitions

6.1.1. Accountability

Author: Signosis

Submission status : Revised

Definitions and Controversy

"Accountability" stems from late Latin accomptare (to account), a prefixed form of computare (to calculate), which in turn derived from putare (to reckon).[1]

Accountability is answerability, blameworthiness, liability, and the expectation of account-giving. Its closest synonym is answerability; where answerability's notion indicates that being accountable to somebody implies the obligation to respond to uncomfortable questions and vice-versa; [2]

The obligation of an individual or organization to account for its activities, accept responsibility for them, and to disclose the results in a transparent manner. It also includes the responsibility for money or other entrusted property.[3]

Accountability is the state of being accountable, liable, or answerable; a policy of holding public officials or other employees accountable for their actions and results[4]

Relevance to the GREAT project

As accountability is counteractive to monologic power, it establishes a dialog relationship between accountable and accounting actors. It makes both parties speak and engages them both in public debate. As governments, businesses and researchers are currently under constant pressure to address today's big challenges through innovation and advanced technological options, they often undermine people-centred approaches, to bringing researchers to account and to progress in parallel a democratic agenda for research and innovation.

"*The **GREAT** project will develop an empirically based and theoretically sound model of responsible innovation in research and research governance. The aim is to bring effective participatory processes to bear on research and research governance. This objective will be fulfilled by determining the nature of responsible innovation, its addresses and object and the nature of the processes in which they feature and the relations between them*." (DoW, page 24)

Accountability is an essential part of participatory approaches in research and innovation, as it safeguards democratic control and secures integrity in research and it is demanded from all those people and institutions involved in research and whose

[1] Oxford English Dictionary 2nd Ed
[2] http://en.wikipedia.org/wiki/Accountability
[3] http://www.businessdictionary.com/definition/accountability.html
[4] http://www.thefreedictionary.com/accountability

work impact on the lives of millions of people. Moreover, innovation could be a product of accountability, as the latter motivates communities and individuals to contribute expertise, practical advice on evaluating results and an important diversity of views. In this respect one of the key challenges of the GREAT's model of responsible innovation in research and research governance is the balance between accountability and enough flexibility to allow for innovation and essential creativity.

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- http://www.businessdictionary.com/definition/accountability.html#ixzz2RAPcuY00
- The Self Restraining State: Power and Accountability in New Democracies, Andreas Schedler,Larry Jay Diamond,Marc F. Plattner
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- Oxford English Dictionary 2nd Ed
- Y. Wadsworth, 'The Mirror, the Magnifying Glass, the Compass and the Map: Facilitating Participatory Action Research' in P. Reason and H. Bradbury (eds.), Handbook of Action Research: Participative Inquiry and Practice, London, Sage 2001.
- Pp. 35-50 in Sverker Gustavsson, Christer Karlsson, and Thomas Persson (eds) *The Illusion of Accountability in the European Union*. London: Routledge, 2009.
- REINVENTING ACCOUNTABILITY FOR THE 21ST CENTURY, Tom Burgis, Simon Zadek, www.accountability .org.uk

6.1.2. Actor Network

Author: VTT

Submission Status: Revised

Definitions and Controversy

By actor network is usually referred to so called Actor-network theory (ANT). The theory is related to the work of such scholars as Michel Callon, John Law and especially Bruno Latour. In short ANT puts forward that both human and non-human actors form constantly evolving and developing networks. Theory's background is in semiotics from which is borrows its vocabulary to describe the development of these networks – in a traditional sense ANT is not a theory but

rather a vocabulary for this purpose (E.g. Latour utilizes the work of A.J.Greimas and other semioticians in his own work. The terms “actant” and “translation” come from this background. The influence can be seen also in the basic idea of the ANT, which can be seen as a network whose elements define and shape one another discursively).

The theory’s central concept is actant which has an ability to act. Anything can be an actant and these actants form networks which are able to transform world. Actants construct themselves and transform other actants by a process which is called “translation”. By translation actants construct definitions and meanings, which are used to achieve power positions in the network. The more central position the actant has in the network, the more power it has to make other actants dependent on it as they are striving for their own goals. (Latour 1988)

Perhaps one of the most important and debated methodological principles of ANT is the principle of generalized symmetry. By this it is meant that human and non-human actors should be equally treated. They are as important actors in the networks and difference between them is socially constructed. This principle has been criticized from the perspective that non-human actors and especially material objects do not have consciousness and they are not intentional actors. Especially intentionality is seen uniquely as a human character, which differentiates humans as actors from other possible actors.

In principle, analysis of the network is power analysis, how it is achieved and used in the network. Especially for Latour (1983) science and technology are ways to change society and its power constellations or, in other words, to do politics. As scientists and engineers are central constructors of society, one should follow these actors in the social analysis in order to understand how social order is produced. In this view scientists and engineers are actually politicians, which use science as a vehicle of change and as a power instrument for societal position.

Perhaps one of the best known works by Latour (1988) concerns the work of Pasteur. In the very essence Latour is able to demonstrate in this work, how Pasteur was able to mobilize or orchestrate a network of actors to support his own goals and finally change also fundamentally the way the society functions. Pasteur indicated how microbs are behind diseases and in this case especially anthrax. By networking with other actors (like hygiene movement) and being successful in his development of vaccine, Pasteur was in the end able to change the whole society towards more hygienic direction.

Relevance to the GREAT project

The contribution of the actor network analysis for the Great project might be to make possible to see science as complex network of actors each of which is attempting to change the activity of the network as well as the whole society (if successful) towards the direction they want. RRI as a concept is also prone to various power games and translations actors are attempting to redefine other actors/actants

and their activities by using the concept of RRI and thus also reroute the development of scientific endeavour and society.

Recommendations and Practical Consequences

Despite the fact that ANT as such is a rather complicated and sometimes more unclear than clear as an approach, it could be used as a general heuristic perspective to open up the possible power relations and games in which RRI may be entangled. On the other hand, it helps to see complex landscape of stakeholders which needs to be directed towards positive interpretation (stakeholder may also see RRI as negative or restrictive concept from the point of view of their action) of the RRI in order to develop RRI into a socially consequential concept.

References

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6.1.3. Actor(s)

Author: DMU

Submission Status: Revised

Definitions and Controversy

An action is 'the fact or process of doing something, typically to achieve an aim' (Oxford online dictionary). In order to complete an action it is necessary to have the means to achieve it. A means therefore, facilitates a change in state, and requires an actor or agent to act as that facilitator or means to elicit change. The term 'actor' stems from Late Middle English and is 'an agent or administrator' (Oxford online dictionary). However, in keeping with its more common use, an actor may be defined as 'a participant in an action or process' (Oxford online dictionary).

Latour (2005, 1996) considers that an 'actor is 'a semiotic definition, an actant' (Latour 1996 p.7), and that whilst an actor may have an effect on a situation it is not always directly involved in its inception or development. In addition, actors are not always necessarily human or quasi-human. In fact, the danger of taking too much of a human-centric approach to identifying actors can result in missing important non-

human actors such as other systems, official bodies, abstract concepts, physical and sociological artefacts and so on.

Aristotle (Nic. Eth 3.1) reminds us that actors and actions have behaviours and impacts that can be considered from two perspectives; those that are voluntary and those that are involuntary. The voluntary is predictable but involuntary actions and actors are not and that an action should be judged on its intention rather than its outcome.

Actors are considered in many fields of enquiry. For example, in computing, actor oriented designs 'acknowledge the variety of interaction models among components, and express these interaction styles independently from the functionality of components' (Liu et al 2004 p. 251). Further, Pask (1992) in his 'Interactions of actors theory' considered that actors facilitate a continuous and on-going 'process' that results in a contextual 'product' and he therefore considers an actor to be a force or concept rather than being limited to an identifiable being.

Relevance to the GREAT project

It is important to consider actors and their impact when undertaking RRI. The GREAT project therefore needs to have a good understanding of what influence potential actors have in the governance of responsible research and innovation. There are likely to be actors who are both within and external to the GREAT project, and they may be beyond the control of the project partners, however awareness that actors may impact on the project itself is as important as understanding how a range of actors can affect outcomes within RRI. Further, 'Multi-stakeholder involvement in RRI- projects should bring together actors from industry, civil society and research to jointly define an implementation plan for the responsible development of a particular product to be developed within a specific research/innovation field, such as information and communication technology or nanotechnology.' (Von Schomberg, 2013 p.23-24).

Recommendations and Practical Consequences

If a key actor group is not identified, it could result invalid or inaccurate outcomes of the research. Therefore, an understanding of the concepts of action and actor from a range of different views will reduce the likelihood of omission.

References

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6.1.4. Agent(s) / agent-based modelling

Author: NUID

Submission Status: Revised

Definitions and Controversy

"Agent-based modelling is a computational method that enables a researcher to create, analyse, and experiment with models composed of agents that interact within an environment" (Gilbert 2007). Agents (computational programs) in this setting are units that have behaviour. They act within an (simulated) environment. Agents can react to other agents, pursue goals, communicate with other agents, and move around within the environment. Macro-level features can emerge from the interaction of agents.

Relevance to the GREAT project

Agent-based models can provide a simulation environment of the laboratory *in silico*, as envisaged for GREAT in WP4. Agent-based simulations (Gilbert and Troitzsch 2005, Gilbert 2007) provide computational demonstrations of production algorithms: they show whether a specific communication/action pattern on the micro level is sufficient to produce a macro-level phenomenon such as innovation. Where the aim is to understand the processes and mechanisms in innovation networks (Tesfatsion and Judd 2006) and to identify access points for policy intervention - even suggest designs and scenarios - this is the approach of choice (Ahrweiler, Pyka and Gilbert 2004, Gilbert, Ahrweiler and Pyka 2007). The aim of simulation modelling is not primarily to predict specific system behaviour or to reproduce statistical observations, but rather to gain a dynamic and detailed description of a complex system where we can observe the consequences of changing features and parameters. Innovation is an emergent property of a complex social system involving heterogeneous agents and evolving rule sets. Our simulations will serve as a laboratory to experiment with social life in a way that we cannot do empirically due to methodological reasons (cf. Ahrweiler and Gilbert 2005). Using this tool, we can understand innovation dynamics in complex social systems and find their potential for design, intervention and control.

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6.1.5. Context

Author: UOXF

Submission Status: Revised

Definitions and Controversy

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

Thus, contextualization is also problematic because it results from prior interpretation, and from already existing theoretical perspectives: How are the surrounding features selected? Which connections are regarded as relevant, while others are ignored? Hence, various scholars have developed the "view that context is generated and negotiated in the course of social interaction and exchange" (Dilley 2002: 439). For instance, Harold Garfinkel (1984) put forward what was seen in sociology as a radical re-specification of context, saying that it is locally created and sustained by participants. This was from an ethno-methodological perspective. Furthermore, in conversation analysis, Heritage (2004: 223) elaborates upon how utterances participants make are "context shaped", and how participants also "*create* (or *maintain* or *review*) a context for the next person's talk" (emphases in the original).

Relevance to the GREAT project

Context is one of the main theoretical difficulties of the entire project. In particular, Work package 3 is "to develop an understanding of the context of Responsible Research and Innovation" (DOW, Work package description, p. 11). So "context" is the key term of this WP. How can we account for different contexts, and for different perceptions of contexts empirically, but also develop a more general conceptual and theoretical understanding for the case of RRI?

Recommendations and Practical Consequences

Choosing case studies from the CIP, and more precisely, from "The Information and Communication Technologies Policy Support Programme", is a first pragmatic step to delimit the context of RRI (see DOW, part B, p. 20). Thereby we consider only projects that have particular connections with EU politics and funding. Even so we still have to discuss various possible selection criteria for the in-depth case studies because this Programme includes more than 200 projects. Once we have done this we can follow the approaches of ethnomethodology and conversation analysis mentioned earlier. Furthermore, it is also sensible to include at least one other project/case study outside of the CIP ICT-PSP pool because this would allow us to develop an understanding of RRI (or lack thereof) in cases where the context variable "EU funding" is missing.

References

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6.1.6. Corporate Social Responsibility

Author: UPD

Submission Status: Revised

Definitions and Controversy

Corporate Social Responsibility (CSR) is a self-regulating process integrated in the management of firms, discussed for at least three decades as a response to economic and technological changes. It is defined as commitment of firms to legal or ethical norms regulating their practices whereby they take into account the "social responsibility" of their activities *i.e.* their impact on environment, health, safety, management practices or the access to the resources they produce. In getting involved in a CSR process, firms undertake to comply with national or international legal norms (Human rights, laws relating to child labor) but also ethical norms (ISO norms or the Global Reporting Initiative, for instance). CSR rests upon a strong focus on the stakeholders' interests opposed to that of the shareholders: it is supposed

that managerial decisions not only impact the earning of investors but also “exert externalities on a number of "natural stakeholders" who have an innate relationship with the firm: employees, customers, suppliers, communities where the firm's plants are located, potential pollutes, and so forth.” (Tirole, 2001, p. 3), but also regulators, local communities, non-governmental organizations (NGOs), civil society organizations (CSOs) or ‘the public’ at large (Groves *et al.,* 2011).

One of the strongest issues raised while theorizing CSR relates to the trade-off corporate managers have to face between competitiveness and the compliance with ethical and legal norms external to their concern for profit maximization. What would be the incentives to enter in CSR process (when there is no mandatory legal norm)? Two lines of answer can be distinguished. First, many studies on incentives and on efficiency of social responsibility have tried to show the positive impact of social responsibility on innovation and firm competitiveness (for instance, Porter and van Linden (1995)) as well as the negative impact of not taking their social impact into account. On another side, Margolis and Walsh (2001) claim that no significant correlation can be established between CSR engagement and financial performance. As outlined by Vogel (2005), this would imply to implement social responsibility as any other aspect of management (such as advertising) taking into account the risk involved regarding returns on investment. In this view, taking the responsibility of their activities will be undertaken by firms whatever its impact on competitiveness or benefits.

Relevance to the GREAT project

CSR is one way of approaching responsibility of firms while innovating. It will be part of the theoretical landscape, as it represents one perspective on RRI that has tried to define and conceive the responsibility of corporate managers towards “stakeholders”, i.e. a greater share of the population that what is implied by the traditional profit maximisation (and shareholder’s benefit maximisation) perspective. Moreover CSR impacts governance models by providing a theoretical struggle confronting a self-regulating process with economic constraints supposed to exert a burden in an opposite way.

Recommendations and Practical Consequences

Many applications (depending on the type of economic activity that is considered) and many different practices can be labelled as being related to CSR. As CSR will be part of the theoretical landscape, it will be helpful for the GREAT project to have an agreement on the important elements that have to be retained while evoking this particular approach of responsibility.

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6.1.7. Culture

Author: UOXF

Submission Status: Revised

Definitions and Controversy

A basic component of any culture is "meaning", and culture exists whenever people refer to one another in a "meaningful" way (Weber 1921/1980: 1-2). Cultures can be considered as systems of interrelated signs ("codes") created and interpreted by humans. It can also be argued that humans are caught up in these "webs of significance" (Geertz 1973: 5, 9). Often, culture involves conflict: A semiotic "confusion of tongues" can easily turn into a severe physical combat (Geertz 1973: 7-9). Many cultural codes do change over time, but usually slowly.

Despite globalization and regionalization (e.g., the European Union) one important form of culture remains the nation state (cf. Sassen 2006). However, culture, including national culture, should not be regarded as a clearly delimited container of meaning, or as a powerful superstructure that imposes meanings onto helpless individuals. Instead, it can be considered as a flexible repertoire, or "toolkit" of "habits, skills and styles from which people construct 'strategies of actions'" in ordinary life (Swidler 1986: 273). In a similar way it can be argued that culture, or cultural belonging, is not inherited in a naturalistic, biological sense. It is rather part of continuous learning processes of individuals who are, or feel, more or less determined by existing societal expectations (e.g., Miller 1997: 112-113).

The systems of meaning and the practices of experts, such as those of scientists and IT professionals, are considered as "epistemic cultures" (Knorr Cetina 1999). Moreover, some authors argue that European and Western societies typically use scientific and technological knowledge to build "centres of calculations" in order to exercise "long distance control" (Latour 1987; Law 1986). In their view, the history of epistemic cultures is closely connected to the establishment of (colonial) power and domination. Furthermore, apart from epistemic cultures other kinds and levels of cultures exist, such as corporate culture or subcultures.

Relevance to the GREAT project

The GREAT project builds on the notion of citizenship, and European citizenship in particular (cf. DOW part B, p. 8, 11). More precisely, EU citizens are supposed to have right to a say in research and innovation processes. Thus, GREAT implicitly deals with the classic concept of national culture ("citizenship" is closely linked to the concept of "nation state"), but it also transgresses it by assuming an EU "supra-state" (p. 18). Furthermore, the DOW of the GREAT project includes various instances of a non-objectivist, culturally relativist way of reasoning. Roughly said, this fits to Weber's and Geertz' notions of culture. For instance, the "interpretive flexibility" of technologies is discussed at length (p. 14). Generally speaking, following a grounded theory and bottom-up approach in the empirical data analysis (DOW part B, p. 27) is also a way of capturing different "meanings": those expressed by different participants and stakeholders in research and innovation processes.

Recommendations and Practical Consequences

Given the continuing importance of nation states, it is an interesting question in how far EU citizenship actually exists, and in how far "EU citizens" influence research and innovation processes. We could pursue this question in our theoretical discussions (analytical grid) and in the empirical studies.

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6.1.8. Deliberation

Author: UPD

Submission Status: Revised

Definitions and Controversy

Contrary to impulse, deliberation consists in the suspension of a possible act (it could be a complex action or process) to examine to accomplish it or not and according to different ways. Therefore it is a careful discussion. Deliberation rests on comparison of different motives (different courses of action and anticipated assessments of them). Following Aristotle's Rhetoric it concerns future possible actions, when law is concerned with past ones.

We can deliberate for different reasons. Among these are (1) conflicts (whether of opinions, ethical views, or interests), (2) descriptive or normative uncertainties, and (3) tensions around the need to act (or not act) individually or collectively (Reber, 2012).

Considering RRI, we will focus here on political definition of deliberation and more precisely on the theory of deliberative democracy (TDD). Political theories of deliberative democracy, or more generally the important role dedicated to deliberation in politics have imposed themselves recently in contemporary political philosophy. Despite interpretative quarrels, this theory could be provisionally described in this way: « The notion of deliberative democracy is rooted in the intuitive ideal of a democratic association within which the justification of the terms and conditions of association proceeds through public argumentation and reasoning among equal citizens. In such a political order, citizens share a commitment to solving problems of collective choice through public reasoning and consider their basic laws legitimate if they furnish the frame for public and free deliberation. » (Cohen 1989)

This theory is opposed to conceptions of democracy that want to insist on bargaining, aggregation of preferences or a more inclusive participation (participatory democracy). To some extent, participation could be opposed to deliberation, regarding the question of the quality of the debate. Thus TDD defends a more ambitious conception of citizens, their interactions, and the political community. We recognize in this theory different virtues, including normative ones. Its defenders expect that political representatives or people involved in mini-publics (Goodin and Dryzek, 2006) have the capacity to justify and perhaps argue for their opinions and decisions. They expect citizens to be able to justify their choices, and not to stay with their often vague preferences, like in rational choice theory or in most of the economical theories. TDD makes a plea for citizens to have the capacity to search for and collectively formulate the common good within public deliberations that link common good, justification and legitimacy, and respect citizens' autonomy.

There are many theoretical and practical debates around deliberative democracy. It is not immune to controversies. Simone Chambers signals at the same time the profusion and the interpretative quarrels (Chambers, 2003): How to evaluate deliberation (see below), the prioritization of freedom and opportunity, questions of reciprocity, publicity and decision making processes, core goals, and whether deliberative democracy only cultivates respect or civility between rivals? Of course

TDD has been attacked by some critics, generally or in part, including by Young, Sanders, Hauptmann, Basu, Sunstein, Shapiro and Mouffe.

Relevance to the GREAT project

TDD has been adapted for empirical research, thanks to people like the authors of Deliberative Politics in Action, (Steiner J., Bächtiger A., Spörndli M. and Steenbergen M.R., 2004). For this purpose, they had proposed an operational definition extracted out of the philosophical discourse. To summarize their approach, a workable list of traits of TDD could be:

1) Arguments should be expressed in terms of “public good” or “public reason”.

2) Participants should truthfully and truly express their views.

3) They should listen others arguments and treat them with respect.

4) Parties should defend their claims and logical justifications, through an exchange of information and good reasons. Habermas goes beyond with his belief in universality.

5) Participants should follow the strength of the better argument, that is not a priori given, but to be looked for in the common deliberation.

6) Everybody participates on an equal level, without constraints in an open political process.

For argumentation, Steiner and his colleagues in Deliberative Politics in Action speak only of inference like a semiotic process deriving a conclusion of something given (premises). With the definition of TDD they have proposed a Discourse Quality Index (DQI) assessing: participation, level of justification for demands, content of justification for demands, respect toward groups to be helped (empathy), respect toward the demands of others, respect toward counterarguments and constructive politics.

If the arguments or the requirement to argue are often mentioned in the literature on TDD their definition is not given. We have to deepen the question of argumentation and to be not only limited to this request and recognize other communicational competencies like narrative, interpretation and reconstruction. Argumentation is very specific and appropriate to go over conflicting interpretations, often because contexts reframing.

Recommendations and Practical Consequences

The literature on TDD has not made the link with the old ethical Aristotelian tradition of deliberative literary genre as specific to the future and the responsible ex ante (or Forward-Looking vs. Backward-Looking). Theses two conceptions are relevant to build the assessment in RRI process, substantially (what we asses) and procedurally (how to assess).

The way Steiner et alii have proceeded from political philosophy to political sciences through the definitions of criteria to build a quality index could be inspiring for GREAT methodology.

Moreover, deliberation is closely connected to reflexivity. It could concern collective one, but individual one that is often forgotten by political researcher, they are political sciences or philosophy.

The bringing together between ethical and political deliberation is accompanied by the one between moral and political philosophy. However, moral philosophy is often avoided by political theorists afraid to open the black box - or as they see it, the Pandora's Box - of ethical deliberation. It is the same with the theory of deliberative democracy, which welcomes political pluralism but not ethical pluralism. If this bridging of ethical and political deliberation is useful for empirical research, it becomes more complex when we recognize the need to characterize it at the individual and collective levels, and to balance these.

To open largely RRI we can follow three lines of research, a) the institutionalisation of mini-public in a larger frame, b) the inter-institutional deliberation c) a kind of "deliberative system" (Parkinson and Mansbridge (ed.) 2012).

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6.1.9. Ecosystem

Author: VTT

Submission Status: Revised

Definitions and Controversy

Here we refer to ecosystems build up by organisations. Not by organisms which is the original meaning of the concept. Following citation is from Wikipedia:

“The concept first appeared in James F. Moore's May/June 1993 Harvard Business Review article, titled "Predators and Prey: A New Ecology of Competition"

Moore defined "business ecosystem" as:

“An economic community supported by a foundation of interacting organizations and individuals—the organisms of the business world. The economic community produces goods and services of value to customers, who are themselves members of the ecosystem. The member organisms also include suppliers, lead producers, competitors, and other stakeholders. Over time, they coevolve their capabilities and roles, and tend to align themselves with the directions set by one or more central companies. Those companies holding leadership roles may change over time, but the function of ecosystem leader is valued by the community because it enables members to move toward shared visions to align their investments, and to find mutually supportive roles.”

Moore used several ecological metaphors, suggesting that the firm is embedded in a (business) environment, that it needs to coevolve with other companies, and that “the particular niche a business occupies is challenged by newly arriving species. ”This meant that companies need to become proactive in developing mutually beneficial ("symbiotic") relationships with customers, suppliers, and even competitors.

Using ecological metaphors to describe business structure and operations is increasingly common especially within the field of information technology (IT). For example, J. Bradford DeLong, a professor of economics at the University of

California, Berkeley, has written that "business ecosystems" describe “the pattern of launching new technologies that has emerged from Silicon Valley”.[5][6] He defines business ecology as “a more productive set of processes for developing and commercializing new technologies” that is characterized by the “rapid prototyping, short product-development cycles, early test marketing, options-based compensation, venture funding, early corporate independence”.[7] DeLong also has expressed that the new way is likely to endure “because it's a better business ecology than the legendarily lugubrious model refined at Xerox Parc—a more productive set of processes for rapidly developing and commercializing new technologies”

Relevance to the GREAT project

More profound study of concept “Ecosytem” might be necessary in able to understand different discussions about responsibility in relation to actor networks or ecosystems.

Recommendations and Practical Consequences

Ecosystem is here presented as potential glossary entry. It might be also case that we do not want to include this concept to the glossary at the moment.

References

- http://en.wikipedia.org/wiki/Business_ecosystem

6.1.10. Efficiency

Author: NAMUR

Submission Status: Revised

Definitions and Controversy

Efficiency in general describes the extent to which time, effort or cost is well used for the intended task or purpose. It is often used with the specific purpose of relaying the capability of a specific application of effort to produce a specific outcome effectively with a minimum amount or quantity of waste, expense, or unnecessary effort. "Efficiency" has widely varying meanings in different disciplines.

Relevance to the GREAT project

In order to understand how deliberation and participation can be efficient we need to understand what efficiency means in practical and contextual terms.

Recommendations and Practical Consequences

It has to be adapted to specific fields and contexts.

6.1.11. Ethics

Author: UPD

Submission Status: Revised

Definitions and Controversy

Ethics can be defined as "the study of the concepts involved in practical reasoning: good right, duty, obligation, virtue, freedom, rationality, choice." (*Oxford Dictionary of Philosophy*). Three different epistemological levels of thinking have to be distinguished. First, ethics includes "the general study of goodness, the general study of right action [and] applied ethics" (*The Cambridge Dictionary of Philosophy*) i.e. it designates the different norms and principles of the good and the bad that are settled to rule human choices, actions and behaviours. This includes the principles of morality and all the regional rules related to a particular object (bioethics, business ethics, etc.). Related to that are the moral theories, or normative ethics, which study how the good and the bad has to be defined. This includes, for instance, consequentialism according to which the goodness of principles and actions depends on their consequences; deontology (where what counts is the goodness of the intention or the respect of universal principles or duties) or virtue ethics for which the moral subject focuses "her attention on the cultivation of her (or other's) virtues" which are independent of other moral concepts (*The Cambridge Dictionary of Philosophy*). Moral theories differ about the sources of normativity they emphasize (i.e. the kind of moral reason allowed to adopt a principle). The third level of thinking related with ethics concerns "the attempt to understand the metaphysical, epistemological, semantic, and psychological, presuppositions and commitments of moral thought, talk, and practice" (Stanford Encyclopaedia of Philosophy). This is sometimes labelled as metaethics and includes investigation on the moral language, studies on the epistemic status of border areas of enquiry such as moral psychology and more generally a reflection on the epistemic structure of a moral theory or a moral principle.

If ethics is often related but distinguished from 'morality' (*The Cambridge Dictionary of Philosophy*; Ricoeur, *Dictionnaire d'éthique et de philosophie morale*), we will consider the adjectives 'moral' and 'ethical' as synonymous.

Relevance to the GREAT project

Defining "Responsibility" implies to adopt a normative position (as the term is both an evaluative and a descriptive term to borrow from Hare's definition). It entails a normative conception of certain actions, choices and practices and, according to the theories and the authors, relies on different normative or moral theories. As such, the distinction between applied ethics, moral theories and metaethics is relevant to distinguish which is the level of reflection that is used in an explanation.

Recommendations and Practical Consequences

Since divergent definitions of the term have been given by philosophers, an agreement between GREAT partners on the definition of ethics is necessary because investigating how to define and conceive responsibility in the context of innovation is an ethical approach. In the writing of the deliverable and on the interpretation of the analytical grid, we need to agree on what we mean by ethics, and at which level of the reflection we are located when formulating a thesis.

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6.1.12. Evaluation

Author: VTT

Submission Status: Revised

Definitions and Controversy

Initial and very general definition of evaluation could be like it has been put forward in the Wikipedia: "Evaluation is a systematic determination of a subject's merit, worth and significance, using criteria governed by a set of standards. It can assist an organization to assess any aim, realisable concept/proposal, or any alternative, to help in decision-making; or to ascertain the degree of achievement or value in regard to the aim and objectives and results of any such action that has been completed. The primary purpose of evaluation, in addition to gaining insight into prior or existing initiatives, is to enable reflection and assist in the identification of future change." (Wikipedia, 12.3.2013)

Various kinds of evaluations and evaluation practices have increased tremendously since the 1980s. Some observers even called this development as a rise of "evaluative state". (Neave 1998). Often this has been connected to the rise of accountability pressures and so called New Public Management (NPM), which as public management paradigm shifted the focus of public administration from detailed regulation and steering more towards goal setting. The principal-agent dilemma needed now a new solution and new control mechanisms were needed. The solution to the dilemma was detailed evaluation of activities (e.g. Chelimsky 1997). Within short period of time starting from the end of the 1980s and especially in the 1990s evaluations boomed. However, the evolution of the evaluation culture has not been stimulated only by the pressure of accountability, but also by the needs of strategic thinking and change, as well as by the needs of decision-making (Chelimsky 1997). Sometimes evaluations are conducted more or less only for political reasons. Then evaluation would be used merely for making an impression on financiers and policymakers or legitimate a decision that has already been done (Rossi, Freeman, Lipsey 1999).

Currently various kinds of evaluations are business as usual as consequences of policy actions are anticipated (ex-ante evaluation) or performance and goal

achievement are assessed (ex post evaluation). Usually evaluations are categorized either as formative or summative evaluations. Formative evaluation (Scriven 1991) focuses on improving some action model. It is used e.g. to help a programme to perform better. Summative evaluation, in turn, focuses on creation of overall judgement of about the performance and worth of the action. Recently it has been suggested that developmental evaluation would be a new type of evaluation in addition to more traditional summative and formative evaluations (Patton 2011).

Typically evaluations are based on logic model thinking. Logic models represent a linear perspective of a system, in which inputs, activities, outputs, outcomes and impacts as well as logical relationship and pathways between different components are presented. (Dyehouse et al. 2009). Logic model approach works in simple and predictable situations, but it has significant downsides in complex and dynamic situations (Patton 2011). Recently it has been suggested that systems thinking offers an alternative to linear model. System thinking can provide a more explicit analysis of the system components and their interaction. (Dyehouse et al. 2009).

Relevance to the GREAT project

The perspective of evaluation is inscribed in the RRI project as the major idea is to develop a RRI assessment criteria framework. The major question is, however, what is the motivation of such an effort and how it is used? Is the target summative, formative or developmental evaluation, or a combination of all these perspectives? The basic motivation and target-setting affects also the way the framework is constructed and used.

Recommendations and Practical Consequences

The project should develop its approach for developing the framework of RRI consciously by taking into account the limitations and possibilities of various evaluation approaches. The perspective of evaluation theory serves as a reflexive concept which aids to see various uses and contexts in which evaluation can be used. For instance, does it have consequences for the development of the “grid” and RRI approach if it is chosen to support developmental use of grid or more administrative, usually more summative, use of grid? One possible answer to this might be, e.g. that former approach is based more on participative approach and “co-creation” of targets and activities while the latter may focus more on indicator development “top-down” (not to say that they could be combined).

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6.1.13. Innovation / innovation networks

Author: NUID

Submission Status: Revised

Definitions and Controversy

Innovation, the creation of new, technologically feasible, commercially realisable products, processes and organisational structures (Schumpeter, 1912; Fagerberg, Mowery and Nelson, 2006), is the result of the continuous interactions of innovative organisations such as universities, research institutes, firms such as multi-national corporations and small-to-medium-sized enterprises, government agencies, venture capitalists and others. These organisations exchange and generate knowledge by drawing on networks of relationships (innovation networks) that are embedded in institutional frameworks on the local, regional, national and international level (Ahrweiler 2010). For innovations to emerge, agents require not only financial resources to be invested in R&D, but the ability to recombine their own with external knowledge, to design interfaces to related knowledge fields and to meet customer needs. Because agents engaged in innovation processes are confronted with a high degree of complexity, which is related to their competitors' behaviours, the overall knowledge development, and dynamic changes in their customer needs, it is very unlikely that single firms will master all relevant knowledge fields in isolation, not to mention pushing ahead the technological frontier in all relevant areas. Innovation networks are considered to be an organizational form of R&D which allows for mutual knowledge exchange and cross-fertilization effects among the heterogeneous actors involved. As innovation is recognized as the driving factor of economic growth, an important part of economic policy today focusses on innovation. Not surprisingly political instruments often attach significant importance to supporting innovation networks as they are considered to be an ideal framework for creative knowledge development without well specified (technological) goals.

Relevance to the GREAT project

Innovation is a key term of the GREAT project. For example, in GREAT's WP4 the objectives are to carry out an empirical investigation into how responsible innovation is currently conceptualised, how it is currently considered in research,

and how the integration could be improved in the future. The empirical domain for this will be a set of innovation networks, i.e. a survey of a special sample of research and innovation networks in the current Information and Communication Technologies Policy Support Programme of the European Commission. A sub-sample will be chosen which will be investigated using in-depth case studies.

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6.1.14. Moral Pluralism

Author: UPD

Submission Status: Revised

Definitions and Controversy

Moral pluralism is a third way between moral relativism and moral monism. We can speak of moral pluralism or ethical pluralism. More than linguistic habits or

philosophical choices, moral and ethics are focusing on different levels (1. social behaviours, 2. moral references, 3. moral theories, 4. meta-ethics). Here moral pluralism concerns the meta-ethical level. It defends the possibility and importance of discussing normative claims per se as defendable positions. Against a monistic position it recognizes the value and importance of rival normative options (for example between moral values or systems of moral values). Against relativism, it does not want to delegate the discussion of normative issues to entities outside the realm of ethics and to reduce ethical issues to group loyalties, cognitive bias, interests, or religious or national particularities. Moral pluralism is based on the recognition of the moral pluralism of values (Kekes, 1993), or, largely, moral theories (Reber, 2006; Kagan, 1998; Becker, 1992). The latter integrates the first one, which is more frequent among moral philosophers.

The existence of moral pluralism of theories can be traced back a) to the existence of different ethical moral theories like utilitarianism, deontology, or virtue ethics (for a summary see Rachels, 1998; Dreier, 2006). It could also be explained because of the b) existence of different normative elements (from different theories or of the same one).

We can summarize moral pluralism of theories in the following multilevel table of possible ways (Reber, 2011a) of ethical assessments in a context of justification (distinguished from motivation or application).

1) Types of entities assessed in moral perspective:

They are the types of entities or objects (often abstract) which attract attention and which are focused on character traits, acts, feelings, institutions, behavioural norms (individual or collective), processes, rules and foundational theories.

2) Normative factors:

They enter into the ethical assessments on the basis of the following elements: a perspective oriented by the good, the right, equality or equity; evil to be avoided; optimistic or pessimistic assessment or commitments towards the future; consequences and other results; restrictions concerning what is allowed or forbidden (rights converging with ethics); general obligations and contracts (regarding all or particulars); promises; principles; norms; values; virtues.

3) Background in foundational normative theories:

They help to justify factors, to generalize them, to manage them in case of conflicts.

Theories could be strongly monist, defending only one normative factor (for example utility); weakly monist, defending only one factor but also some other types of assessment; weakly pluralist defending several factors and only one type of assessment; strongly pluralist defending several factors and types of assessment.

In the case of monism there should be a rule which explains to retain only one entity to assess and only one normative factor (simple monism) or to rank them before the others (complex monism).

In the case of pluralist systems, it should be explained why the selection or the rankings are arbitrary or could be different (make counter-proposals).

Conflict management could be handled through a personal point of view, impersonal or collective one. Theory could target the promotion or maximisation (or arrive to a point of excellence) of the selected factor (or factors).

This management could comprise optional dimensions or, on the contrary, what goes beyond the duty or the obligation (subrogatory).

Relevance to the GREAT project

This analytical presentation displays constitutive elements for an ethical pluralism of moral theories. It indicates diverse possible compositions in real ethical argumentation of rational people according to different choices they can make in selections and linkages of different elements. These different modes of presentation and justification of the good or the right were constructed through the history of philosophy with a lot of moral imagination and rigorousness to be defended inside a moral dispute or to support moral inquiries. Therefore they are very helpful to develop the justification and clarification of opposing positions in RRI or Participatory Technological Assessment (PTA) contexts. These theoretical possibilities are not only abstract debates and a priori. They reflect the virtual practical possibilities of justifications in real ethical debates. It is true as well for professional ethicists involved in different fields of applied ethics. We can notice that they often choose only some normative elements (like utility, or rights, or virtues, or values, or principles, etc) to present well-structured and coherent arguments to defend their ethical position. Thus, we find different sorts of moral pluralisms backgrounds at work in applied ethics or in empirical research on PTA (Reber, 2011b) process, debates inside ethical committees or stake-holders arenas. They are based on values, normative elements like principles, duties, or all elements we have presented in the general map of moral pluralism of theories.

Recommendations and Practical Consequences

The different levels of moral pluralism could help to go from a plurality of representatives (that is the people or the stake-holders) to a pluralism in the management of the values and normative issues (that is the discussion on the level of normative ethics). Indeed, most of the researchers in political sciences and in sociology confuse plurality and pluralism, that is more reflexive and a step from moral to ethics, or from application in specific contexts with limited references to moral theories or meta-ethics.

However, internal coherence may go together with lack of practical relevance. This is for example true for many utilitarian philosophers who reduce the ethical analysis of biotechnologies to a calculation of the amount of pleasure in relation to pain and discomfort in society as a whole (utility principle). The social impact of biotechnologies and the impact on human values are often ignored in such a utilitarian analysis.

In moral philosophy, moral pluralism appears most of the time in a justification context. Therefore it is appropriate for participatory technological assessment or stake-holder's participative arena. These kinds of justification, specific for moral, are at work not only for the actors discourse buildings, more often implicit, but for the analysis (in moral sociology) and assessment too.

For the GREAT project it is possible to recognize different normative factors embedded in the different meanings of responsibility (i.e. virtue in responsibility-as-a-capacity or consequences in responsibility-as-a cause). Despite more limited, the focus on responsibility is confronted to moral theories elements. These elements and the different meanings of responsibility can help to develop the parameters and the criteria in assessment phase.

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6.1.15. New Public Management

Author: VTT

Submitted Status: Revised

Definitions and Controversy

New Public Management is a public sector's government and leadership paradigm that was introduced in the 1980's especially in England but also in other countries like US, Australia and New Zealand. Later it was also disseminated to other countries like Finland, Sweden and Netherlands, where public management reforms have been, however, usually more modest than in Anglo-Saxon countries. These administrative changes have been based on the assumption that public sector's operations and service production are inefficient and ineffective and that this would lead to increasing taxation and declining standards of public service. The central drivers of reform therefore, were to stop increasing costs and improve performance. (Dawson & Dargie 2002).

With varying emphasis the reform has included such elements as stress on private sector styles of management, measures of performance, and output controls. New Public Management has also had the impact of lessening the previous differences between the public and private sector (Pollitt 1993; Pollitt & Summa 1995). Pollitt (1995) has proposed that there are certain principles that in varying combinations are found in NPM reform ideology. These principles include: 1. Efficiency, 2. Decentralization, 3. Introduction of market and quasi-market mechanisms, 4. Disaggregating traditional bureaucracies into separate agencies, 5. Application of performance targets, productivity measurement and evaluation, 6. Shifting basis for public employment, 7.Separating the function of providing public services from that of purchasing them, 8. Increasing emphasis on values like ”quality” and ”use-orientation”.

There is no shared understanding of the reasons for the development of NPM. Some researchers have explained it as being due to a country’s poor economic performance and fiscal stress, whilst others have referred to party politics and especially to the rise of the‘New Right’. However, It has been also pointed out that there is no simple causal relationship between poor economic performance and NPM, or between political orientation and NPM. For instance, Sweden had high economic performance and left-wing governments during the 1980s, but it also advocated New Public Management (Hood 1995).

There are several ways that NPM has manifested itself in the management and steering of public R&D organizations. Most research performing organizations are expected to behave like market actors in the marketplace of research services. This goal is, in turn, supported by new steering mechanisms emphasising the use of competitive funding mechanisms, performance targets, productivity measurement and evaluation. The efficient use of public resources also necessitates social “usability” and relevance from research. (Dimmen A., Kyvik S. 1998)

Recently there have been views expressed that NPM is now passing by. In general this may be due to various views, which have emphasized citizen participation, the increasing role of networks and their governance, as well as complex system views, all of which have questioned the continuing validity of the NPM (Wikipedia, 12.3.2013). Dunleavy et al. (2005) have put forward the view that digital governance and wider participation structures are substituting NPM. Despite this, it seems that the central values and criteria of the NPM are still strong. E.g. efficiency and effectiveness of public services and administration are central objectives for governments in the middle of economic constraints and fiscal challenges. Relevance to the GREAT project

The perspective of NPM is relevant for RRI due to the fact that it involves the idea of public target setting and control of actors via assessment or evaluation of activities. It forms the general framework where RRI ideas are implemented in public administration. RRI also emphases values like “quality”, “use-orientation” and “societal impact”, which are of central issues within NPM. It can be also considered, whether RRI forms just another performance criteria for the R&D actors alongside

the existing ones thus adding performance as another form of control over their actions? The latter implies a meta-critical or reflective perspective to the project.

Recommendations and Practical Consequences

The concept of NPM can be used to create critical distance to the RRI concept and its uses. Being responsible means also being critical and reflexive towards one's own action. It is reasonable to ask whether we are, despite good intentions, creating or supporting the construction of such new structures which may also have negative unintended consequences.

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6.1.16. Policy

Author: VTT

Submission Status: Revised

Definitions and Controversy

Policy is a shared vision and plan of ideas and actions to the specifically determined goals and intentions. However this is a very general definition of policy there are also the challenge that means that more detailed definitions are required according to the specific contexts.

In general public policy seeks to achieve a desired goal that is considered to be in the best interest of all members of society. [1] The question is still: who the policy makers are, for what purposes, sharing whose intentions and values?

Torjman (2005) states that: 'public policy represents a decision, made by a publicly elected or designated body, which is deemed to be in the public interest'.

Policy development involves the selection of choices about the most appropriate means to a desired end. A policy decision is the result of a method, which in theory at least, considers a range of options and the potential impact of each. The weighing of options takes into account various factors, including:

• Who benefits? (the more the better)

• Who might be negatively affected? (the fewer the better)

• Time required to implement a solution

• Associated cost and financing

• Political complexities of a federated government structure.

An example of reasoning for policy decisions is that of the European Union whereby The Treaty of Lisbon defines policies for various segments of life – "Policies for a better life".[2]

Besides national, governmental, confederation or global alliance level there are also policies for organisations, companies, corporates, industries or communalities. The Dictionary defines policy as: " A plan or course of action, as of a government, political party, or business, intended to influence and determine decisions, actions, and other matters". [3,5] In management policy however, it is defined as the set of basic principles and associated guidelines, formulated and enforced by the governing body of an organization, to direct and limit its actions in pursuit of long-term goals. [4]

Relevance to the GREAT project

Policy is a key concept of planning and implementation activities and hence related to the governance practice very closely. At the moment I have used basic definitions from internet which give good starting point for further study of the concept.

Recommendations and Practical Consequences

Related to the previous comment: this concept should be studied little bit more closely so maybe added only to the next version of glossary?

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6.1.17. Power

Author: UOXF

Submission Status: Revised

Definitions and Controversy

Power can be considered as the "[a]bility to act or affect something strongly" and as the "[c]ontrol or authority over others" (Oxford English Dictionary 2013). There are various forms of power, overt as well as subtle ones. For instance, a hierarchy is a particular way of distributing power in an organization. If organizational hierarchies are backed by claims of formal as well other types of rationality, they appear legitimate, at least in "modern" societies (cf. Weber 1921/1980: 122-130). Furthermore, discourses can be powerful (e.g., Foucault 1971). Moreover, national and international funding agencies can exert power by awarding or denying financial resources. Power can also be executed indirectly when it is imbedded in the design of artefacts, including technologies. However, people can often find ways to circumvent such design features and develop their own usages. This user agency can be regarded as a countervailing power to the "politics of artefacts" (Winner 1980; Oudshoorn/Pinch 2003).

Relevance to the GREAT project

The GREAT project aims at investigating "the nature of new partnerships among various stakeholders". Moreover, GREAT intends to "explore the knowledge and research potential of multi-stakeholder approaches in research" (see DOW part B, p. 4). In other words, we want to study the relationships and interactions between stakeholders, and we also try to account for different stakeholders' needs as well as problems in a given research and innovation process. These problems can be financial, organizational ones etc. All this implies studying the different ways different stakeholders influence, or try to influence, or fail to influence the innovation process, or are influenced by other stakeholders. Having influence (or lack thereof) is a form of power (or lack of power). Furthermore, the GREAT project aims at studying technological innovations (e.g., DOW part B, p. 10). So we are also concerned with the (sometimes subtle) "politics of artefacts".

Recommendations and Practical Consequences

According to the above definition, there are different overt and subtle forms of power that nest in research and innovation processes. We should identify these varieties in our empirical studies and study their consequences for "responsible" behaviour. For instance, a researcher or IT professional might not be able to act in a more "responsible" way (e.g., account for wider societal expectations) because he is in a low position in terms of the organizational hierarchy, or because his wage depends entirely on short-term external funds.

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6.1.18. Precaution

Author: Signosis

Submission Status: Revised

Definitions and Controversy

Precaution is a. an action taken in advance to protect against possible danger, failure, or injury; a safeguard b. Caution practiced in advance; forethought or circumspection.[5]

Precaution according to www.dictionary.com is a measure taken in advance to avert possible evil or to secure good results; and b. caution employed beforehand; prudent foresight

Precaution may be defined as "caution in advance," "caution practised in the context of uncertainty," or informed prudence. All definitions have two key elements:

- An expression of a need by decision-makers to anticipate harm before it occurs. Within this element lies an implicit reversal of the onus of proof: under the precautionary principle it is the responsibility of an activity proponent to establish that the proposed activity will not (or is very unlikely to) result in significant harm.
- The establishment of an obligation, if the level of harm may be high, for action to prevent or minimise such harm even when the absence of scientific certainty makes it difficult to predict the likelihood of harm occurring, or the level of harm should it occur. The need for control measures increases with both the level of possible harm and the degree of uncertainty.

The precautionary principle or precautionary approach states if an action or policy has a suspected risk of causing harm to the public or to the environment, in the absence of scientific consensus that the action or policy is harmful, the burden of proof that it is not harmful falls on those taking an act.[6]

[5] http://dictionary.reference.com/browse/precaution?s=t
[6] http://en.wikipedia.org/wiki/Precautionary_principle

Paragraph 2 of article 191 of the Lisbon Treaty states that "Union policy on the environment shall aim at a high level of protection taking into account the diversity of situations in the various regions of the Union. It shall be based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should as a priority be rectified at source and that the polluter should pay."

Relevance to the GREAT project

The February 2, 2000 European Commission Communication on the Precautionary Principle notes: "The precautionary principle applies where scientific evidence is insufficient, inconclusive or uncertain and preliminary scientific evaluation indicates that there are reasonable grounds for concern that the potentially dangerous effects on the environment, human, animal or plant health may be inconsistent with the high level of protection chosen by the EU".[7]

The precautionary principle shall be informed by three specific principles:

- The fullest possible scientific evaluation, the determination, as far as possible, of the degree of scientific uncertainty;
- A risk evaluation and an evaluation of the potential consequences of inaction;
- The participation of all interested parties in the study of precautionary measures, once the results of the scientific evaluation and/or the risk evaluation are available.[8]

The GREAT project as focusing on the dynamics of RRI governance the precaution of the stakeholders of research and innovation is eccentric to responsibility concept.

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[7] Consolidated Version of the Treaty on the Functioning of the European Union article 191, paragraph 2

[8] http://europa.eu/legislation_summaries/consumers/consumer_safety/l32042_en.htm

6.1.19. Precautionary Principle

Author: UPD

Submission Status: Revised

Definitions and Controversy

The meta-norm of precautionary principle (PP) founds its first coherent formal shape in the *Vorsorgeprinzip*, enunciated in German environmental policy in the early 1980s. Strictly speaking, the German word focuses more on anticipation than responsibility, attention or care. There has been proposed a simple definition of PP, one that has been widely adopted in the regulations regarding marine pollution, climate change and biodiversity loss, dangerous chemicals, and genetically modified organisms (GMOs). After the World Charter for Nature was adopted by the United Nations General Assembly in 1982 and the first mention of PP, one archetypal and globally influential formulation of the concept appeared as Article 15 of the 1992 *Rio Declaration on Environment and Development*. That section holds: *In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation*. (UNEP, 2007)/ There is a statement in one of the main documents on the Precautionary Principle for the European Policy, the *Communication from the Commission on the Precautionary Principle* (EC, 2000). It says very strongly that "An assessment of the potential consequences of inaction should be considered and may be used as a trigger by decision-makers. The decision to wait or not to wait for new scientific data before considering possible measures should be taken by decision-makers with a maximum of transparency. The absence of scientific proof of the existence of a cause-effect relationship, a quantifiable dose/response relationship or a quantitative evaluation of the probability of emergence of adverse effects following exposure should not be used to justify inaction. Even if scientific advice is supported only by a minority fraction of the scientific community" (idem, art. 6.2., p. 16).

Even those who feel skeptical toward the precautionary principle recognize its weaker definition, because "its requirement [says] that bounds be put on the uncertainty surrounding scientific knowledge (...) when there is a very great uncertainty regarding the likely impact of technology" (Morris, 2000, pp. 14-15).

Compared with the traditional decision criteria facing uncertainty, in applying the PP to practical (policy) issues (Reber, 2009), the different considerations are manifestly matched, namely those for: economics, legal (rights), risks of damages, and technologies. One novelty of the criteria in PP is its characterizations of this meta-principle as "serious and irreversible damage," a "lack of full scientific certainty" and the impossibility to postpone, based on those conditions. The last point here is clearer in Article 10 of the Cartagena Protocol on Biosafety, ratified in June 2003. The Decision Procedure therein states: "10.6. Lack of scientific certainty due to insufficient relevant scientific information and knowledge regarding the extent of

potential adverse effects of a living modified organism (...) shall not prevent that Party from taking a decision, (...) in order to avoid or minimize such potential adverse effects." (Annexe A, (Myers & Raffensperger, 2006, p. 323).

Indeed PP installs a new relationship between scientific uncertainty and policy decision (Stirling, 1999). The reverse use of scientific uncertainty, in terms of what should be assessed and simply often used as an excuse for governments to avoid making beneficial but drastic decisions, could be possible. Because of its possible arbitrary application, however, some political and law philosophers' prefer the classical form of risk/benefit assessment to the precautionary principle (Sunstein, 2005), pretend that PP has not a set of criteria to guide its implication (Gardiner, 2006), when others are very hostile toward it (Morris, 2000).

Relevance to the GREAT project

PP has sometimes been used in real decision-making processes or actual trials (Foucher, 2002), and argued or interpreted in deliberative Participatory Technological Assessment practices (Reber, 2010a, 2011), and furthermore, the principle has been discussed as desirable by the ordinary citizen through this deliberative process (Dryzek *et al.*, 2009). Its burden is mainly on civil authority. Therefore it is very appropriate for European research and innovation domain.

With the PP, the GREAT project analysis could try to see if PP is at work as a key responsible conception in different case studies and help to build some typologies. PP can inspire theoretical work for RRI too (Von Schomberg, 2013), more precisely in the way it articulates epistemic and normative sides (Reber, 2010b).

The return to the first German definition *Vorsorge Prinzip* understood as anticipation is closer to only one side of RRI: the anticipation and foresight. As anticipation and participation are embedded in RRI (Grunwald, 2011) and as they open the problem of articulation between different spheres and their embedded normativities (sciences, ethics, law, economy…), PP and its different interpretations and applications is a key concept.

Recommendations and Practical Consequences

The PP is one way to express responsibility in the tension with innovations that potentially could cause big and/or irreversible damages. It is a meta-principle that holds closely factual and normative sides of a collective assessment process and gives insights to follow an integrative inquiry. It includes uncertainty, mainly on the scientific domain, but it is too vague on the normative (ethical, political) one. We have to integrate the possibilities of normative pluralism of theories to guide and balance the decision to act or not to act, and more precisely to wait or not to wait. The tools of this actions could follow different ways (observatories, monitoring, moratoriums, special laws, new research …).

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6.1.20. Privacy

Author: DMU

Submission Status: Revised

Definitions and Controversy

It is relatively easy to state the benefits of privacy from the perspective of the individual. Rossiter (1958) considers that privacy provides the individual with 'independence, free will, secure autonomy, dignity and resolve against the whole world' (Rossiter, 1958 p.24). The concept of independence and resolve against the world does however appear rather confrontational and does not seem to appreciate the need for co-operation and participation. Nor is it able to take into account the nature of today's information society whereby individuals who have the need to participate for a wide variety of purposes, must also give up some of their privacy and personal information in order to do so. Concerns about privacy can include fears for its loss, invasion or violation, which certainly give an indication of its importance even if privacy as a term remains a slippery term to define. How individuals see the world they live in, will inevitably have an effect on what they perceive to be a valid definition of privacy. This is further complicated by the changes to perception over time or during particular life-stages.

Understanding the need for privacy goes some way towards developing a definition that can be utilized as a standard across the GREAT project. Definitions tend to be derived from a wide range of perspectives, including rights based, normative, descriptive, or imbued with some kind of property right (Hunter 1995). One of the earliest and perhaps most famous attempts in modern times to define privacy is 'The right to be let alone' (Warren and Brandeis, 1890 p.205). This provides a non-intrusion 'freedom from' definition but does not address the 'freedom to' aspect of privacy. Later, Westin (1967) saw privacy as 'The claim of individuals, groups or institutions to determine for themselves when, how, and to what extent information about them is communicated to others' (Westin, 1967 p.7), but this only provided limitations on informational privacy and did not consider for example bodily privacy. Gavison (1980) expanded the scope of privacy to include 'the limitation of others' access to an individual with three key elements: secrecy, anonymity and solitude' (Gavison, 1980 p.421) but then failed to consider beyond the focus on the individual and seclusion theory.

Moor's (1990, 1997) suggests a restricted access/limited control (RALC) theory of privacy which, whilst still chiefly concerned with the individual, also provides an approach that sees privacy as 'protected from intrusion, interference, and information access by others' (Moor 1997). This approach will be utilized as a way of normalizing understanding of privacy within the GREAT project, as RALC theory has the ability to 'distinguish between the condition of privacy and a right to privacy and between a loss of privacy (in a descriptive sense) and a violation or invasion of privacy (in a normative sense)' (Tavani 2007 p. 19). This provides the multi-faceted

and therefore inclusive and wide-ranging understanding of privacy that should be a requisite for the governance of any responsible research and innovation activity.

Moreover, recent developments mean that by mid 2013, the EU will have finalized its proposed data protection legislation which is intended to harmonize data protection standards across the whole of the EU member states. This will have the significant impact on EU Research and Innovation projects in the future and means that awareness of the importance of privacy protection will become increasingly significant and reinforce the need for RRI.

Relevance to the GREAT project

Privacy in its many derivations is important in that it impacts on both the perception and actual success of change. It is also a key concern in all technology developments that involve ICTs and is of particular importance for RRI. However, even though many scholars have detailed its importance (Tavani 2007, Moor 1990, 1997, Westin 1967) privacy issues are still not always taken seriously by developers, policy-makers and business, and violations are often largely ignored by the media. Therefore it is doubly important to ensure that an awareness of and understanding of the importance of privacy is built-in as an integral part of a successful RRI project. There are currently several EU projects that are directly privacy related such as PRESCIENT, SENIOR etc that further highlights the importance of privacy in research

Recommendations and Practical Consequences

By adopting the RALC approach to understanding privacy the GREAT project will be utilising a recognised approach that ensures some standardisation of understanding across disciplines through the utilization of clear parameters of description and analysis Tavani (2007)

The protection of privacy by ensuring that protections are built-in through adherence to privacy by design and the use of privacy enhancing technologies such as encryption and privacy impact statements alongside risk analysis during project design development lifecycle, will go some way towards addressing privacy which is one of the primary problems of current and future RRI.

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6.1.21. Recommendations & Guidelines

Author: DMU

Submission Status: Revised

Definitions and Controversy

This glossary entry concerns the processes of the GREAT project, not so much the research content of the project.

A guideline is defined by the Oxford Dictionaries (online) as: “a general rule, principle, or piece of advice”[9].

The same source defines a recommendation as: “a suggestion or proposal as to the best course of action, especially one put forward by an authoritative body […].”[10]

The possibly interesting aspect of this is that the GREAT project, by issuing guidelines, posits itself as an “authoritative body”.

Relevance to the GREAT project

WP6 of the GREAT project is dedicated to “Guidelines and Recommendations”. These will be based on all aspects of the work undertaken prior to WP6. Guidelines and Recommendations are thus a key output of the project. As explained in the objectives of WP6 (DoW, p. 20), “Work package 6 will therefore ensure that the research is conducted with a view to this aim. It will translate research results into guidelines and ICT tools in collaboration with the most important stakeholders and assess the usefulness and ease of use of the resulting guidelines with a view to optimising the wider uptake of project results.”

It is worth pointing out that similar activities have been undertaken or will be undertaken in the ETICA and CONSIDER project, so there will be experience that the GREAT consortium can draw on.

In the spirit of reflexivity, the consortium will need to consider what the source of the consortium’s authority is to issue guidelines and how this is created and developed throughout the project.

Recommendations and Practical Consequences

[9] http://oxforddictionaries.com/definition/english/guideline?q=guidelines, accessed 10.04.2014
[10] http://oxforddictionaries.com/definition/english/recommendation?q=recommendation, accessed 10.04.2013

It will be important to ensure that guidelines and recommendations are deeply anchored in all activities of the project. We need to go through a sound process of answering the following questions:

- Who are stakeholders,
- Who are addressees of guidelines and recommendations?
- What are their needs and requirements?
- How will we know we have med them?

Some of these will be answered in due course during different tasks of WP6.

A practical recommendation arising from this is to consider guidelines and recommendations during all stages of the project.

6.1.22. Research

Author: DMU

Submission Status: Revised

Definitions and Controversy

The Oxford online dictionary considers research to be 'the systematic investigation into and study of materials and sources in order to establish facts and reach new conclusions'. The UK Research Excellence Framework however provides a more detailed definition of research as including 'work of direct relevance to the needs of commerce, industry, and to the public and voluntary sectors; scholarship; the invention and generation of ideas, images, performances, artefacts including design, where these lead to new or substantially improved insights; and the use of existing knowledge in experimental development to produce new or substantially improved materials, devices, products and processes, including design and construction.' (HEFCE 2012)

The purpose of undertaking research may be an attempt to develop new theories, products or services or it may be undertaken in a way that directly addresses existing or emerging needs or problems or is undertaken to establish, confirm or reaffirm the results of previous work, either to reinforce its validity or to advance knowledge to a new level. (Morgan, 2007, Bryman, 2004, Cresswell, 1998). It may also be necessary to undertake research that tests the validity of instruments, procedures, or experiments prior or subsequent to their adoption. In this way better understanding of predicted outcomes may be achieved or new outcomes may be discovered resulting from research undertaken after implementation (Morgan, 2007)

Research therefore has the intention of advancing human knowledge through utilising a range of tools, instruments and approaches. Controversies will inevitably arise where philosophical approaches conflict across disciplines (Bryman, 2004). For example epistemological differences between how we understand and relate to the world alongside philosophical concerns about the nature of existence and

assumptions about beliefs (ontology) may result in intractable or highly complex differences in perception of validity. Further, different paradigms that indicate a world-view or 'stance' will likely impact on the methodologies employed to undertake research investigations. As Popper indicates, 'It is comparatively easy to agree on observations of physical phenomena, harder to agree on observations of social or mental phenomena, and difficult in the extreme to reach agreement on matters of theology or ethics' (Popper 1959).

Relevance to the GREAT project

It is of particular importance that there is a common understanding of what research is and what it means for the GREAT project. As much of the work includes observation, evaluation and includes interviews as well as modelling, it is important that the project partners have an understanding of what is meant by research within each element of the GREAT project. It is important that researchers have an understanding of each other's' approaches to provide new insights into the governance of RRI.

Recommendations and Practical Consequences

Through greater understanding across different research approaches it is expected that the design of research and innovation projects will consider not only the practical application and direct measurable impacts of new technologies, but also to appreciate and understand the importance of the potential societal, individual and other impacts of research. It is important however to appreciate that some differences in perception may be incommensurable with each other due to their different epistemological approaches.

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6.1.23. Stakeholder

Author: UOXF

Submission Status: Revised

Definitions and Controversy

According to Friedman and Miles (2006: i-ii, 4), the stakeholder concept was originally developed by Freeman (1984: 31) and had a rather narrow focus on corporate strategy and morality: It would have referred to "any group or individual who can affect or is affected by the achievement of the organization objectives". Since then, the term has grown massively in popularity among policymakers, regulators, NGOs and the media (Friedman/Miles 2006: 3).

At the same time, many authors widened the initial "organization-centric" view and abandoned the focus on achieving organizational objectives (Friedman/Miles 2006: 4, 9). It is argued that there are at least 435 different definitions today (Miles 2012: 287). For instance, some definitions account for "individuals or groups who are affected by unintended consequences" of an organization's activities and products (Friedman/Miles 2006: 4, 9). One of the broadest definitions was developed by Starik (1994) who considers that in order to account for phenomena such as environmental impacts, future generations should also be seen as stakeholders, for example. Moreover, he includes non-human and immaterial or mental entities such as rocks or "community" (Friedman/Miles 2006: 9, 11). Starik's definition can also be considered as a normative one because it "draws attention to categories of potential stakeholders that may be overlooked in current organization practice". "Strategic" definitions, in turn, focus more clearly on organizational goals (Friedman/Miles 2006: 12).

Relevance to the GREAT project

The aims of the GREAT project are to "explore the dynamics of participation" in research and innovation processes, and to "investigate the nature of new partnerships among various stakeholders". Moreover, GREAT intends to "explore the knowledge and research potential of multi-stakeholder approaches in research" (see DOW part B, p. 4).

Recommendations and Practical Consequences

It is a theoretical and empirical challenge to actually develop and implement a "multi-stakeholder approach" if the number and types of stakeholders are not delimited in advance. Furthermore, the domains or cases to be studied are not yet clear because they depend largely on the development of the analytical grid. Hence, we don't know yet precisely the "stakeholders" that we investigate. Currently it could literally be anybody.

However, from a grounded theory and ethno-methodological point of view, this is not a big problem. Further, the selection of domains and the identification of stakeholders (direct versus indirect ones, people who voice their concerns versus tacit actors etc.) is a stepwise process anyway. It is stepwise in the sense that it takes into account the ideas developed for the analytical grid, and it also considers how researchers and IT professionals involved in a particular innovation process negotiate between themselves who has a stake, and who has not. Lastly, following an ethnographic approach includes identifying stakeholders that the researchers and

IT professionals in a given domain overlook. So we consider participants' points of views on stakeholders, but we also search for their blind spots or wilful ignorance.

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6.1.24. Sustainability

Author: UPD

Submission Status: Revised

Definitions and Controversy

Called on intensively for two decades as a means to constrain economic activities, the adjective 'sustainable' refers to 1) the ability "to be maintained at a certain rate of level" and 2) a way of "conserving an ecological balance by avoiding depletion of natural resources" (Oxford Dictionary). The World Commission on Environment and Development Report known as the Brundtland Report (1987, p. 8) has provided a widely used definition of sustainable development focused on the second aspect: it promotes "a development which meets the needs of the present without compromising the ability of future generations to meet their own needs."

Indeed, the concern for sustainability emerged originally together with ecological issues and with a special focus on future generation to ensure a fair intergenerational share of resources. But as claimed by Dummond and Marsden (1999), sustainability not only concern agriculture and natural resources, but extends its relevance to activities such as urbanism, tourism, architecture, but also management, finance or political decisions (socially constructed resources).

In terms of ethics, sustainability is often conceived in a substantive way as set of good practices (empirically grounded as with the concept of biomass) or more abstract as it is illustrated, for instance by Hodge and Dunn's (1992) distinction between the prevention of catastrophe for human society and the promotion of society in harmony with ecosystem. As contended by Thompson (2010) sustainability can be conceived as resource sufficiency ("are there enough resources?") or as functional integrity ("is my conduct threatening the system's stability?"), this latter meaning coming closer from a last dimensions of sustainability as being "able to be upheld or defended" (Oxford Dictionary). But other normative criteria such as social justice consideration have been added to the concern for sufficiency or durability

(Allen and Sachs, 1993). If we seek to provide a general definition of sustainability, we could say that it is a virtue of a system to maintain elements for which it is socially considered that they have to be preserved.

Finally, sustainability is sometimes related to responsibility as a feature of the latter, as in von Schomberg's (2013) where responsibility includes European Constitution's endeavor to achieve sustainable development.

Relevance to the GREAT project

As mentioned in the definition, sustainable development is sometimes argued as being one criteria of responsible innovation. According to these conceptions, innovation threatening ecological resources or any process of production involving a heavy imputation on futures generation resources should not be considered as "responsible". Further investigation in GREAT project should determine if sustainability is a relevant parameter for responsibility or not.

Recommendations and Practical Consequences

Sustainability and responsibility are both terms very widely and sometimes very imprecisely used to include different set of practices, recommendations and intentions. They share some meta-ethical issues so as whether the definition should be substantive-like or procedural-like. An agreement on the term sustainability will help to get a common definition of responsibility.

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6.1.25. Taxonomy

Author: UOXF

Submission Status: Revised

Definitions and Controversy

A taxonomy is a classification, or rather, a particular system of classification that is closely related to a particular body of knowledge and theories (e.g., botany; cf.

Oxford English Dictionary 2013). According to Foucault, taxonomic thinking as a particular way of producing knowledge started in the course of the 17th century (Foucault 1966). The basic operations are division (dividing the world in clearly separated entities) and "subsumption" (categorization, and defining a hierarchical order for all entities created; Handelman 1981: 9). Any statistics such as those produced in the natural and social sciencies as well as in public administration presuppose taxonomic thinking (cf. Desrosières 1998: 237 et seqq.).

A few authors have argued that temporal dynamics (e.g., historical change) and ambiguity (e.g., hybrid identities) cannot be represented easily by a taxonomic approach, though (cf. Bowker/Star 1999). Furthermore, the hierarchical order of a taxonomy can often be doubted. For instance, in a given empirical domain or field of expertise some participants might consider a problem as a minor issue (i.e., a "lower level" entity subordinated to a more general and more important problem), whereas for other participants it is key and structures all of their other concerns or activities.

Despite these existing critical views taxonomies continue to be very useful means of knowledge that help depicting and structuring reality systematically. Narratives, metaphors or case studies are alternative modes of understanding the world that can balance their mentioned occasional deficiencies. Moreover, a given taxonomy can be adapted to changing circumstances, so it can actually be flexible in practice. In addition, in practice taxonomies are often contextualized by some sort of methodology that explains the choice and the order of the included categories (meta-data). Thus, in practice it is often acknowledged that a taxonomy is a product of a certain historically, culturally and theoretically contingent mindset.

Relevance to the GREAT project

Probably the analytical grid is a system of classification (taxonomy) that embodies particular theories and concepts (e.g., a specific theory of civil society, a particular concept of "stakeholder"). Moreover, Task 3.1 and D 3.3 in WP3 are about "gathering current ethical governance measures within EU funded projects with a view to identifying governance patterns resulting in the creation of a taxonomy of common approaches".

Recommendations and Practical Consequences

A taxonomic approach is very useful and important for the GREAT project because we try to account for and compare as many empirical instances of responsible research and innovation processes as possible (this also includes instances of lack of responsible behaviour). Moreover, to some degree, we are supposed to develop policy recommendations. Constructing a clear system and even hierarchical order of approaches supports this policy goal. However, we might also encounter ambiguous cases. For instance, certain practices might be called "responsible" from a particular stakeholder's point of view, but irresponsible from another. Furthermore, some innovation practices and technologies might have appeared to be unproblematic in the beginning, but regarded as irresponsible later on, and vice versa. Thus, it would be good to always explain the methodologies behind our taxonomies, to point to

potential weaknesses (blind spots et cetera) of a given taxonomy, to change a given taxonomy in the course of our project, and to use other means of knowledge where they seem appropriate (narratives et cetera).

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6.1.26. Transparency

Author: UOXF

Submission Status: Revised

Definitions and Controversy

In public and political discourse, transparency is often positively associated with democracy, freedom and accountability. For instance, it is frequently assumed that "more information leads to improved democratic systems" (Lew 2011: 101). Thus, transparent behaviour is often regarded as a virtue. It implies making aspects of processes and procedures visible to all relevant parties so that they have a clear and fair representation of what has occurred. Consequently, many people have recognized that "access to, and control over information is linked to the function of power" (Lew 2011: 101).

However, more information can also mean less understanding and distrust. Moreover, proponents of transparency and the information society might underestimate that a lot of knowledge in expert systems and organisations is situated and tacit. This knowledge might get less effective if it is made explicit in a compulsive way (Strathern 2000: 313-314; Lew 2011: 102).

In a literal sense, something is "transparent" when it is pervious to light. Accordingly, transparency refers "to the state or quality of transmitting or allowing the passage" of any content "without distortion" (Oxford English Dictionary 2013). For instance, slides used with overhead projectors are called "transparencies". The slide is a medium that carries a picture, diagram etc. which is made visible by some background light. Once the light is on, the observer's attention can easily shift from the medium (slide) to the content (picture, diagram).

This shift of attention is related to a paradox that is theoretically relevant. Apart from the light, the medium (slide) is the basic condition for seeing and knowing the content at all. Yet, the more sophisticated (effective) the medium, the more it "disappears" from the observer's point of view. This paradox applies to most infrastructures and media as well as to the production of knowledge in general. For instance, it has been argued that there is no "transparency", but only "cultural transparency" (Wenger 1991; Star/Bowker 2002). According to this approach, processes or artefacts are never transparent *per se*. Their presumed clearness always depends on complex infrastructures of different media as well as people's historical and current practices. As long as this complex web works, it appears invisible. But once it breaks down or the cultural frame of reference shifts, the practices and artefacts can get opaque and incomprehensible. At the same time, the web (i.e., infrastructures, media and supportive practices) has gotten visible.

Relevance to the GREAT project

Von Schomberg states that transparency is part of responsible behaviour in research and innovation processes (von Schomberg 2011: 9). The GREAT project is in line with this view and takes transparency as a "central concept[...] of participatory governance in the context of co-responsibility where innovative change is at work" (DOW, part B, p. 10).

Recommendations and Practical Consequences

A balanced view of transparency is necessary: It is not always a virtue. Sometimes scientists or technological experts might need their individual rooms for manoeuvre to work efficiently and effectively. This does not necessarily mean that they deliberately hide something. In our empirical case studies we can find out in how far and in which ways some experts need this particular form of freedom. Moreover, if we take the concept of "cultural transparency" seriously we probably have to acknowledge that many technologies as well as research and innovation processes remain rather opaque, difficult and inaccessible for some stakeholders. It is probably unrealistic to assume that every possible stakeholder obtains the same level of understanding, and of participating in technology design as well as scientific research.

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6.2. Specific terms relevant to the GREAT project

6.2.1. Case study

Author: VTT

Submission Status: Revised

Definitions and Controversy

“A case study (also known as a case report) is an intensive analysis of an individual unit (e.g., a person, group, or event) stressing developmental factors in relation to context. The case study is common in social sciences and life sciences. Case studies may be descriptive or explanatory. The latter type is used to explore causation in order to find underlying principles.[1][2] They may be prospective (in which criteria are established and cases fitting the criteria are included as they become available) or retrospective (in which criteria are established for selecting cases from historical records for inclusion in the study).

Thomas[3] offers the following definition of case study: "Case studies are analyses of persons, events, decisions, periods, projects, policies, institutions, or other systems that are studied holistically by one or more methods. The case that is the subject of the inquiry will be an instance of a class of phenomena that provides an analytical frame — an object — within which the study is conducted and which the case illuminates and explicates."

Another suggestion is that case study should be defined as a research strategy, an empirical inquiry that investigates a phenomenon within its real-life context. Case study research can mean single and multiple case studies, can include quantitative evidence, relies on multiple sources of evidence, and benefits from the prior development of theoretical propositions. Case studies should not be confused with qualitative research and they can be based on any mix of quantitative and qualitative evidence. Single-subject research provides the statistical framework for making inferences from quantitative case-study data.[2][4] This is also supported and well-formulated in (Lamnek, 2005): "The case study is a research approach, situated between concrete data taking techniques and methodologic paradigms”[1]

Case studies are used 'to explain the causal links in real-life interventions that are too complex for the survey or experimental strategies' [4]. It also 'investigates a contemporary phenomenon within its real life context especially when the boundaries between phenomenon and context are not clearly visible' [4]. The main purpose of a case study is to explain, describe, illustrate, explore and evaluate phenomena.

Relevance to the GREAT project

Case Study is one of the key concepts in Great analysis. For that reason I think it should be defined in context of Great work. And in fact naturally is defined/described more closely in wp3

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6.2.2. Simulation Model

Author: NUID

Submission Status: Revised

Definitions and Controversy

A simulation model is a "running model" that produces artificial data about the structures and behaviours of a target (e.g. a social system), where empirical target data and artificial model data are sufficiently similar to serve the purpose of the modeller. The advantage of a simulation model of the target is that it allows experimenting with structural and behavioural change (cf. Doran and Gilbert 1994).

Relevance to the GREAT project

Simulation models are at the core of a laboratory *in silico*, which is envisaged for GREAT in WP4. They provide computational demonstrations of production algorithms: they show whether a specific communication/action pattern on the micro level is sufficient to produce a macro-level phenomenon such as innovation. Where the aim is to understand the processes and mechanisms in innovation networks (Tesfatsion and Judd 2006) and to identify access points for policy intervention - even suggest designs and scenarios - this is the approach of choice (Ahrweiler, Pyka and Gilbert 2004, Gilbert, Ahrweiler and Pyka 2007). The aim of simulation modelling is not primarily to predict specific system behaviour or to reproduce statistical observations, but rather to gain a dynamic and detailed

description of a complex system where we can observe the consequences of changing features and parameters. Innovation is an emergent property of a complex social system involving heterogeneous agents and evolving rule sets. Our simulations will serve as a laboratory to experiment with social life in a way that we cannot do empirically due to methodological reasons (cf. Ahrweiler and Gilbert 2005). Using this tool, we can understand innovation dynamics in complex social systems and find their potential for design, intervention and control.

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6.2.3. Workshop

Author: VTT

Submission Status: Revised

Definitions and Controversy

An educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. [1]

A brief intensive course of education for a small group; emphasizes interaction and practical problem solving[2]

Relevance to the GREAT project

Basic method/approach for co-operation and development of work in project like this.

Recommendations and Practical Consequences

GREAT has planned to run workshops throughout the project, not only to disseminate findings but to involve key stakeholders early in the project as a means

of informing the research strategy and testing project results. They also provide a way to secure buy-in to the project results from key groups. At least, two workshops will be held during project' s implementation to maximise dissemination of findings, promote uptake of the guidance documents and to encourage further engagement on the topic.

References

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6.3. Evolution of glossary / entries

This iteration of the glossary should be seen as on-going and subject to revision. In order to facilitate the revision process, the consortium agreed to the inclusion of a glossary section in all deliverables for the GREAT project.

Some of the terms included in this glossary are work in progress and have either not been reviewed by partners or reviewed terms have not been revised and so such cases, the original version has been used. Revised versions of the terms will be included in future iterations of the glossary.

It is also expected that there will be further steps taken by the project Coordinator to collaborate across the four related RRI projects of GREAT, RESPONSIBILITY, Res-Agora and PROGRESS. Therefore, it is envisaged that the Coordinator will undertake dissemination and consultation activities with the other projects.

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