

What is required of requirements? A first stage process towards developing guidelines for responsible research and innovation

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ABSTRACT

Responsible research and innovation (RRI) considers the impact of development on stakeholders and provides a direction for the future of science and technology. Therefore, in the practical world of the lab, what is needed is a set of guidelines to assist in the application of those RRI principles. However, to ensure that any guidelines are usable and acceptable, it is important to engage with those who would actually be expected to implement them.

Stakeholders are often asked to evaluate a set of guidelines or recommendations without having any say in how they are constructed, what they should look like or what they should contain. The process of stakeholder engagement in the development of a set of 'requirements' therefore provides insight from which a set of guidelines can be developed. In this way, acceptance is fostered through stakeholder involvement in the process, which has been built from the core principles of RRI.

Categories and Subject Descriptors

General Terms

Management, Performance, Design, Human Factors, Standardization, Theory.

Keywords

Guidelines, Requirements, RRI

1 INTRODUCTION

Taking personal responsibility for our actions and the impact of those actions is something we are taught from an early age. We are expected to be honest, admit our mistakes and rectify and/or apologise where we do harm.

Responsibility in the context of research and innovation and as a key element of RRI blurs the boundaries between the personal and the institutional. Being responsible 'to' can involve a chain of command or similar whereby the lines of responsibility for completion of a task or some other obligation is directed towards an individual or an organization, often through specific channels of communication. This form of responsibility can lead to 'passing the buck' and may allow individuals to avoid taking personal responsibility. Being responsible 'for' something

however remains with the personal and includes taking responsibility for the outcomes of one's actions, and a concern about those who are likely to be affected both within and beyond an organization.

RRI re-engages the individual with personal responsibility at the same time as re-inforcing institutional responsibility. This means that RRI creates a step-change in the way that those who are engaged in research and innovation should consider the impact of what they do. To encourage RRI take-up amongst researchers and innovators across all sectors therefore, guidelines and recommendations are needed to provide a starting point for its adoption. However, guidelines for the governance of RRI need to be broad enough to encompass all stakeholders and yet flexible and specific enough to enable stakeholders to frame their own particular contextual understanding of RRI. Indeed, if there is to be any hope of success in normalizing the key principles of RRI into the working practices of researchers and innovators, it will not be through rigid and inflexible approaches.

This paper addresses part of the process in developing a set of guidelines and recommendations for the governance of RRI. Creating a set of guidelines are often key requirements of research projects and can be aimed at a wide audience ranging from researchers and civil society organisations (Stahl and Wakunuma, 2015) to project co-ordinators (Fedor et al, 2006).

Of the key pillars of RRI, participation and stakeholder engagement (Pelle and Reber 2013) are considered to be particularly important. Therefore, in order to create a set of guidelines it seems logical to involve stakeholders at each step of the process to have a clear idea about what the guidelines should look like and the nature of the content to be included.

When creating guidelines, this engagement generally occurs at the point after the first draft has been constructed to enable stakeholders to evaluate and revise them before finalizing. Decisions about what guidelines should contain and how they should be presented are generally taken in the first instance by their creators and presented to stakeholders as a *fait accompli*.

The research aimed at developing a set of guidelines for RRI in practice and across a broad spectrum of needs and concerns. Although chiefly aimed at researchers and innovators, the guidelines may also act as a guide to other stakeholders to better understand the principles under which they should be working if they are to comply with RRI. This may be particularly relevant to

those seeking funding from national (public) funding institutions such as the European Commission and other bodies such as the EPSRC which has recently adopted the AREA framework; *Anticipate, Reflect, Engage, Act* (Stilgoe et al 2013) to promote RRI within its mission.

This paper presents the process of stakeholder engagement that should occur before the guidelines are created and addresses an important gap in the process i.e the requirements for guidelines. By using this approach the requirements and subsequent guidelines are likely to have greater validity and acceptability to those expected to use them.

The paper firstly considers RRI and its importance and relevance to future developments and then considers guidelines in context and how norms, governance and reflexivity are critical factors in establishing a set of guidelines that will be useful and relevant. The rationale behind the approach to the requirements for the guidelines is discussed and then the methodology and process is detailed. Finally, the paper concludes by indicating how user developed guidelines for guidelines can inform the creation of the guidelines themselves and that the process can be utilized in other projects where the development of guidelines are a required element.

2 GUIDELINES IN CONTEXT

2.1 Responsible research and innovation

In general terms, responsible research and innovation (RRI) describes how research and innovation in all fields of endeavour, can be beneficial to stakeholders by considering possible impacts from the outset. The idea that all fields including management, science, sociology, ethics and engineering could each strive towards the same ultimate goal under an umbrella of RRI has grown in recent years, (Stahl et al, 2013; Owen et al, 2012; Sutcliffe 2011) and the ways it is defined have become increasingly diverse and context dependent. Stahl et al (2013 p.200) for example considers RRI to be ‘a social construct of ascription that defines entities and relationships between them in such a way that the outcome[s] of research and innovation processes lead to socially desirable consequences and importantly, socially desirable for whom and why’ and focuses on society as a whole. Von Schomberg (2012) however, highlights business and economic concerns in defining RRI as ‘a transparent, interactive process by which societal actors and innovators become mutually responsive to each other with a view to the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products’ (Von Schomberg, 2012, p. 9).

Embedding RRI however, requires the provision of tools and guidance, which will only be used and therefore useful if they fulfil the needs of the stakeholders being expected to implement them. Further, embedded ways of working or approaches within research and innovation culture may also be changed through education, and evidence that RRI actually improves outcomes. This means that any guidelines or recommendations, particularly if they require changes in already established working practices, policies and procedures, should contain only that which is needed, workable, relevant and practical and which provide evidence that it will lead to improvements. Guidelines therefore should allow each stakeholder group to develop their own suitable strategies of responsible innovation during all phases of the project life cycle, from planning and implementation to evaluation and revision.

To create such an important and potentially far-reaching document however, first involved understanding what the core

principles of RRI are. To this aim, Pelle and Reber (2013) identify the five key ingredients of RRI as:

Anticipation:

In the context of technological development, anticipation tries to predict possible social outcomes by developing scenarios and reflecting on the ethical issues to ‘reveal visions of the world associated with a given technology’ (Grimpe et al, 2014)

Transparency:

This means that once possible outcomes have been identified, including both desirable and undesirable ones, they should be disseminated and made available.

Responsiveness:

To be responsive in any research and innovation process requires a deliberate reflection on current practices and behaviour. Beyond this there is also a need to adapt and change, not just once, but possibly many times during the course of a project.

Reflexivity:

Two orders of reflexivity provide key ingredients for successful RRI. The first is to consider the extent that something can be adapted or changed in some way so that for example, a problem can be identified and fixed (Pelle and Reber 2014). The second order of reflexivity considers the framing in which the work is done, and whereby researchers and innovators can think about and take responsibility for the assumptions that guide their actions. (Grimpe et al 2014).

Participation:

Participation in RRI is not merely a top-down, tick-box exercise in stakeholder engagement. Participation means that all those affected by or concerned with the process or the outcome of research or innovations should be involved from the outset. (Pelle and Reber 2014, Grimpe 2014).

These key ingredients and definitions of RRI therefore provide underpinnings for the development of the requirements and the subsequent guidelines.

2.2 Norms

It is understood that for guidelines to become normalized in practice, they should be developed in context (Maesschalck and Lenoble 2011) and with an understanding that norms and ways of working may be tacitly embedded and so difficult to identify or change. Understanding the importance of norms in context therefore is a starting point in the identification of the requirements for the guidelines and from which they can also be reviewed and revised. Stahl (2012) explains the need for reflexivity in understanding context, which is important for ‘doing’ RRI, when he considers that ‘engagement with ethical questions will require the development of reflective processes within research, so that norms, their context and application can be understood, predicted and influenced’ (Stahl 2012 p.209).

Therefore, to ensure that the reflective process was engaged with by the participants, they were asked to evaluate the requirements for guidelines from two perspectives. Firstly from a professional (institutional, organisational, academic field etc) context and secondly from their own personal (social, ethical, individual) context. In this way both first (problem identifying and solving)

and second (norm and context framing) order of reflexivity on the guidelines was achieved. This helped to understand what was important to the stakeholders, what guidelines would mean to them in their personal and professional context, and how those expectations and concerns could provide insight into how to design a set of guidelines for RRI that could actually be used in practice

However, just a reflexive approach to context alone cannot provide answers to what is required in a set of guidelines. A concept of RRI is taking personal responsibility (Owen et al, 2013, Sutcliffe 2011, Fedor et al 2009) alongside an understanding that there may be a disconnection between organizational norms and an individual's normative horizons within their own 'personal' context. This can lead to irresponsible behaviour that whilst generally unacceptable to the individual, is considered an acceptable norm in particular contexts such as in the work-place, where it is 'one thing for a norm ...to be acceptable in principle, another... to be valid in practice.'" (Maesschalck, 2001, p. 83).

An example of a context specific norm of personal responsibility is file sharing online. It is not unusual for individuals to consider the general principle of theft to be wrong, and yet have few qualms about the downloading and distribution of copyrighted material. The changing nature of what constitutes property and therefore theft, has left both ethical and policy vacuums (Moor 1985). Understanding and factoring-in context therefore is a key requirement for influencing change in behaviour, particularly if that is then to become the norm for that individual. In practice, this means that one of the building blocks in devising the requirements for guidelines was that they should be context-specific and support the building of new norms.

It is also understood that there are different approaches to the governance of research and innovation, from the researchers themselves, within organisations and to funding organisations such as the European Commission. Therefore a multi-disciplinary approach is needed to gain insights into established norms within the researcher community and help to understand perceptions and practice of governance within their own context. Through a survey, case study analysis, workshops, semi-structured interviews and focus groups, the findings from this research will be the main sources of evidence for the content in the guidelines. However, this approach could also be applied for other projects.

2.3 Governance and the Participatory Approach

The goal for a set of guidelines for RRI therefore is the effective governance of research and innovation practices leading to a change in behaviour and establishment of new norms in context that reflect RRI principles. This is an ambitious goal and can only be tested in practice. Governance has been identified as 'an attempt to answer a "trilemma" between "scientific accuracy, policy effectiveness and political legitimacy"' (Pellizzoni, 2004), i.e. between the rules of scientific knowledge, the efficiency of political norms and rules, and their social acceptability. Further, governance is seen as also being reflexive, again taking context and norms into consideration.

Governance is also self-determining and considers the needs and inter-relationships between the affected actors and tries to envisage the most appropriate course of action.

Governance is often seen as reflexive and self-determining and should consider the needs, relationships and context of those affected (Jessop 2003). Further, given that there are many different ways of conducting and governing research and innovation (Groves 2006) and that these are also likely to be in a range of different contexts, it was understood that a requirement of the guidelines was that they need to be designed in a way that they support different stakeholders' own initiatives within their own context and through a democratic participatory approach (Lenoble and Maesschalck 2003). Governance then, when considered in light of the development of guidelines, requires that decisions are not so much dictated from above by the imposition of one set of rules for all, but that RRI governance should emerge from a more democratic and inclusive process.

The participatory approach (Rowe and Frewer 2000) and concepts of procedural justice, which provides a theoretical perspective on the practical experiences of science policy and the importance of stakeholder involvement in effective decision-making (Joss and Browlea 1999) indicate the importance of democratic ideals surrounding science and technology policy. Democratic approaches to participation (focus groups, workshops, questionnaires and so on) can facilitate acceptance (albeit with limitations) (Jessop 2003) alongside the participatory approach.

However, it is important to avoid public engagement for its own sake, and to avoid the 'de-mocratising of democracy' (Felt and Fochler 2010 p.18). The danger of paying mere lip-service to stakeholder involvement in the process of developing the requirements for the guidelines would mean that any resulting requirements would be unlikely to lead to the development of a set of guidelines that would be acceptable to the stakeholders themselves and would therefore be entirely ineffective.

Awareness of this meant that efforts were made to ensure that the stakeholder views were used to directly inform the content of the requirements, and that the views of each individual were considered of equal weight. The empowerment of the actors through the use of unambiguous, effective and usable guidelines, developed in context and with stakeholder participation makes it more likely that the guidelines will be seen as an enhancement to working practices and lead to embedding RRI governance into research and innovation working behaviour.

However, engagement is just one of the conditions for RRI and the requirements for the guidelines therefore, were also built on an understanding that successful RRI, and in particular any guidelines promoting RRI approaches 'represents the attempt to provide an answer to the multitude of ethical, moral, legal and other problems arising from the use of technology research and innovation' (Von Schomberg in Stahl 2011).

Ideally then the process for creating a set of guidelines should both acknowledge the importance that the role of actors and stakeholders have in establishing their own norms, and consider the many factors and issues that may arise.

3 METHODOLOGY

Having established the need for an inclusive, democratic, reflexive and participatory approach that acknowledges norms in context, it was necessary to provide an initial set of requirements for guidelines to enable the participative process to begin. To avoid re-inventing the wheel it was decided to utilize existing sources to inform the starting point for the creation of the requirements. A recently completed EC FP7 project, CONSIDER (Civil Society Organisations In Designing Research Governance)

had created a set of stakeholder specific RRI guidelines for engagement with Civil Society organizations in research. In addition, FRRIICT (Framework for Responsible Research and Innovation in ICT), another recently completed RRI project funded by the EPSRC (Engineering and Physical Sciences Research Council) had created a framework and tools for RRI in ICT. These projects and the expertise of the GREAT consortium informed the development of the initial set of 14 requirements.

The next stage was to invite a range of stakeholders drawn from researchers across a range of disciplines to a workshop to reflect on what was being created, why it was important and to be engaged with the creation process. This was so that the initial draft requirements could be revised or re-written if necessary to better reflect the needs of the stakeholders. This approach is important to ensure that the process of identifying the requirements for guidelines was not only looking towards providing guidance for future RRI governance, but to also ensure that RRI principles were embedded within its own creation.

During the process, ongoing research was able to further directly inform the theoretical landscape of RRI and the context in which the guidelines were to be produced. Therefore, the stakeholder revised requirements were then further tested through evaluation by the project partners in the light of their own research and experience. In addition, the literature on the approach to the creation of guidelines and frameworks for RRI was further examined to inform their development.

3.1 The Workshop

The stakeholder engagement activity for revising the requirements for the guidelines was selected on the basis that it would enable discourse between actors with coinciding and yet also very different approaches to research and innovation. With one of the core stipulations that the guidelines should address all stakeholder groups, the involvement of people from a range of disciplines, all of whom could be directly affected by RRI guidelines was considered to be important to provide valuable insight.

The workshop itself was approached and conducted in a similar way to a focus group, i.e. problem-centered group discussions moderated by the researcher (Krueger, R & M.A Casey, 2000). In this instance, the discussion centered on the initial set of 14 requirements, as the workshop's intention was to evaluate and provide feedback and suggestions on these initial requirements. Participants were encouraged to reflect on each of the draft requirements and to offer alternative or additional requirements. In this way it was anticipated that acceptance of the resulting guidelines would be encouraged when identified with their own experiences, within their own context, and with acknowledgment of the norms of research and innovation practices within their discipline.

The workshop also encouraged the stakeholders to engage in second order reflexive thinking throughout to 'think about their own ethical, political or social assumptions underlying and shaping their roles and responsibilities in research and innovation as well as in public dialogue' (Pelle and Reber 2014 p.17).

During the course of the workshop, each of the draft requirements was evaluated in turn, to systematically evaluate each one in depth. In addition, the principle of having guidelines for RRI governance, the need and likelihood of acceptance was discussed. This provided significant insight into the perceptions of researchers towards future guidelines for RRI. Whilst this was not the focus of the workshop, the generally dismissive approach to

the idea of guidelines in any form merely served to highlight the need to not just impose guidelines, but to facilitate their acceptance through democratic participative approaches and to educate future generations of researchers in the principles of RRI to foster new norms of behaviour.

3.1.1 Participants

In order to effectively and appropriately evaluate the requirements for guidelines, it was important that those invited to participate in the workshop were those stakeholders most likely to be affected by the introduction of guidelines for the governance of RRI. The rationale for selection of the participants in the workshop therefore was based on an understanding that there are multiple possibilities when identifying and selecting stakeholders, some of whom may also have incompatible interests (Friedman and Miles 2006).

The stakeholders invited to participate in the workshop were drawn from those people who were amongst the potential users of the guidelines and thus were considered to have an interest in both their design and development. However, this pool of potential participants is vast and so a further narrowing of potential participants was necessary. In order to select which particular stakeholder groups to focus on, selection utilised criteria that was specifically devised within the project to ensure consistency. However, it is acknowledged that when selecting participants in other projects, the criteria used would be specific to that particular project's needs. In light of this, the participants for this particular workshop were selected from one of the categories below:

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

The selection process and subsequent invitations led to seven researchers agreeing to take part. The participants came from a range of disciplines including management, technology, and computer ethics and included:

- two Professors currently involved in European FP7 Projects
- one Postdoctoral / Research Associate involved in a UK based project and an European FP7 project
- one PhD student involved in a UK based project
- three Senior Lecturers/ Senior Research-fellows involved in several European FP7 projects

Of these participants, the Postdoctoral/Research Associate and one Senior Lecturer/Senior Research-fellow were in the early stages of their careers. The other participants were in mid-career stage and one senior stage.

3.1.2 Workshop Structure

In order to allow time for preparation, the workshop participants were sent a participant information sheet and consent form. The information sheet provided an overview of the project, an explanation of what the workshop was hoping to achieve and the initial table of 14 requirements.

At the start of the workshop, there was an introduction to the project, and specifically the requirements for guidelines. Then all participants were asked to provide a brief introduction to their work and to indicate what kind of projects they had worked on or were working on currently. This provided the participants with a clear impression of what was expected from them and to understand some of the different perspectives and approaches of their fellow participants.

There was then a brief discussion of the initial requirements amongst all participants to discuss what they are intended to be used for and what the first impressions were. This was followed by a point by point analysis and evaluation of each element of the initial requirements table. Suggestions for improvement and revision of the requirements were suggested and noted. The workshop was sound recorded and had a note-taker. Whilst there were some extremely valuable suggestions made during the workshop, it was felt that subsequent reflection by the participants could result in further revisions. Therefore, a second revised table, based on the findings from the workshop was sent to all participants to ask for further feedback. There were no responses to this request and the requirements table was then sent to the project partners to enable them to further inform the identification of the requirements for guidelines from their own research and expertise. It was acknowledged that the project partners would also be impacted by the guidelines subsequently constructed based on those requirements.

3.2 The Requirements for Guidelines

The requirements were initially informed by the research findings that led to the first set of 14 requirements for guidelines. It was acknowledged that different stakeholders speak different languages (national; technical; domain-specific), and that most of them have little time and are busy with various tasks. Therefore any further imposition of a new set of regulations on top of already existing ones would not be well received, perhaps seen as further restricting their ability to undertake the actual work. However, adding a further layer of regulation is not what is intended by the guidelines. On the contrary, the intention is for them to be used as a guide for people to better understand how to be responsive and responsible from an ethical perspective and not a legal one which is sometimes seen as box ticking compliance rather than an opportunity to reflect on current practices.

The final 11 requirements detailed below (Wilford et al 2014) were the result of both the initial identification of the requirements for guidelines discussed above, and the subsequent stakeholder engagement process which directly informed the revision of the initial set.

The final requirements are presented in two sections; firstly a set of constructive, process focused requirements were identified.

These would indicate the look and feel of the guidelines to make them accessible and usable. Secondly a set of substantive, content focused requirements that would be practical and effective were defined.

3.2.1 Constructive, process focused requirements

1. Use a common language that overlaps all disciplines.

One of the challenges for the creation of guidelines is that across different disciplines as well as in different countries, there would likely be language that would be understood in a very specific and contextual way by specific stakeholders. These may be technical terms that would be important to be used for clarification or succinctness, or terms that may have different meanings depending on context. Therefore, it was indicated that where special terms were needed for clarity, a link should be provided to an appendix or website which should include a glossary providing definitions of terms used in the guidelines that would provide consistency in the understanding of what a particular term means in the context of the guidelines.

2. Be concise and ensure it is practical and usable (bullet points etc.) as shorter documents are more likely to be read and understood.

As indicated above, researchers often already need to read many documents on a daily basis and so the addition of further 'work' needs to be considered sensitively.

3. Use good style to enhance readability (colours, diagrams, pictures, other types of media). Make it attractive and easy to understand.

It is important in a guidelines handbook for RRI governance that it is presented in a way that makes the information easy to understand and to use. The inclusion of graphics and other media means that the guidelines will be accessible to different types of learners (See Gardner 1983 for an in-depth understanding of approaches to learning). In addition, the use of different approaches to present the guidelines will prevent the document from being a purely text based which may not be appropriate for all of the target audience, or may even be off-putting for some users.

4. Provide an interactive document (e.g. links to RRI websites, case studies, providing examples of 'good'/'bad' practice or normative dilemmas, tools and resources). to provide examples for discussion leading to organisational/individual learning.

It was felt that a digital interactive 'document' may be more effective and appealing to some stakeholders than purely paper guidelines, particularly with the increasing use of electronic devices such as tablets and mobile phones to access information. By providing the information electronically and online, the ability to link directly to the glossary and other resources will enable decision-makers to better contextualize their own RRI approach.

5. Provide a pitch to grab attention, for example, a cover page with the key points.

A document that is ‘eye-catching’ is more likely to be actually picked up and read. In addition, a casual observer may also be attracted to such a document, thereby encouraging further dissemination of the message of RRI beyond the core target group of researchers and innovators.

3.2.2 Substantive, content focused requirements

6. *Provide a small number of concise RRI definitions and other key terms that are tightly coupled to the findings from the project.*

There are a host of definitions of RRI that provide context and discipline specific focus. In developing their own approaches to RRI and to facilitate the development their own RRI approach, multiple definitions may be needed. However, detailed definitions and their explanations may conflict with requirement 2 (*Be concise and ensure it is practical and usable*) to be concise. Therefore, within the guidelines themselves, only a small number of selected general definitions should be offered. The provision of external links to other definitions will enable wider interpretations of RRI to be considered if needed.

7. *Provide links to further definitions of RRI to broaden awareness of RRI principles and to encourage the use of RRI theory to relate to user’s own practice.*

The links to definitions and other resources would be provided to help researchers to identify the scope of RRI and the importance of embedding its practices within their own research and innovation context. This will also go some way to avoid tick-boxes and bolted on practices. This is made more likely if just one approach or perspective is offered and could then limit the amount of change possible within a particular discipline or organization.

8. *Provide methods to re-asses and challenge the guidelines including reflection on the processes, outcomes and impact of the guidelines*

Research and innovation is by its nature dynamic and ever changing. It is therefore essential that any guidelines for an RRI approach should be under regular review, partly to reflect the flexibility of the guidelines, and partly to ensure that practical relevance is maintained.

9. *Respond to the EC framework, e.g. intervention logic model (relevance, effectiveness, efficiency, utility) and relate the benefits and problems of RRI to the EC framework.*

In view that the guidelines created in this research are largely aimed at EC researchers, it was felt that they should identify and respond to aspects of the European Commission framework that are specific to the project, area of enquiry, stakeholder group etc. It is understood however that in some cases this may be too prescriptive, narrow in scope or it may not be accepted in other geographical regions and may create confusion where there are

conflicting demands. Where this occurs, then it was felt that legal requirements should take precedence.

10. *If the pluralistic approach to RRI currently developed in the project turns out to go beyond the scope of requirement 6 (‘provide only a small number of concise RRI definitions’), deliberate on possible ways of representing this pluralistic approach without compromising too much on requirement 2 (Be concise and ensure it is practical and usable.)*

This requirement further encourages flexibility within the guidelines and the ongoing discourse on RRI and how they can be presented. As technology and expectations change, the approach to the presentation of future iterations of the guidelines needs to be under regular review. A more pluralistic approach may require even greater need for flexibility in the guidelines and revisions would need to reflect this.

11. *If explicit norms of responsible behaviour are expressed in the guidelines, these norms should be established with the participation of stakeholders, and by taking into account their contexts.*

This requirement rests on one of the key findings of the project in that ‘good’ governance implies, among other things, that various actors participate in the making of the very norms they subsequently have to follow. In this way, the resulting guidelines will aim to help to establish new norms of behaviour and to facilitate the normalisation of responsible research and innovation practices into the future.

4 CONCLUSION

The guidelines for the governance of RRI can be directly informed by the requirements identified through the process detailed above. However, the flexibility of RRI means that these steps can also be applicable to other projects where the development of guidelines are required. It is understood that there is always be scope to gain further understanding about what is needed in requirements and subsequent guidelines and so future guideline development and understanding of requirements would be enhanced through being applied in other projects and areas of inquiry.

Further, and in keeping with the five principles of RRI, it is *anticipated* that any requirements identified are likely to change over time; the process should be *transparent* in the way that changes are introduced and *responsive* to the needs of society as well as funding bodies, scientists and researchers. In addition the importance of being *reflexive*, not only about the processes and procedures, wider impact, and unexpected consequences of those actions but also to consider the framing of the requirements and the norms in context from the personal perspectives of the stakeholders.

Finally, should the guidelines in practice or the rationale for the requirements change so that revision is needed, or if current practice either directly or indirectly causes harm, then, in particular, the *participation* of those affected should be prioritized

to ensure that changes made are also decided through utilising an RRI approach.

Throughout the process of the identification of requirements for guidelines, and subsequent guidelines derived from them, it was important to emphasise that they should not only incorporate RRI principles into the guidelines themselves, but they should also construct them incorporating RRI principles. In this way, the perception of legitimacy of both RRI and the resulting guidelines is reinforced and the applicability of the process to the development of guidelines in other areas is strengthened.

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