RRI in Industry

On the Translation of the RRI Discourse into the Private Domain

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Abstract: The concept of responsible research and innovation has its origin in publicly funded research. Much of the research activities and even more innovation activities which bring products and services happen in private companies. This editorial therefore aims to outline what RRI can mean in industrial complexes and describes the role that ORBIT can play in them. It draws on the work undertaken in the European project 'Responsible-Industry' and highlights the question of how the RRI discourse can be translated into a vocabulary familiar to companies.

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Introduction

It is probably not too controversial to state that the origin of the discourse concerning responsible research and innovation (RRI) is the publicly funded research sector. Both the European's (European Commission, 2013) and the UK's (Owen, 2014) approach to RRI have their origin in the attempt by public research funders to ensure that the results of their activities are palatable to the tax payers and their representatives as the ultimate funders of these research and innovation activities. Given that much of the efforts expended on research and innovation, in particular in the ICT sector, come from private companies, this raises the question of the relevance of RRI to industry. This issue of the

ORBIT journal is therefore dedicated to the question of the role of RRI in companies. The editorial will give an overview of some of the key issues pertaining to the relationship between RRI and industry. It will then highlight some of the key findings of the first EU-funded project specifically in this area, the Responsible-Industry project. The final section is a short overview of the papers included in the issue.

RRI and Industry – the Framing of Private and Public

In order to answer the question of the relationship between RRI and industry, it is worth briefly exploring the difference between publicly and privately funded research and innovation. A first and crude distinction between publicly and privately funded activities could be that public funding supports research, i.e. work undertaken at a more basic and conceptual level at low technology readiness levels whereas privately funded activities aim at innovation activities associated with higher technology readiness levels that are closer to market introduction. In practice this distinction does not work well. Public funding opportunities exist for all technology readiness levels. Similarly, activities of both public and private sector organisations can span the entire range from basic research to applied innovation. Some public institutions such as universities have entrepreneurial ambitions and aim to bring products to markets, while some private organisations have a strong focus on basic research.

The source of funding does not necessarily offer a better way of distinguishing private and public activities. Public funding is often available to both public and private organisations, albeit sometimes from different sources and for different purposes. However, in many types of projects it is the norm to see universities and companies work together, often in consortia including other types of actors, such as civil society organisations. Similarly, private funding can be gained by both private and public organistions.

The distinction between private and public with regards to RRI may thus not be quite a straightforward as might seem at first sight. In addition, the very distinction between private and public is complex, with private actors playing multitude of roles in the development of public policies and structures, whereas the private sector as a whole is to a large extent constituted by public actors. Markets as the key area of activity for private organisations, for example, are shaped by public institutions, including legal frameworks and international arrangements.

And yet, despite the fact that it turns out to be more difficult to distinguish between private and public sector research and innovation activities, this distinction is widely accepted and seems to be relevant to RRI. The RRI discourse is a one that is carried largely by academics with a limited contribution from industry. Which leads to an important problem for RRI itself. If much of the research and innovation activities are carried out by organsiations that are not represented in the RRI discourse and which, therefore, are un-

likely to engage with or even be aware of RRI, then the aim of RRI, namely to bring research and innovation closer to society, to ensure acceptability, desirability and sustainability of research and innovation activities, is unlikely to be achieved.

It therefore remains important to continue to ask what the relationship is between RRI and the private sector. This question is, of course, not an entirely new one. So far there have been two special issues in journals focusing on this question (Martinuzzi, Blok, Brem, Stahl, & Schönherr, 2018; Scholten & Blok, 2015). The European Union has funded at least five projects that specifically investigate the question of RRI in industry so far: Responsible-Industry (www.responsible-industry.eu) Innovation Compass (www.innovation-compass.eu), PRISMA (http://www.rri-prisma.eu/), Smart-MAP (http://projectsmartmap.eu/) and Living Innovation (to start in May 2018). The discourse around RRI and industry has raised a number of questions and often fundamental issues. One of them is the structural problem that the RRI perspective of research and innovation is a fundamentally positive one, while Blok and Lemmens (2015) rightly point out that the creative destruction of innovation as described by Schumpeter, may be anything but positive to those experiencing it.

We can thus note that neither the framing of private industry versus public research nor the integration of the RRI narrative into innovation activities are easy to achieve. This, however, does not negate the importance of understanding the role of RRI in private companies. For the purpose of this paper, I will assume that a key difference between public and private organsiations is to be found in the narratives used to justify their core activities. Public organisations such as universities are meant to promote the public good, whereas private ones pursue a profit motive for the benefit of their owners. Again, this is a simplistic division, with universities becoming increasingly market oriented and the traditional justification of market mechanisms going back to Adam Smith (Smith, 1776) being the promotion of the public good.

Despite the difficulty of clearly delineating public and private, the justification of private organisations as means of producing profits, or at least their existential necessity not to produce long-term losses is a useful starting point in understanding how they can relate to RRI. If profits or at least financial sustainability are what drives companies, then RRI, in order to stand a chance of being relevant, must not contradict this central tenet. Making this point is not trivial. The various activities of RRI, be they future foresight, public engagement, ethics review or any other all require resources and are therefore cost factors for companies. Their financial gains are much less certain. There are of course a number of arguments one can put forward to companies that indicate how RRI can be financially valuable to them. RRI can improve the quality of interaction with stakeholders, which can lead to a minimization of the risk of user rejection. In a similar vain, RRI can be seen as a broad and qualitative approach to risk management of unknown and unforeseen risks. More positively, RRI requires the reflection of research and innovation activities

from a broad range of positions, which improves the awareness of different perspectives and can thereby lead to better design of products and services and better ways of achieving these. On a very broad level RRI can be described as a way of ensuring that companies retain their societal "license to operate," i.e. the public support that they require to be seen as legitimate contributors to the societies they work in.

In order for these or other arguments to make an impact on companies, they need to be framed in ways that resonate with the individuals who represent these organisations. It is therefore not surprising that attempts have been made to translate the RRI discourse into the language that business people are familiar with, notable the discourse around business ethics and corporate social responsibility (CSR) (Iatridis & Schroeder, 2015). It is not immediately clear, however, whether and to what degree RRI and CSR are compatible.

This is one of the questions that was explored in the Responsible-Industry project which is discussed in the next section.

RRI in ICT for Health and Ageing – the Responsible-Industry project.

The Responsible-Industry project (www.responsible-industry.eu) was a European project funded under the Science with and for Society Programme of the 7th Framework Programme. The project sought to find out how companies interpret their responsibility in research and innovation and develop principle and good practice examples of responsible practice in industry R&I. Key questions included why companies would act responsibly, how this translates into practice and which outcomes it would lead to. These insights were to be synthesised, rendered accessible and relevant to stakeholders, in particular industry, and, finally communicated and disseminated to relevant decision makers. In order to provide a methodological focus, the project concentrated on information and communication technologies (ICT) as the subject area of R&I and on one particular social challenge, namely that of health, demographic change and wellbeing.

The main aim of Responsible Industry was thus to collect insights on industrial RRI practice and, on this basis, to develop and pilot a framework for RRI in industry.

This main objective was broken down in a number of sub-objectives that were to be achieved via a range of activities. These aimed to clarify the ways in which RRI can be relevant to industry and to map this to activities in industry that incorporate the principles of RRI. The overall aim of these activities was to develop a framework that shows industry actors what RRI is, why it would be beneficial to them to adopt it and how such an adoption could be implemented.

Based on the initial review of the RRI discourse in health, demographic change and wellbeing, a review of the literature was used to highlight specific challenges for the imple-

mentation of RRI in industry. In total 18 domains were identified as being in need of further work and empirical investigation in order to become more applicable to Industry.

This review provided the basis for a set of 30 interviews with thought leaders in the field of industrial R&I in ICT for health and ageing. The interviews showed that RRI is not a term familiar in industry, even though many of the activities linked to RRI are undertaken by companies. One of the emerging themes from the interviews has been adopted as a key message for the framework, namely that by conducting their activities in a responsible manner, industries may both be doing good for society and benefiting themselves.

In order to be able to provide companies real-life insights into RRI practice, five case studies were selected through an open call process. These cases illustrate examples of successful RRI implementation in industry. Following a rigorous selection process these case studies were written up and published on the project website. They form the main body of this issue of the ORBIT journal.

The final activity related to principles and tools was a horizon scanning exercise. This exercise showed that the Responsible-Industry project needs to incorporate a broader sensitivity to societal issues into the implementation plan, and to identify how other stakeholders, beyond the companies themselves, can contribute to a responsible way of researching and developing novel healthcare ICTs.

On the basis of the above activities, the consortium developed an the first draft of its Framework for Implementing RRI . This was based heavily on the findings of a Delphi Study that included more than 150 experts from a variety of backgrounds. The analysis of the Delphi Study showed that the complexity and variability in industry is too great to reasonably expect that a one size fits all plan can be applied to all industry actors. The consortium therefore used its insights to develop a framework that is based on a number of guiding questions and helps industry explore which areas of RRI are already covered and where further efforts could improve their performance.

The first draft of the framework was used to evaluate and validate the insights and recommendations that the project had identified. This was achieved via a number of detailed and in-depth case studies. Following a pilot case study in Denmark, two in-depth case studies were undertaken each in Spain and Finland. In each of these cases the work was split into two phases with an initial engagement with the companies followed by a phase where the companies were invited to work with the framework in their own context. The case studies were completed by a second round of engagement where feedback from the companies was collected.

A second stream of evaluation and validation was undertaken via a set of 15 focus groups. These focus groups were distributed throughout the consortium which had the advantage of allowing a broad geographical coverage across Europe. In each focus group

the intermediary version of the framework document was discussed with individuals working in companies active in the area of ICT for health, demographic change and well-being.

The final step of evaluating and reflecting on the topic and the framework was realised through a set of stakeholder engagement exercise. These started early in the project and informed the initial version of the framework and were continued throughout the project, leading to valuable input from a range of stakeholder groups.

The main insights arising from the project are encapsulated in the three publications depicted in the table below. The full documents can be downloaded from the project website. Copies of the documents are stored on the ORBIT website.

	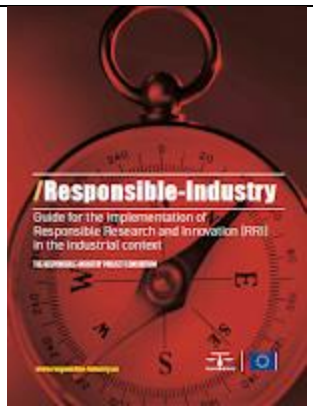	
Benefits of RRI in ICT for an ageing society	Guide for the implementation of RRI in the industrial context	EU Policy recommendations for RRI in Health and Ageing

Table 1: cover pages of the three key outputs of the Responsible-Industry project.

The first document highlights the benefits of RRI for companies. It was developed in response to the insight that for companies to even start to engage with RRI, there needs to be a tangible benefit. The document is therefore aimed at key decision makers in influential positions in companies and it conveys the message that RRI can help the company achieve its goals. Based on the investigations undertaken in the project, it highlights a number of concerns that can be found in ICT for health and ageing. Key benefits listed in the document include:

- Strengthening links with customers and end users
- Enhancing the company's reputation
- Decreasing business risks and unintended consequences
- Strengthening public trust in the safety of products
- Increasing acceptability of products

- Adopting an environmentally friendly profile

The document argues that RRI can contribute to enhance a company's medium-term competitiveness/profitability, so improving the bottom line and the company value.

If the first hurdle of gaining the company's attention is cleared and the company decides to engage with RRI, then the next question is how this can be realized. The second document therefore provides a guide for the implementation of RRI. It reviews where in the value chain which types of activities might be put in place. This includes question of how an ethical and social impact analysis can be performed, which tools are available to companies to implement RRI and which responsibilities could be defined at particular functions in the company.

The final booklet in the series is motivated by the insight that an exclusive focus on companies will not suffice to anchor RRI in industry. It is therefore aimed at policymakers who have an important role to play in creating a business environment that is conducive to the adoption of RRI. Aimed predominantly at European policy, the document shows that RRI has relevance to industry but that a continued engagement requires policy level support.

The key insight of the Responsible-Industry project which has been succeeded by a number of other projects that look at different industries, types of organisations and other aspects of RRI, is that companies react positively to RRI but that a continuous effort of translation will be required, if it is to lead to sustainable changes in business practices.

In addition to this rather general and abstract view of RRI in industry, one frequently voiced request is that RRI needs to be rendered approachable and comprehensible. This is often best achieved through examples of good practice. The Responsible-Industry therefore created a set of bottom-up case studies that allowed individuals and organisations to self-select and tell their stories of how they interpreted and enacted RRI. The papers in this issue of the ORBIT journal consist of these case studies that are now briefly outlined.

Cases of RRI in Industry

The case studies that are included in this issue of the ORBIT journal resulted from an open call that was launched as part of the Responsible-Industry project. This project decided to focus on the field of ICT for health, demographic change and wellbeing for methodological reasons. All of the case studies therefore share this focus. The open call was launched early in the project and was meant to ensure that the project can benefit from practical insights that individuals working in industry or with industry had developed. All submissions were reviewed by members of the Responsible-Industry consortium and the successful ones were awarded a cash prize and included on the project website. All of these were included in this special issue.

It is important to highlight that the case studies were undertaken independent of the RRI discourse. Part of the task of the cases was therefore to translate RRI terminology into the language of business and vice versa. All case studies therefore focus on particular aspects of RRI, such as engagement, foresight, ethics etc. but none of them was undertaken with an RRI framework as a starting point.

The Ambiact case study by Frenken et al. is a good example of what can plausibly count as RRI in industry. The ambiact is a smart meter for social alarm systems. It is aimed at individuals who are still broadly independent but feel the need to have assurance that they can receive help, if required. Most current social alarm systems require individual attention, such as regular pressing of a button. Ambiact, however is designed as a plug-adapter and can be placed between the power outlet and any appliance. If the user does not make use of this appliance (e.g. a kettle or a coffee machine) for an untypical amount of time, then ambiact generates an emergency call. This has benefits for the users who feel safe and for the alarm and care providers who have fewer false alarms which can save resources. Importantly from an RRI perspective, this product was developed using an iterative method that relied on early and frequent stakeholder interaction. This led to a product that med the needs of stakeholders and is profitable.

Savitch's description of My Brain Book has a similar focus on engagement and involvement of stakeholders. This case study provides a description of a working prototype of a computer-based planning tool for people with the initial development and testing of a working prototype of a computer-based planning tool for people with dementia and their carers. Engagement activities included: a parallel priority setting event, focus groups, involvement in design workshops and testing of the prototype. The involvement of people with dementia has directly influenced the development of the product and also changed the way ICT researchers and professionals see people with dementia. People with dementia convinced the designers that more emphasis should be given to elements of the system which enable families and professionals to really get to know the person with dementia before any care planning process begins. In addition, the design process and timelines were also influenced by people with dementia in order to ensure that they could be involved in meaningful ways. While there are still may lessons to be learned, the case demonstrates that this type of engagement with stakeholders is not only possible, but it leads to better products.

The third case, the one by Bolz discusses the development of the telemedical diabetes monitoring system GlucoTel™ as a learning case for RRI in ICT. It displays significant similarities with the first two cases and emphasises the importance of stakeholder engagement and open access in product development. Bolz points out that adopting an RRI position provides benefits to different stakeholders in that it accommodates users such as patients and caregivers, but also offers a competitive advantage to the company producing the technology. In addition to the local level of technology development, he argues

that such work can have higher level benefits by showing the potential of telemedicine with regards to addressing global societal challenges including diabetes and other worldwide and growing healthcare issues.

Mittelstadt uses his case to provide broader insights into the type of systems covered in the first two cases and looks at medical technologies capable of remotely monitoring the health and behaviours of individuals to detect, manage and prevent health problems. Known collectively as 'Personal Health Monitoring' (PHM). The earlier cases ambiact, GlucoTel and My Brain Book fall under this category. Such systems are typically used to provide help with health monitoring outside of care environments such as hospitals. They are widely promoted as one important avenue in dealing with shortages and resource issues in light of the demographic change of most industrialised societies. Mittelstadt points out that PHM systems raise numerous ethical concerns, not least with regards to the data they collect. Based on an empirical investigation of users and healthcare professionals he arrives at a number of recommendations that developers of such systems can follow to ensure their work is done responsibly.

The next case study, the second one developed by Bolz's uses a very different level of analysis. Instead of looking at a product for end users, it describes a good practice example of the inclusion of RRI in the transformation process connected with making cities 'smart'. The case looks at the German city of Friedrichshafen and its attempt to use ICT to sustainably improve quality of life. It shows that the goals and perspectives of different stakeholders can be united and that win-win-situations can be generated. The T-City initiative was an inclusive approach in which societal actors worked together during innovation processes and became mutually responsive to each other.

The final case study developed by Flipse is most explicit in its aim to integrate the principles and practices of RRI into industrial practice. This case describes how RRI can be promoted in practical work in companies. It presents the first example of collaborative, interdisciplinary and integrated innovation project management that is supported by an ICT tool with the aim of stimulating RRI. In addition to the integration of RRI, this case collects data to demonstrate the value and relevance of RRI to companies. This case draws important lessons in terms of the type of tools and supports that companies can use to understand, reflect on and integrate RRI and to collect feedback to demonstrate the value of this approach. Maybe most importantly, the case makes the argument for a central integration and adoption of RRI in the research and innovation process which moves beyond an add-on approach.

Conclusion

It seems clear that RRI will need to find a role in industrial research and development, if the overall idea of RRI is to be successful. In this editorial I have tried to argue that there

is good reason to believe that RRI is relevant to companies but that there is a need for a translation of the RRI discourse into the language spoken by companies. Drawing on the work of the Responsible-Industry project, I have highlighted some key findings and outputs that aim to do some of this translation work.

The cases that form the main body of this issue of the ORBIT journal will hopefully exemplify the way in which RRI can be integrated and become relevant in companies, industry and the market for ICT products and services more generally. The ORBIT project will engage with this and reach out to companies. While its initial funding by the EPSRC aims predominantly at researchers funded by the EPSRC, this editorial has shown that this focus, while important, is not sufficient for RRI to be successful. If RRI does not gain traction in industry, it can represent the ambition to ensure that processes and products of research and innovation are sustainable, desirable and acceptable, but it will find it difficult to realise this ambition.

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