Horizontal Foresight to Address Societal Challenges in Danish Priority-Setting for Strategic Research

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Case Study

Horizontal Foresight to Address Societal Challenges in Danish Priority-setting for Strategic Research

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Introduction

The paper describes the case study on the foresight exercise RESEARCH2015, which is a priority-setting exercise aiming to address societal challenges in strategic research in Denmark. The exercise attempts to achieve its aim through cross-disciplinary deliberation and broad inclusion of societal actors. After a brief introduction to the methodology, the paper will introduce RESEARCH2015. Here the theoretical context of foresight exercises will be shortly introduced and the exercise will be located among other European example of cross-disciplinary priority-setting exercises. In the second and third part RESEARCH2015 will be analysed using the research model developed within the Res-AGorA project. The analysis is divided into two parts, one looking at how RRI in the making is conditioned and the other de facto governance practices[1]. The fourth and last part will draw up lessons for the Res-AGorA project. The case study finds that doing horizontal foresight is a delicate balancing act, where many different factors have to be weighted. While it is clear that RESEARCH2015 creates some constructive interactions between actors, some actors and viewpoints never become part of the core process. The process also has a limited ability to create transformation in the values and behaviours of actors, and therefore only minor long term impact of the process can be identified going beyond

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[1] See the research model for an explanation of our understanding of RRI in the making and de facto governance

the immediate results. Finally the exercise has a strong focus on being instrumental for policy-making, closing down perspectives which are not fitting this perspective. This raises the question whether it is possible to both achieve an impact on policy-making and create an inclusive and creative priority-setting exercise bringing together a variety of perspectives.

Scope and methodology

The purpose of this paper is to describe the case study as well as draw lessons for the transversal analysis of the Res-AGorA project. The paper will therefore not include a full analysis of RESEARCH2015 but is structured after the Res-AGorA research model, which makes the transversal analysis of case studies possible. The case studies contribution to the Res-AGorA project will be focused on two main themes: The engagement of societal actors in research priority-setting and the connection between the foresight exercise and its input for policy-making. The empirical work consists of 8 interviews with key people in the priority-setting exercise, as well as document analysis of central documents giving a detailed overview of each phase of the exercise. The interviewees were selected to reflect the different types of actors central to the process and therefore included a Danish foresight expert, facilitators from the Ministry for Research, Technology and Innovation, university representatives, industry representatives, and research council representatives. The interviews were also distributed among academic disciplines, making sure that a variety of different academic backgrounds both within science and humanities were represented.

Introduction to RESEARCH2015 and its context

Background, purpose and process of RESEARCH2015

Denmark has since year 2000 had an increased focus on improving international competitiveness, and one key aspect has been to give more attention to science policy (Aagaard & Mejlgaard, 2012). In 2005 the Danish government created a globalisation council, which consisted of representatives from different parts of Danish society, and several ministers, including the prime minister. The purpose of the council was to give ideas for how Denmark could better cope with the challenges of globalisation. The final report came in 2006 and had the following suggestion for finding new ways to strengthen decisions of strategic research:

> "The basis for the political prioritisation of strategic research should be strengthened. Therefore, a broad-based survey[2] should be regularly carried out to identify the research needs that societal and business developments create as well as the capabilities of Danish

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2 The Danish version of the report uses the word mapping and not survey, and this is the version the ministry implements. However this translation is the official one made for the English speaking audience by the Danish Government.

research institutions to meet these needs. Once every four years, a catalogue should be compiled of themes for strategic research." (The Danish Government, 2006, p. 25)

This became the start of the process RESEARCH2015, which was developed and facilitated by a team of three people in the Ministry for Research, Technology and Innovation. This passage has served both as a guideline for the purpose, methodology and result of the exercise. Central was to develop a more structured and transparent approach to priority-setting that could be used across different institutions, which at the time only had their own internal procedures for priority-setting. The key public institutions, which the exercise were aimed at, were the parliament, the universities and the Strategic Research Council. With only few Danish experiences with foresight, and none with priority-setting across disciplines, the exercise had to be built from scratch using a mix of different known methods. Some inspiration was found in similar exercises done in other European countries, but the ministry decided to build up their own model consisting of three distinct phases:

1. In phase one OECD was ordered to do a horizon scan of international societal challenges with the purpose of creating a broad foundation of knowledge as starting point for the exercise. Then an open call for input was issued and facilitated through a web tool, where 366 individuals and organisations gave their input to the process. Many of these input came after a newspaper article saying that Danish people did not wish to participate in the exercise (Berlingske, 2007). The input of ministries and universities were added afterwards creating more than 500 suggestions for strategic research.

2. Phase two was to compile these many suggestions into themes for strategic research. The ministry decided this phase should be steered by an independent expert group of 8 people in consultation with a user panel of more than 50 individuals representing relevant societal organisations. At the end of the second phase the expert group handed in a report suggesting 31 themes for strategic research.

3. In the third and final phase the ministry took the steering role to narrow down the number of topics, get comments on the work of the expert group, and to secure that each suggestion was well founded. This was done in consultation with ministries, research councils and a few other key actors to. The final report to be used by the parliament as knowledge foundation for dividing funding included 21 themes for strategic research (VTU, 2008).

A theoretical context for horizontal foresight

The theoretical inspiration for RESEARCH2015 comes from the field of foresight, which again has historical roots in fields such as future studies, technology forecasting, and planning. Not until the 80'ties did the term foresight actually begin to be used by both policy makers and academics with *Foresight in Science* (Irvine & Martin, 1984) as the most prominent publication

of the time. Coates (1985) describes foresight as one out several steps of *planning*, while Miles (2008) emphasise the relationship to *future studies*, as the core historical roots of foresight. Andersen & Rasmussen (2012, p. 5) describes the combination of the technology sceptical *future studies* centred around European, with the more technology positive *technology forecasting* more prominent in the USA, as the two main inspirations for foresight.

While the theoretical and historical inspirations for foresight are many, it is the increased use of foresight in practice that has given way for new ways to carry out foresight studies. According to Georghiou (Georghiou & Keenan, 2006, p. 766) 4 different generations of foresight practices can be identified. The first generation focused on experts predicting future technologies. In the second generation industrial actors were brought in and focus moved away from prediction to the building of networks. In the third also users were added to complete the understanding of the potential consequences of future technologies. The fourth generation goes beyond the nation and uses foresight in regions or organisations. Foresight has become a widely used method (see Georghiou, Harper, Keenan, Miles, & Popper, 2008), but most studies have focused on emerging technologies within specific fields of study. This limits the amount of relevant experts and other relevant stakeholders, as a certain level of expertise within the field is needed to participate. Foresight across disciplines is different as the questions asked are broader and the expertise needed to participate not as specific. Instead of focusing on the potentials of a certain technology within a field, it opens up questions about what is good research and how should we prioritise between different fields of research. In the fourth generation foresight moves away from being a completely state controlled exercise to be tailored the needs of innovation systems. This progression has moved foresight away from a focus on the technical sides of the development, to a further interest in the improvement of networks and institutions central to the innovation system. This has consequences not only for whom to include in foresight exercises, but also for the central purpose of doing foresight:

"*If it is accepted […] that foresight is correcting an inherent tendency to have excessively short-term horizons and a difficulty in forming new networks around technologically and socially innovative activities, then foresight may be best evaluated ultimately in terms of its ability to change values and behaviour in these directions*" (Georghiou & Keenan, 2006, p. 769).

The move away from the strictly technical and expert based foresight has given a new interest in understanding interaction across disciplinary boundaries. This is described as a move away from vertical foresight, where the discussions concerned the developments of new technologies within a certain discipline or area, towards horizontal foresight where focus is on the prioritisation and cooperation across different disciplines or areas of research. It is in this relative new tradition of horizontal foresight that RESEARCH2015 is located.

Experiences with horizontal foresight outside Denmark

While RESEARCH2015 was the first attempt of horizontal foresight in Denmark, a number of recent foresight exercises in other European countries have used foresight for priority-setting

across disciplinary boundaries. Three examples will be given here, to show how the process of RESEARCH2015 is similar and different.

FUTUR in Germany

FUTUR in Germany, which began in 2001, is one of the first exercises to have used foresight methodologies to bring together a broad number of stakeholders in discussing research priorities across disciplines. The process included three phases and spanned over a number of years, giving room for different kinds of inclusion of actors. The purpose of FUTUR has some similarity to RESEARCH2015 as the process was:

"…*oriented towards the identification and inclusion of societal needs in future research agendas and serves as a means of priority-setting for future innovation-oriented research policies*" (Cuhls, 2008, p. 138)

The result of the process was four lead visions for research. FUTUR was an experiment in that it used foresight methods in new ways, but has been criticised for not having an adequate connection between the many different inputs and the results. Many of the activities did not contribute directly to the results, leaving participants with questions about the purpose of these activities and the use of the input given (Cuhls, 2008, pp. 148–9). Germany has now returned to a more technology and expert focused foresight model showing the limited success with FUTUR.

Finnsight in Finland

Finnsight in Finland, which began in 2005, took a different approach. While not wanting to discuss within traditional disciplines focusing on certain technologies, it was still decided to pick 10 themes as the starting point for the foresight exercise. Panels were then chosen with 12 experts, who developed each of the 10 themes. To secure that cross-cutting issues were taking adequately into account, meetings were arranged between chairmen of the different groups. The expert panels each had two chairmen; one from academia and one from industry. Special focus was given to the identification of competences within the Finish research and innovation system, and the timing of the process was fitted to a new national research strategy, giving the process a clear instrumental purpose. The result was a report for each of the 10 themes as well as a cross-cutting report, and a survey showed a general satisfaction on the side of the panels, both with the experience they gained from the process and their influence on the result (Salo, Brummer, & Könnölä, 2009). Compared to FUTUR, Finnsight was a much shorter process, with a more limited inclusion of actors and a more clearly defined scope. The panels of finnsight were created to balance academia and industry, while also leaving a few spots for other organisations. Compared to RESEARCH2015 this gave industry relatively more influence over the process.

Technology and Innovation Futures in the UK

Similarly the UK has attempted to move beyond traditional disciplinary boundaries when conducting foresight with the foresight exercise on "Technology and Innovation Futures: UK

Growth Opportunities for the 2020s". Like Finnsight the goal was to include a relative small number of experts in a structured way. This was done through 25 interviews and 5 workshops containing a total 150 experts of research and innovation. The first report came in 2010 and in an updated version in 2012. For the updated version the team carried out 41 interviews with experts as well as a survey sent out to over 180 contributors of the first report. The amount of contributors in this case was fairly similar to Finnsight, although the process was slightly different. Where the expert panels of Finnsight played a key role in writing up the reports, in the UK case the inclusion of experts happened as consultations, while the steering and writing was left strictly with the facilitators.

These three examples show some of the recent attempts to use foresight as priory-setting across different disciplines. While the German example has it as a key objective to include new actors, the other examples mainly tries to move traditional actors of research and innovation beyond their disciplines. All three examples use, like RESEARCH2015, the idea of societal challenges as a new driver for setting priorities, which also has been taken in by the EU in horizon 2020. RESEARCH2015 includes ideas from all of these exercises, yet combines them in a different way. Like FUTUR RESEARCH2015 tried to reach out to new actors, yet in a much more limited way, through the open web based call for input. Like Finnsight RESEARCH2015 chose to let an expert panel be in charge of parts of the process, thereby letting important decisions be taken outside the group of facilitators. However in the last phase of RESEARCH2015, the process has most similarity to the UK process as this involved workshops and consultation with traditional actors of research and innovation lead by the foresight facilitators from the Danish Ministry.

Conditions for RRI in the making

Governance arrangements

RESEARCH2015 can be seen as a governance instrument with the purpose to create a better foundation for the governance of strategic research with more robust knowledge through wider inclusion. There is no enforcement system build in to the process, but it was attempted to create alignment through building consensus within the process. This was especially in focus in the third phase where only stakeholders central for the implementation of the results were included. RESEARCH2015 was a new initiative and therefore not in a formal way linked to other governance arrangements. The main audience, from the facilitators' point of view, was the politicians and the strategic research council, while also hoping to affect universities, in other words the key public institutions for the division of funds for strategic research in Denmark.

A key aspect of the governance arrangement was the steering of the process. The ministry decided early on that it would not be optimal for them to steer the process, and in the end each phase ended up with different types of steering. The first hearing phase happened with

the least possible steering; only slightly affecting who was involved or what type of input was given. This gave a very chaotic input, which the expert group found hard to work with, but which also included new and different suggestions for strategic research. In the second phase the steering of the process was given over to the expert panel, in which the ministry had made sure that different disciplines were represented. The experts decided that each expert should develop themes from the input related to their own disciplines, mainly due to the limited time given. In the third phase the ministry took back the steering to develop the final report. While people outside the expert group questioned the influence of this group and its weighting of disciplines, the experts criticised the lack of time given to the process thereby limiting their possibility to consult with other actors.

Actor Landscape

The three phases of RESEARCH2015 included different types of actors. The first open hearing gave the opportunity for everyone to give input, yet most input came from research organisations and organisations representing industry. Of the individuals who submitted suggestions, a big part came from people employed at universities. Only a few other individual citizens made suggestions and similarly only a few individual companies contributed. It was therefore more the number of actors than the type of actors that was different from other priority-setting exercises in Denmark. This broad inclusion of actors was by many of the interviewed seen as a strength of the process. Among the 8 independent experts, who were in charge of the second phase, 4 were from universities, 3 from business and 1 from a private research foundation. They were the only actors who followed the process over a longer period of time, while other actors contributed just once or twice. The user panel consisting of 57 representatives of societal organisations gave their input through a one day workshop with the expert group. In the third phase the ministries and public research councils helped adjust and write the final proposals. In this phase comments were still given by a number of organisations both written and orally to the ministry.

Only few actors within the process expressed the need for a broader inclusion to develop the knowledge base, although it was expressed that a more structured and facilitated inclusion of the general public could have given an interesting input. On the contrary it was questioned by some participants in the expert group if all the actors included had the expertise needed to develop robust themes for research; this was especially mentioned in relation to the workshop with the user panel. Some also expressed unhappiness about the balance of actors, especially in the expert group. Two different critiques were expressed in this regard. First, that industry were underrepresented, giving disproportionate influence to public research institutions. Secondly, that the natural sciences were underrepresented, especially since strategic research in Denmark traditionally has had a main focus on natural science. From the point of business actors wishing an increased focus on innovation, a more systematic inclusion of actors outside the traditional research institutions would have strengthened the exercise. The hearing failed to achieve this, as it mainly included existing actors and with alternative suggestions often not very developed. However opening up the box of relevant actors is at the same time difficult as

it can be discussed whether it is for example smaller companies, NGO's or the general public that should be better included.

De facto governance practices

Constructive interactions:

The inclusion of actors in RESEARCH2015 went beyond the normal actor inclusion of priority setting in strategic research. The official evaluation (VTU, 2009) shows a general satisfaction with the way different input were discussed and taken in, even if some feel that the final result was skewed towards traditional views of research and innovation. While it is hard to judge this dissatisfaction in itself as a negative result, as not every suggestion can be included, it is worth considering if there is an overlap between those who are not normally included and those who did not influence the result. To affect such a long a complicated process demands both knowledge and time, but also thorough understanding of how such processes work and the type of input wanted. A more thorough and systematic inclusion of new actors, giving them a clear understanding of the different ways to affect the process, could potentially have given more influence to new and different suggestions for strategic research.

A main objective of the extensive process was to build up a robust knowledge base. From the actors point of view though, there were very different opinions of how this is done in the best way. An example of this is the OECD horizon scan, which some business actors thought was crucial and not used enough, and which several actors from academia found of a poor quality. The discussion was therefore not so much about the amount of knowledge, as it was about the quality of the knowledge given weight in the process.

Also when it comes to the learning gained from being part of the process actors deferred. Some of the experts thought the process included significant learning, while others felt on the outside. It was emphasised by several people that such processes tend to use the same actors, therefore creating a network of actors helping to facilitate cooperation across disciplines. A process understanding was seen as essential to give input that could be taking forward in the process and clearly understood by the diverse actors taking part. Working across disciplines and between institutions was therefore seen as a capacity that was needed to have influence, but also which such processes help build up.

Was there an adequate discussion of the issues according and were actors included in a meaningful way? My analysis shows that the process added to the amount of discussion of the issue, and the main critique from actors was not to the amount of discussion, but to how different purposes and interests were weighted within the discussion. Whether the right actors were included in the right way is a subject dividing the actors. The interviewees from the expert group tend to say that all actors were listened to, while others feel that the process were dominated by traditional research actors, and therefore making little difference from more traditional priority setting practices.

Transformation:

The official evaluation (VTU, 2009) shows a significant impact of the exercise on policy making and strategies of the strategic research council, which is often seen as the most important criteria of success from these exercises according to literature on foresight (see Calof & Smith, 2010). However several actors emphasised that this impact is caused through over inclusion of the traditional actors of research and innovation, thereby not giving room for new and different input to make a difference in the process. In other words, such a narrow definition of success does not in any way take into account; who runs such processes and with what purpose. As this process was run by the ministry as a response to a political set target, adaptation to the political context was a natural part of the process, and cannot in itself be seen as a success, if it is done without respect to the independence of the process. This point echoes the argument made by Stirling (2008) that processes with a clear instrumental purpose can have a tendency favour perspectives of strong actors.

So while some kind of consensus was built in the process and a political impact was achieved, a transformation of how actors work to prioritise strategic research is difficult to identify. Several actors emphasise that it was constructive with broad inclusion, the focus on societal challenges, and the possibility to learn from many different actors, but no clear transformation in values or behaviour can be identified. As the process included strong interest of research and innovation and relative little time for transformation, this might not be a very surprising result. The process was the first of its kind in Denmark, and transformation takes time. That the process was reviewed positively, and that learning happened in different ways, could be seen as an important first step.

Drawing lessons for Res-AGorA

In this section I will draw some lessons for the Res-AGorA project. These lessons are not mutually exclusive, but on the contrary interdependent and should be understood as part of a whole.

Knowledge robustness

The OECD horizon scan functioned as a knowledge base for the discussions of societal challenges in RESEARCH2015, yet there were very different opinions on the quality of this document and its validity as knowledge foundation for the exercise. The scan was therefore not extensively used, despite being the main analytical document in the process. The knowledge base therefore consisted mainly of the shared knowledge among the participants of the process. Different types of analytical input, such as research on the effects of strategic research and best research practices, were requested by a few actors. The limited analytical input to the process was partly due to the emphasis on consensus and the attempts to value most input, as no clear frame of good knowledge were developed in advance.

Doing the process a suggestion was made by a member of the expert group to create a theme concerning sociological reflections on the quality and usability of the knowledge created through research. The purpose was to enhance the robustness of the knowledge base, through studies of the consequences of research on society, but the theme did not find resonance with the ministry. Such a theme would have enhanced the analytical foundation to discuss future priority-setting, which was sought after by several actors.

Understandings of responsibility

The research 2015 process was initiated as part of the globalisation strategy, which emphasised the need to improve growth and innovation. The three selection criteria, which have been used within Danish strategic research for a while, were: Challenges with clear societal relevance, indication that a scientific solution could be found, and existing capacity within Danish research and innovation system within the field. No disagreement on these overall criteria was found in the study, despite disagreement on how to implement them.

The main understanding of responsibility present in the final documents is that there is a need to improve competitiveness through strategic research, to sustain growth and welfare. Competitiveness and the importance of strategic research was emphasised by most actors, yet the ideas of how to improve strategic research were very different. A difference in understanding could be detected between those emphasising innovation and specialist expertise as a means for creating competiveness and those focusing on the broad benefits of research for social cohesion.

Balance between inclusion and influence

The format and inclusiveness of the process was developed in the ministry, and was not part of an overall strategy of inclusion, although the history of using such methods played a role for the facilitators. Most actors spoken to underlined the importance of a democratic underpinning of strategic research, and were positive of the hearing phase as the starting point of the process, despite the shared concern that the content was of a mixed usefulness. In the end the ministry decided not to bring the format forward to future exercises, as it made the process overcomplicated compared to how much was gained from the open internet hearing. Several interviewees suggested that including the population in a more structured way, so that the input fit the framework of the process better, had given a better input and therefore would have changed its impact on the results.

In general there was agreement that it is a difficult balance between inclusion and influence. For the process to have legitimacy it is important that results are made in all parts of the process, so that people don't feel their time is wasted. In maintaining this balance it is central to have a clear structure that defines the purpose and scope of each of the exercises. RESEARCH2015 seemed fairly successful in achieving this balance, creating a general satisfaction with the exercise among participants according to the official evaluation (VTU, 2009). Yet according to some of the interviewees this is also what makes the exercise less important, as the existing strong actors agree on what they are already working on is important, leaving little

room for different input. A question could therefore be if existing ideas of strategic research have been thoroughly challenged in the process.

Balance between consensus building and the promotion of new ideas

One of the criticisms brought out in the official evaluation was that the process did not bring anything new on the table (VTU, 2009, p. 8). Innovation could have played a bigger role, giving more room and weight to input from outside traditional research institutions. Instead the process focused on themes that could create consensus among participants and which Denmark could make significant contribution through existing research environments. For business actors who emphasised the need for Denmark to take up new areas of strategic research this approach seemed inadequate. A first analysis concerning the current standing of Danish strategic research and whether there is a clear need to define new areas of research could have brought this discussion to the fore, as this is clearly an area that divides actors.

Balance between centralised structure and decentralised steering

Having a clear structure and purpose is important for actors in RESEARCH2015, and one of the suggestions for improvement was a better structure for the initial hearing of actors, so that all suggestions had a similar form and were on a similar level. Structuring the exercise is also part of steering, in which it is important to create balance. The ministry decided to let the expert panel steer the second phase, yet put the work of the experts through another extended review in the third phase, which not all experts were happy about. This makes it unclear how much each of the three phases contributes to the final result.

In the follow up to RESEARCH2015, called RESEARCH2020, it was decided by the ministry to decentralise part of the process by asking organisations to submit joint proposals for new research themes and reviews of old ones, so that e.g. universities and business organisations each came with one input including suggestions from all their sub organisations. This left some of the coordination and prioritisation work with individual organisations, while also giving the ministry an easier job with compiling suggestions. While this pragmatic approach clearly has advantages, the disadvantage could be that the transparency, which was one of the central objectives, is lost when more of the content is developed outside the actual process.

Conflict management

The strategy of "conflict management" in RESEARCH2015, focus on the early and nonbinding inclusion of actors, to develop governance based on consensus. The goal of long term thinking is to go beyond immediate interests. However actor's view the conclusion of the exercise in relation to their existing interest, and each have their own vision on the how research and innovation can benefit Denmark and the world in the long term. Despite the very different views of strategic research among actors, the process included limited conflicts. The non-binding character of the process meant that influence on the process was not seen as essential. There was a general agreement in the interviews that actors who put more effort into the process also had more of a say, which was accepted without creating conflict.

Conclusion

In my paper I have analysed the RESEARCH2015 process using the research model developed within the Res-AGorA project. My focus has been on the process and interaction between stakeholders, with a special focus on the value of broad engagement and the steering of the process to gain political relevance. While the exercise is seen by actors as a positive step both with a more inclusive, interdisciplinary, and transparent process and towards relevant objectives, there is little agreement on what parts of the process were useful. A more structured and transparent approach to the relationship between each of the phases could potentially have made the influence of different actors more clear, and brought forward discussions which now happened behind closed doors; first in the expert group and then in the ministry. While there were plenty of disagreements, most were not brought forward as part of the process, making it hard to identify the central issues dividing actors. Some themes were brought forward, taken away, and then brought in again, yet nothing was done to show how these decisions were made and on what grounds. The results of the process had a clear impact on policymaking, yet I have argued that this cannot be seen as a success in itself. If impact is at the cost of diversity in perspectives, then it contrasts the values of inclusiveness and long term thinking that such processes should promote.

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Towards Anticipatory Governance of Responsible Research and Innovation

The objective of the Res-AGorA project is to develop a comprehensive governance framework for responsible research and innovation (RRI). This will be a contribution to the EU ambition of becoming a genuine Innovation Union by 2020 striving for excellent science, a competitive industry and a better society without compromising on sustainability goals as well as ethically acceptable and socially desirable conditions.

The goal of the Rea-AGorA project will be achieved through extensive case study research about existing RRI governance across different scientific technological areas, continuous monitoring of RRI trends in 16 European countries, and constructive negotiations and deliberation between key stakeholders. This comprehensive empirical work will be the building blocks of the creation of a governance framework for RRI.

The case study summarised in this document is output of Res-AGorA's extensive empirical programme (Work Package 3).

More information at www.res-agora.eu

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