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### Interim design requirement report

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## 1. Res-AGorA – A brief project overview

The EU seeks to become a genuine Innovation Union in 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. Europe thus needs to develop a normative and comprehensive governance framework for Responsible Research and Innovation (RRI). This is the major goal of Res-AGorA.

The Res-AGorA framework builds on existing RRI governance practices across and beyond Europe. It is a reflexive and adaptable framework to enable the inherent tensions in all governance of RRI to be actively addressed by procedural means aiming to facilitate constructive negotiations and deliberation between diverse actors.

The project achieves these objectives through a set of work packages providing an empirically grounded comparative analysis of a diverse set of existing RRI governance arrangements and their theoretical/conceptual underpinnings across different scientific technological areas (WP2 and WP3), a continuous monitoring of RRI trends and developments in selected countries (WP5) and, based on the cumulative insights derived from these work packages, co-construct with stakeholders the central building blocks and procedures of an overarching future governance framework for RRI (WP4).

This governance framework delivers cognitive and normative guidance that can be applied flexibly in different contexts. Res-AGorA expects thus have direct impact on RRI practices (science, industry, policy), and strategic impact in terms of the political goals (Horizon 2020) and competitiveness (Lead Market through growing acceptance of new technologies).

Res-AGorA will aim at ensuring intensive stakeholder interaction and wide dissemination of its tangible and intangible outputs in order to maximise impact, including comprehensive and interactive stakeholder engagement, liaisons with other ongoing RRI activities funded by the Science in Society Work Programme, and a final conference.

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### 3. Preface: objectives of the deliverable

The Res-AGorA project developed a governance framework that shall support stakeholders 'navigate' towards Responsible Research & Innovation (RRI), supporting strategic reflection on key governance challenges for achieving their ambitions. Starting point for our approach was that many, if not all, goals formulated under the banner of RRI were not new, but already pursued through various governance instruments. After developing some basic understanding and deductive cornerstones for the framework and the empirical analysis from governance, STI and recent RRI literature, we conducted a number of case studies, analysing what could be learned from longstanding as well as rather new practices of navigating the processes and outcomes of research and innovation in ways deemed more responsible. In addition we studied shifts in RRI narratives and the meaning of 'responsible' and 'responsibility'. Separately, we recorded RRI activities in European member states. The findings from our research activities informed the design of an RRI governance framework, which was further operationalised through a series of five co-constructive stakeholder workshops.

In this context this deliverable serves two goals:

- Providing a reference document for the rationale, architecture and content of the Res-AGorA governance framework for RRI
- Documenting the analytical steps taken in building the governance framework on the findings from literature, team reflection, stakeholder participation and our empirical analysis

The report is structured as follows. The preamble presents the Res-Agora Governance Framework in a nutshell. Chapter 1 summarises the key governance challenge of RRI and outlines the basic rationale and approach for the Res-AGorA framework. In chapter 2 we summarize what we have learned from our empirical program. In chapter 3 we discuss how we have linked these lessons to our conceptual approach. The governance framework itself is presented in chapter 4. Finally, chapter 5 discusses options with regard to the envisioned use of the Res-AGorA governance framework.

Karlsruhe, 14.09.2015

## 4. Preamble

The Res-AGorA project proposes a governance framework aiming at supporting stakeholders in Europe to better navigate towards Responsible Research & Innovation (RRI), that is, a **conceptual tool** to encourage and facilitate strategic reflection for achieving the ambitions and goals formulated under the overarching banner of ‘RRI’<sup>1</sup>.

The starting point of the development process of the proposed framework was the realisation, based on case studies and stakeholder workshops, that how these RRI goals could be understood exactly and could be realized concurrently is in fact an issue far from clear. For this reason, the Res-Agora project proposes a framework without proposing yet another normative definition of what RRI is, is not, or should be. Instead, the project’s aim was to develop a framework that could **guide individuals and organizations in strategically thinking and engaging in ‘navigating RRI governance’** in Europe<sup>2</sup>.

The governance model proposed therefore aims at supporting actors, particularly organizational actors, to develop within and between current and future organisational arrangements shared practices of deliberating about and negotiating RRI ambitions and claims, and to collectively acquire **governance know-how** facilitating the transformation of institutions and behaviour, whereby the emphasis is made on the normativity grounded not so much in a particular definition of RRI, but on our collective understanding of what is good and effective governance of RRI. For this purpose, the framework is meant to support all stakeholders concerned with the help of appropriate principles and instruments, fitting their specific situation.

Why is a governance framework for RRI needed in the first place? In fact, the concept of Responsible Research & Innovation has become an **increasingly important concern in research and innovation policy and political debates** both at the EU-level and within member states’ research systems. This is allegedly a result of **two claims** that developed separately and that are now brought together.

First, there are longstanding concerns around the ethical, legal, environmental and social implications of R&I which are based on issues related with scientific practice and developments as well as from technological innovations fuelled by claims for reacting against direct or

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<sup>1</sup> Broadly speaking, RRI includes research and innovation expected to benefit society either by addressing societal challenges, such as sustainability or security; anticipating potential risks or ethical concerns, where such activities are also expected to be done properly, allowing for open access, equal opportunities and the involvement of stakeholders in decision-making; and the fair distribution of costs and benefits of the R&I performed according to democratic standards.

<sup>2</sup> It is important to emphasize that this framework is intended for Europe as we do not assume transferability to ‘the world,’ as governance conditions are different, where plural governance does not pertain, and where self-regulation is neither expected or possible.

indirect unintended negative effects. In this context, think for example about the claims made regarding the use of chemicals in the production of food; the complaints about information technology developed to increase security; the rise of new markets, products and services in medicine or psychology; or large investments and experiments in brain sciences, space and many more dimensions, which often cross-cut or overlap and all have potential for producing positive effects, but eventually also harm in the short term or in the foreseeable future.

Second, and increasingly present at political debates, research and funding organisations and literature, is the desire among the R&I community and STI policymakers to improve 'responsiveness', that is, to be more responsible vis-a-vis what societies regard as desirable research directions/outcomes. Examples are the efforts aiming at evaluations of societal relevance for research, corporate responsibility, stakeholder and public dialogue, equal opportunities claims, education, open access instruments, sustainability policies, gender policies, innovation for cohesion, etc.

The development of the proposed governance framework for RRI did not start from scratch. It builds on our understanding of existing **de facto RRI governance arrangements**, including activities such as Corporate Social Responsibility (CSR) schemes, societal mission oriented research funding, citizen science initiatives, ethical review or safety regulation, Technology Assessment, etc.

The Res-Agora project proposes the current framework as a 'thinking tool' not only intended to make individuals, organizations and institutional systems **more responsive** towards societal needs and preferences, but also to make existing and new governance instruments and arrangements really **integrative**, allowing and encouraging contestation, learning, experimentation and, ultimately, institutional transformation at a systemic level, allowing RRI to emerge from a constructive, bottom-up perspective.

The key to the Res-Agora project approach lies in the reflexive, self-organised and collective nature of RRI, where governance dynamics are shaped by specific instruments and arrangements, and where the design and operation of all instruments (even the formulation and operation of hard law) are in fact not a given, but **actively constructed** through processes of problem framing (appraisal), coordination and negotiation. In this context, what is judged responsible and for what, is part of these interactions, where the governance of RRI takes place in processes of sense making and decision making in a collective way.

The social construction of governance, therefore, directs the application of our framework towards building on and intervening in the reflexive (self-) organization of RRI governance. How well individuals, organizations and institutional arrangements work together and arrive at agreements will be continuously challenged by the multifaceted, distributed and contested nature of RRI. Therefore, we aim for a framework providing guidance in accounting for the **dynamic interplay** of goals, instruments, stakes, problem framings, preferred solutions and rules of the game in various arenas, when trying to put RRI into practice.



For whom would our meta-governance approach be useful and in what way? The primary target users of the framework are actors striving for leading research and innovation organization and procedures towards more responsiveness; who in so doing aim at defining RRI goals and implementing appropriate instruments and arrangements; who support setting priorities, defining policies, and developing evaluation and assessment tools; who intend to mediate between levels of the innovation system by bringing together different actors and different interests as well as defining the framing for the practical implementation of governance instruments; who are motivated to work as **change agents** or institutional entrepreneurs and struggle for leading research and innovation to be more responsive. For this type of users, who typically work at research funding organizations, boards of universities or of companies, or at professional organizations the framework can offer **support and guidance for reflecting on and intervening in RRI governance**.

We therefore envision our framework to be used by actors facing dilemmas and complex situations challenging the governance of RRI and wanting to reflect strategically on their own position as well as those of others in navigating research and innovation towards RRI ambitions.

In Res-AGorA Deliverable D2.4<sup>3</sup> we have discussed audiences covering also **intergovernmental organisations, policymakers, research performers, export bodies and advocacy groups**. In fact, our meta-governance approach speaks to all these institutional actors, as it builds on the collective nature of RRI governance and the challenges therein. That's why we aim for supporting actors not only to reflect on their own position and abilities, but also on those of others and how these work together in specific contexts. Actors categories vary and involve people and organisations with different roles and different needs, and they will have to make choices in whether and how to **tailor** the Res-AGorA governance framework, be them operating at the analytical level, the strategic level or the procedural level, responsible for strategic orientation, programming or performance of R&I. According to this logic, *illustration* is seen as more helpful than *specification* to retain the reflexive character of RRI governance framework designed. In this context the Res-AGorA empirical program can be used as a **repository of cases and lessons** illustrating the relevance of framework components in specific contexts.

The Res-AGorA framework therefore is about supporting **legitimate, accepted arrangements** involving actors with different interests to deliberate and negotiate about goals and means -that is the substance and the process- of RRI, to better align governance mechanisms and to bring about institutional transformation.

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<sup>3</sup> Nielsen & Bedsted 2014

Building on the idea of ‘strategic intelligence’<sup>4</sup> we have designed the framework as a collection of principles and requirements supporting strategic reflection and change agency and transformation towards RRI. For these purposes the **principles and requirements** proposed are organised in three dimensions: social/political interaction (**how actors interact**), interplay of governance mechanisms (how governance mechanisms **structure action and interaction**) and individual and institutional formation (how **individual and institutional formation** can support the collective ability to direct and shape research and innovation responsibly). For each of these dimensions guiding principles describe key properties, or functions, of RRI governance that have to be fulfilled.

We have conceptualized our approach mainly in a **European context**. Therefore we have assumed RRI governance to be working in the context of working constitutional democracies. This has been reflected in the framework by adding ‘**democratic standards**’ as a meta-condition.

We hope that the principles and requirements identified help to develop a comprehensive strategy on RRI. In this respect two assumptions are important: First, the framework is meant to be considered **as a whole**. In a specific situation, for example in facing controversies over fracking, the immediate concerns may primarily be about how different groups interact with each other: who has a voice, in which debates, what arguments are being used and how is the process moderated. The first area in the framework then is of key significance. However, it is no less important to consider how governance mechanisms structure these interactions as well as follow-up action (think of environmental impact studies, safety regulations or energy market mechanisms). Likewise, when one wants to build broad-based capacities for recognizing, communicating and addressing societal dimensions in research and innovation (the third areas covered in the framework), it has to be acknowledged that it makes little sense to do so in a top-down, non-deliberative manner, and thus to apply the principles of inclusion, moderation and deliberation when designing and implementing such a capacity building program.

Second, while the principles do provide a guiding orientation for reflecting on and intervening in the governance of RRI, we do not assume that either individuals or organizations are in full control. Rather the opposite: many actors will find themselves in a position in which they are quite depending on governance mechanisms as they are, or on the actions of others. It is for this reason that our framework is not meant as a set of static rules, but as a tool for analysing what aspects of RRI governance are at stake in a specific situation and what aspects of RRI governance have to be taken into account for improving it. This is why RRI governance should be thought more as the result of ‘**interplay**’ than of **control**.

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<sup>4</sup> Kuhlmann et al. (1999) defined strategic intelligence as “a set of – often distributed – sources of information and explorative as well as analytical (theoretical, heuristic, methodological) tools employed to produce ‘multi-perspective’ insight in the actual or potential costs and effects of public or private policy and management.”

If the proposed RRI governance framework is to make a difference, the resulting strategies have to aim for **transforming present day practices** of research and innovation towards **'responsibilisation'**<sup>5</sup>. Given that there will always be multiple goals for RRI (from safety and sustainability to inclusiveness and responsiveness) as well as different instruments to promote it (from professional training and education, design principles, stakeholder and public dialogue to regulation by voluntary codes as well as hard law), the framework aims at facilitating strategic reflection and continuous formative evaluations to account on how instruments interact and play out at different levels and contexts and to what extent goals are ultimately achieved, in turn facilitating constructive interventions in de facto or future rri governance arrangements and challenges.

These processes involve in fact effective transformation towards a set of articulated normative goals embedding values into practices and processes and orienting action towards those goals. We call this **'deep institutionalisation'** of responsible research and innovation<sup>6</sup>, which represents in practice a process of **cultural change**.

In the next chapter, we discuss about the key governance challenges of RRI and outline the basic rationale and approach for the Res-AGorA framework.

## 5. Navigating Towards RRI: set-up and approach

Recently, the participants and organisers of the conference "Science, Innovation and Society: achieving Responsible Research and Innovation" (RRI), pronounced what has been called the **'Rome Declaration on Responsible Research and Innovation in Europe'**. According the authors *"the conditions are now right for responsible research and innovation to underpin European research and innovation endeavour"* and the declaration calls on *"European Institutions, EU Member States and their R&I Funding and Performing Organisations, business and civil society to make Responsible Research and Innovation a central objective across all relevant policies and activities, including in shaping the European Research Area and the Innovation Union"* (Rome Declaration, 2014).

These are strong claims. The notion of RRI brings together many goals by which research and innovation is thought to benefit society. From addressing societal challenges, such as sustainability or security, to anticipating potential risks or ethical concerns. Just as important, research and innovation itself is expected be done fairly, by allowing for open access,

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<sup>5</sup> The goal of responsibilisation refers to the fact that R&I should be a transparent, interactive process by which actors become mutually responsive to each other with a view to the (ethical) acceptability, sustainability and societal desirability of the research and innovation processes and their resulting products. In this context, responsibilisation involves self-commitment towards the exercise of responsibility beyond the mere compliance with rules.

<sup>6</sup> Randles et al, 2014.

equal opportunities and the involvement of stakeholders according to democratic standards. So far, many will agree, but how these goals have to be understood exactly and can be realized concurrently is far from clear.

Instead, many of the goals formulated under the banner of RRI are not new, but already pursued through manifold governance arrangements. Just think of Corporate Social Responsibility (CSR) schemes, societal mission oriented research funding, citizen science initiatives, ethical review or safety regulation. If RRI has to make a difference, an important question is how it can build on, or taken up in, the already existing governance of research and innovation. It is this question we have taken up as the key challenge for developing a governance framework for RRI in the Res-AGorA project.

In this chapter we first position our conceptual take on 'RRI governance' in relation to above problem setting (section 1.1). Next we outline our approach towards developing a governance framework that supports individuals as well as organisations navigate towards RRI, that is, in strategic reflection on, and constructive intervention in process of, the governance challenges of RRI (section 1.2).

## **5.1 The governance challenge of RRI**

Responsible Research & Innovation (RRI) has become an increasingly important concern in research and innovation policy and political debates at the EU-level as well as within member states' research systems. This is allegedly a result of two claims that are now brought together. First, there are longstanding concerns around the ethical, legal, environmental and social implications of R&I which are based on issues related with scientific practice and developments as well as from technological innovations fuel claims for reacting against direct or indirect unintended negative effects. For example, think about the claims made regarding the use of chemicals in the production of food; the complaints about information technology developed to increase security; the rise of new markets, products and services in medicine or psychology; or large investments and experiments in brain sciences, space and many more dimensions, often cross-cutting or overlapping and all having potential to produce positive effects, but eventually also harm in the short term or even in the foreseeable future.

Second, and increasingly influential, is the desire among the R&I community and STI policymakers to be more responsible vis-a-vis what societies regard as desirable research directions/outcomes. Examples are the efforts aiming at evaluations of societal relevance for research, corporate responsibility schemes, stakeholder and public dialogue, equal opportunities, education, open access instruments, sustainability policies, gender policies, etc. As will be discussed in 2.2, these views correspond to the six narratives found in the empirical programme of this project, where rri governance both as a process and as an outcome actually overlap/complement each other.

Therefore, together with different, often competing, views on what exactly is ‘responsible’, these governance arrangements of research and innovation raise a **double challenge** for actors and organisations aiming to foster RRI, whatever definition of ‘responsibility’ is adopted. In fact, navigating towards RRI does not only require to make individuals, organizations and institutional systems **more responsive** towards societal needs and preferences, but also to make governance instruments really **integrative**, while allowing for contestation, learning, experimentation and institutional transformation.

In Res-AGorA we seek to address this double challenge for RRI in a constructive way. To start with, we are certainly not the only ones working on RRI concepts and frameworks. Activities like ethical review or public and stakeholder dialogue are thought to serve RRI as well, including those already institutionalized in more or less established practices such as Technology Assessment (TA) or Corporate Social Responsibility (CSR). Therefore, we will not come up with another definition or normative framework for RRI. Instead, our aim is to develop a framework for Europe that can **guide individuals and organizations in strategically thinking about and engage in navigating RRI governance**<sup>7</sup>.

In other words, we develop a normative governance model supporting actors, particularly organizational actors, to develop within and between organisations shared practices of deliberating about and negotiating RRI ambitions and claims, and to acquire governance knowhow facilitating the transformation of institutions and behaviour. So, the normativity of our framework is not grounded in a particular definition of what is RRI, but in our understanding of what is good and effective governance (in other words: legitimate, accepted arrangements with other actors to deliberate and negotiate about the substance (and the process) of RRI). Therefore the Res-AGorA governance frame is not concerned with the understanding of what RRI itself should be, but a guideline of how actors should go about achieving such a RRI approach fitting their specific situation, guiding all stakeholders involved with the help of appropriate principles and instruments.

## 5.2 Requested: governance towards RRI

The key to our approach lies in the collective nature of both RRI ambitions and research and innovation. First, research and innovation appear often confined to the activities and capacities of firms, universities and other research organizations. But actual outcomes of research and innovation are as much determined by markets, users, financial arrangements and regulatory frameworks. Thus, the governance of research and innovation is *distributed and heterogeneous*. It comprises hard law as well as voluntary codes, it is about investments as

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<sup>7</sup> It is important to emphasize that this framework is intended for Europe as we do not assume transferability to ‘the world,’ as governance conditions are different, where plural governance does not pertain, and where self-regulation is neither expected or possible.

well as career paths, and it hence works in different modes (cf. hierarchies, networks, markets).

Second, while governance dynamics are shaped by specific instruments and arrangements, the design and operation of all instruments (even the formulation and operation of hard law) are not a given, but *actively constructed* through processes of problem framing (appraisal), coordination and negotiation. What is judged responsible and for what, is part of these interactions, either explicitly or implicitly. Consequently, the governance of RRI is taking place in these processes of sense making and decision making in a collective way.

Both aspects have shaped the way in which we have developed the governance framework. The second aspect, about the ‘social construction of governance’, directs the application of our framework towards building on and intervening in the reflexive (self-) organization of RRI governance. Hence, the target audiences for our framework are actors charged with the task to navigate research and innovation organizations and procedures towards more responsiveness by defining RRI goals and implementing appropriate instruments and arrangements (such as research funding organizations; boards of universities or of companies; professional organizations; etc.).

What is often happening at the moment is that the collective nature of RRI ambitions is translated into calls for concerted action, emphasizing that ‘all stakeholders have to be involved’. There may be many reasons to request this, but it is far from self-evident how this ambition can be realised. How well individuals, organizations and institutional frameworks work together and arrive at agreements will be continuously challenged by the multifaceted, distributed and contested nature of RRI. Therefore, we aim for a framework providing guidance in accounting for the dynamic interplay of goals, instruments, stakes, problem framings and rules of the game in various arenas, when trying to put RRI into practice. Keeping in mind the first aspect of distributedness and heterogeneity, we have informed the design of our framework with lessons from a rich set of case studies reflecting various situations and challenges of RRI governance. These are discussed in chapter 2.

To sum up: if RRI is to make a difference, then RRI governance strategies have to aim for **transforming present day practices** of research and innovation in becoming more responsive and integrative towards societal goals. We label this goal as ‘**responsibilisation**’. Given that there will be multiple goals for RRI (from safety and sustainability to inclusiveness and responsiveness) as well as different approaches (from professional training and education, design principles, stakeholder and public dialogue to regulation by voluntary codes as well as hard law), we aim for a framework facilitating strategic reflection on how goals and instruments interact and play out at different levels, in turn facilitating constructive interventions in rri governance.

Before further operationalizing our conceptual approach to developing the Res-AGorA framework, we will first discuss in the next chapter what we have learned from our empirical program. In chapter 3 we will then continue our conceptual discussion by positioning these lessons in a ‘meta-governance’ perspective, that is, at a systemic level.

## 6. Lessons from RRI discourse and practice

Two important building blocks for the Res-AGorA framework for RRI governance are our study of evolving paradigms in what is meant with ‘responsible’ and ‘responsibility’ (for whom and for what?), as well as a number of empirical studies of new and existing governance practices in which attempts have been made to navigate research and innovation according societal needs and preferences. Here, we will make a distinction between what is explicitly positioned as normative directions and ambition for **RRI** (signified with the upper case abbreviation) and ongoing as well as evolving practices in the governance of research and innovation related to societal dimensions and questions of responsibility, signified with lower case: **rri**.

### 6.1 Evolving paradigms of ‘responsible’ and ‘responsibility’

A Res-AGorA internal discussion paper (Arnaldi, Gorgoni and Pariotti 2014) discusses how RRI has been variably conceptualised and defined in the literature. Two definitions closely related with the EU policy environment are worth mentioning:

RRI is 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 (in order to allow a proper embedding of scientific and technological advances in our society) (Von Schomberg 2012, 50; 2014, 39).

RRI refers to ways of proceeding in Research and Innovation that allow those who initiate and are involved in these processes at an early stage (A) to obtain relevant knowledge on the consequences of the outcomes of their actions and on the range of options open to them and (B) to effectively evaluate both outcomes and options in terms of ethical values (including, but not limited to well-being, justice, equality, privacy, autonomy, safety, security, sustainability, accountability, democracy and efficiency) and (C) to use these considerations (under A and B) as functional requirements for design and development of new research, products and services” (EC 2013, 14).

The central features of the idea of responsible research and innovation emerging from those definitions are:

**1. Responsibility oriented towards future:** RRI does not primarily deal with the negative consequences of innovation (preventing damages) but indeed promotes a prospective idea of responsibility focused on the exercise of responsibility towards future. Responsibility is then conceived more as a constructive process than a remedy to the negative outcomes of innovation.

**2. Responsibility is proactive more than reactive:** responsibility is intended to be mainly a driving factor and not as a constraint of the innovation process. Indeed, RRI definitions do refer to the positive outcomes of R&I.

3. **Responsible Research and Innovation is a collective and participative process:** responsibility is shared across different levels of actors with different roles and powers and has to be reciprocal along a two-way innovation process, as competing or conflicting actors should look for common goals.

4. **Within RRI multiple dimensions of Responsibility are interconnected:** it is not possible to fully isolate a single responsibility dimension considering it as being that which characterises RRI (the political, the legal, the ethical, and so on); indeed there is a clear complementarity between the different dimensions of responsibility.

RRI and its features reflect the multiplicity of the concept of “responsibility” associated with research and innovation, but above all emphasize the turn from an essentially backward-looking conception (linked to the ideas of fault and guilt) to a forward-looking idea (linked to the ideas of risk, precaution and now also RRI). In a regulatory perspective, this active and forward looking nature of RRI grants centre stage to strategies of *responsibilisation*, like incentivising self-commitment towards the exercise of responsibility beyond the mere compliance with rules:

Responsibilisation - namely expecting and assuming the reflexive moral capacities of various social actors - is the practical link that connects the ideal-typical scheme of governance to actual practices on the ground. Responsibility - in contrast to mere compliance with rules - presupposes one’s care for one’s duties and one’s un-coerced application of certain values as a root motivation for action (Selznick, 2002)

Responsibilisation strategies are based on the idea of encouraging actors' responsiveness, intended as “*predisposing actors to assume responsibility for their action*” (Dorbeck-Jung, Shelley-Egan 2013) and in particular “*assuming a receptive attitude towards the needs or desires of others before deciding what to do*” [Pellizzoni 2004, 549].

The emphasis on the peculiar role of responsibilisation in RRI has developed through a historical process of emerging and **changing underlying paradigms of interpreting ‘responsibility’**. The following table illustrates (with some unavoidable simplifications) the different features between the paradigms responsibility discussed above and provides a first ground for exploring how the concept of responsibility changes.

The ex post Responsibility paradigm based on fault represents the archetype idea of responsibility: as everyone is considered a moral agent, responsibility issues do arise mainly towards things happened in the past for which the agent is held accountable (and can be sanctioned). Within this typical liberal framing, responsibility is eminently individual.

The solidarity paradigm separates compensation from the proof of fault: the criterion of causality then replaces accountability. Here also the model is essentially retrospective as responsibility is resolved in the legal obligation to covering damages. Quantification of damages is made in advance by risk assessment, which then anticipates responsibility (for this reason the paradigm of responsibility is presented as prospective). In this paradigm, responsibility is systemic in that it consists in the distribution of risks within society.



**Table 1: paradigms of responsibility**

Paradigm	Guiding Principle	Criterion of ascription	Mean of realisation	Target	Dimension	Regulating mechanism
Responsibility (ex post)	Fault	liability	sanction	Negative outcomes	individual	Hard law
Solidarity	Risk	damage	compensation	Negative outcomes	systemic	Hard law
Safety	Precaution	uncertainty	Consultation (expertise)	Negative outcomes	collective	Hard/soft law
RRI	Pro-action	responsiveness	participation (deliberative fora)	Negative and positive outcomes	collaborative	Self-regulation Soft/Hard law

Source: Arnaldi, Gorgoni & Pariotti 2014

The paradigm of safety is based on the precautionary approach, which re-connects responsibility with moral agency by putting the focus of responsibility in the prevention of uncertain risks, so re-introducing the idea of accountability. Within this paradigm responsibility focus is on decision-making which explicitly involves the balance of political and ethical issues that cannot be properly decided in legislation.

The shift from risk to precaution is due to the epistemological and political limits of the idea of pure risk management, which covers only to a little extent the much broader area of scientific uncertainty. In terms of means of realization, this form of responsibility requires the interplay of hard and soft law, as it has to give room to contextual decisions which have to set the safety thresholds in each case.

This analysis is helpful to characterize the RRI paradigms guiding the development of the governance framework whose principal components are presented in this document. RRI takes the heritage of the precautionary approach one step further: as the consequences of innovation are not fully predictable and uncertainty is a key feature of technological trajectories, the idea of precaution is applied as a steering factor of innovation process towards desired goals rather than only as a way to correct its unforeseen consequences. RRI is thereby typically thought to be realised mainly through self-regulation instruments and soft law, in the broader contexts of key societal values, rights and principles that are stated in legal orders.

## 6.2 Variety and interplay of RRI framings and frameworks

Res-AGorA Deliverable D3.6 (Randles, Gee & Edler 2015) argues how different understandings of ‘responsible’ and ‘responsibility’ become embedded (institutionalised) into organisational structures, processes and practices, but also how these are contested across different groups in society, dependent on different, but interrelated dynamics:

- Bottom-up actors' understandings of de-facto responsible research and innovation (or rri), forms an interplay with new formal, top-down explicit frameworks of Responsible Research and Innovation (or RRI). This dynamic is represented as rri/RRI.
- Attempts to standardise, stabilise and integrate across disparate groups particular framings and interpretations of what is a priority for responsibility and what is not, forms an interplay with tensions pulling in the opposite direction, creating local, context-specific, variants.

From this perspective, a variety of Responsible Research and Innovation 'narratives' can be discerned, together forming an unstable contemporary discourse on what responsible research and innovation is, which societal goals are to be prioritised, what it should aim to do on behalf of whom, and how it should translate to on the ground practice and implementation.

Six '**grand narratives**' capture the historical development of the range of (largely separate) Research and Innovation settings and objectives that rri/RRI covers:

1. Responsible Conduct of Research. Scientists' self-regulation of data collection, storage of samples, reporting of results. Health and Safety in the lab.
2. Science with/for Society: public participation in Science, Research & Technology development including reflection & methods to achieve inclusiveness of wider groups of stakeholders especially citizens/general public.
3. Responsible development of New and Emerging Technologies. Mediating Technology Controversies. Including Technology Assessments , Anticipatory Assessments (including Ethical, Legal, Societal implications (ELSA) & 'balancing' risks/challenges/benefits
4. Responsible Business and Management, & Corporate Social Responsibility
5. Responsible Research and Innovation Systems, and Responsible Industry. Commercialisation and markets. Including responsible value chains.
6. Re-orienting Research and Innovation Systems towards societal problems and challenges, including inter-disciplinary 'team science' problem-solving. Engagement with whom? How?

Our empirical analysis revealed that the six narratives are schematic and not mutually exclusive. It can be said that whilst the fifth grand narrative may represent a 'pinnacle' of an integrated understanding and objective of RRI, thus-far this remains at best an aspiration. It is still far from institutionalised or evidenced in widespread practice as yet, in particular in a form that has an explicit, integrated, futures-orientation aiming to enrol wider societal reflection, anticipation, participation and responsiveness from a wide spectrum of actors into the process.

## 6.3 Lessons from *de facto* governance of RRI

Deliverable D3.6 also lists a series of transversal lessons drawn from a number of case studies of 'RRI in the making'. The case studies were intentionally selected to give insight onto a full spectrum ranging from a) Responsible Research (setting research funding priorities, governing the development of new and emerging technologies, mediating struggle in technology controversies), b) Responsible Innovation (shifting large innovation systems, the links from producers to consumers: constructing responsible value chains, grass roots, garage, and 'bottom-up' innovation, including social innovation); and c) addressing societal challenges (orienting R&I systems towards societal problems and challenges). Institutional arrangements studied combine actor constellations (plural and fluid groups of organised actors) with specific governance instruments (legal instruments, economic incentives, Standards, Codes of Conduct, ethics frameworks and committees, technology impact assessments, performance management system, etc.)

Two main questions were asked to guide the research programme: **1. How is 'RRI in the making' conditioned?** **2. Are there building components for a socio-normative governance framework?** The lessons act as a series of check-points for organising and orienting actors towards responsible research and innovation. Thirteen lessons cover three themes:

- an overarching lesson suggesting a need for **responsibilisation** and '**deep institutionalisation**' and
- twelve lessons elaborating the **elements** considered necessary to bring this about:
  - eight lessons refer to **governance processes** at the level of actor practices and experiences
  - four lessons concern the 'background' **institutionalisation processes and conditions**, and how these would need to simultaneously change in terms of their capacity and their normative orientation, i.e. institutions would themselves need to be transformed to create the external environment in which actors practices of rri/RRI governance on the ground would be encouraged, incentivised, and enabled.

### 6.3.1 Overarching lesson

#### (1) Towards Responsibilisation and Deep Institutionalisation

'Responsibilisation' and 'deep institutionalisation' are theoretical constructs rather than empirically-generated and therefore are not evident in any one case alone. However, different cases give insight into, and empirical support for the two concepts and how they might translate into practice.

As for the concept of ‘responsibilisation,’ we embrace Dorbeck-Jung and Shelly-Egan’s (2013) claim that “responsibilisation provides an objective for meta-regulation and acts as a ‘pre-requisite for actors to internalise social values (such as consumer safety or occupational health) and to ensure that these values are built into regulatory practices’.” This is a concept that goes beyond the unique concern of governments and involves expressions/institutional arrangements put forth by the ‘markets’ and corporations, the scientists, technologists and engineers themselves, as well as the media and the civil-society at large. In this sense, responsible research and innovation is then just one setting where these debates play out and questions about the distribution of responsibilities are raised or re-visited.

Deep institutionalisation of responsible research and innovation is a set of necessary conditions against which claims to responsibility can be assessed. It involves effective transformation towards a set of articulated normative goals embedding values into practices and processes and orienting action towards those goals’ (Randles et al 2014: 32). Deep institutionalisation therefore represents a process of cultural change.

### **6.3.2 Lessons about governance processes:**

#### **(2) Transformative interaction needs to be inclusive, open and transparent**

A key feature for transformation towards responsibilisation is the nature of the engagement of actors, where interaction needs to be inclusive, open and transparent, reflecting the heterogeneity of actors in a given governance situation. Inclusiveness is an important end in itself as well as needed for good governance processes towards rri, such as anticipatory learning, capacity and capabilities building, and finally institutional change at a pre- stage to facilitate it. Against this background, to bring about inclusive, transparent and open, and thus transformative interaction requires preparatory work and process management. However, inclusive interaction often has a balance to strike between breadth of inclusion and manageability and fairness of the process.

#### **(3) Intermediation and moderation**

The study found that governing towards RRI will need conscious intermediation and moderation as immediate, direct interactions are not always reasonable or feasible. The cases we drew from involve cases of open confrontation (hot contestation) with incompatible interests and values involved, cases in which the geographical or epistemological distance between actor groups is prohibitive, cases where actors that are to be mobilised in rri governance processes are not able or willing to connect and communicate, such as the heterogeneity of framings and perceptions, with limited capabilities and capacities or with a lack of awareness or interest, etc.

Intermediators must be credible and their function and own interests must be transparent and public bodies, particularly government, can play a key role in mediating contesta-

tion. Finally, foresight processes organised by state actors are also a means of moderation, of bringing heterogeneous actors together.

(4) Anticipation: the importance of building future-oriented learning through a repertoire of anticipatory techniques and methods

Many forms of organisations set in train tasks of reflexion about the ethical dimensions of their own futures, the future of technologies they use and future challenges they may face, with responsibilities flowing from and corresponding to debates about appropriate values-orientations. In this sense, such reflections are set against social, economic, political, and technological policy and trends of the day and may be formalised or organised through informal social networks of friends, colleagues, mentors and peers. The study highlights the role of visionaries as institutional change agents (see lesson 12 and 13) in not simply anticipating, but rather imagining and pointing out practical routes to achieving desired futures in accordance with desired 'good' values and interpretations of Research and Innovation responsibilities (normative orientations). Such actors do not work alone, however, but collectively in teams comprising individuals with different but complementary technical, discipline and functional skills sets, and/or political or resources access. Together these are adept at displaying and mobilizing political, intellectual, social and economic capital towards a desired articulated future.

(5) Robust, inclusive, and contextualised knowledge

Based on the cases studied, it was found that governance processes deal with different levels of uncertainty about the current or future consequences of scientific and innovation practice and products. For the reduction of uncertainty and to inform the discourse on consequences of research and innovation these governance processes need to be underpinned with evidence and knowledge. However, in order for evidence and knowledge to be effective in underpinning responsibility discourses, it needs to be accepted as valid, adequate and trusted by the stakeholders in a governance process. For this to happen, three conditions were identified: knowledge needs to be perceived to be scientifically robust, contextualised and sourced from a variety of stakeholders and follow a transparent process.

(6) Timing: the importance of time, timing and managing tensions of different temporal horizons.

Any governance process has to take the different dimension of time very seriously into account, as (a) there are different time horizons (e.g. of anticipatory processes), (b) there is the question of the timing of governance action, (c) institutional change takes time d) and there is a need to understand capabilities and capacity building for rri/RRI as a continuous process with a long preparatory lead-in.

Furthermore, to govern rri processes means to be aware of inherent tensions between a pressure to follow a discourse on the imperative of speed and acceleration of research and innovation processes on the one hand; and the imperative of their slow-down to facilitate greater care-taking and true normative and behavioural change on the other hand; and that

both can be claimed as compatible with increased ‘responsibilisation’ (See Lesson 1 Organising for Responsibilisation and Deep Institutionalisation).

Also, transversally across the cases, regardless of technology area, country, or originating body (whether government policy, business or NGO), there is a tendency for assessment exercises of various kinds to be commissioned with lead-times that are too short: weeks rather than months.

Finally, for RRI to become more than a superficial technocratic response, the modification of existing institutional patterns and structures, would be needed (i.e. ‘deep-institutionalisation, see Lesson 1). But this deep institutionalisation takes time, political will and resources, since incumbent institutional structures need to be altered in a process of ‘deinstitutionalisation’ in parallel with the creation of new institutional configurations.

(7) Multi-level governance: the importance of taking account of multiple levels of governance and seeking synergies between top-down and bottom-up processes.

Multi-level governance has many different forms. It can relate to the political level of city-regions, regions, nations, EU and global governance level. Furthermore, it can relate to different hierarchical levels within large organisations or to different hierarchical levels between organisations at the same political level. In any of those cases it means that there is an interconnectedness of governance processes and rri dynamics between those levels. Any governance process at any given level needs to take this interconnectedness into account, and pay attention both to bottom up and top down dynamics across the levels.

(8) Alignment: the importance of aligning and synchronising the normative goals, objectives and procedures of different instruments and measures.

Rri ‘governance’ comprises multiple governance instruments, which have to be intentionally operating in an aligned manner, or co-created so that they mutually re-enforce each other and together perform more strongly as a system ‘steer’.

(9) Boundary objects: the effectiveness of instruments as boundary objects and of actors as boundary-crossing agents.

The idea of boundary object is useful to shed light on how different levels, networks, and instruments of rri/RRI governance appear to ‘knit’ together systemically, in practice. These are objects shared by different groups of researchers: such as research results, data, materials, specimens. Drawn upon by different research groups, these ‘objects’ can be interpreted differently by them. Yet, there can be a common enough core understanding to enable the two or more groups to coalesce and engage in conversation around the ‘shared’ object. From this perspective, the boundary object contributes to a form of system integration premised on loose and flexible couplings.

For the governance of rri, boundary objects thus are important to link different actor groups, to provide a common anchor for heterogeneous actors to enter into debate and de-

velop the basis for the necessary alignment to develop a mutually accepted understanding of the rri challenge. Therefore, a key message from this lesson is to understand and pay attention to boundary-objects (such as Codes, Roadmaps, training programmes) and thus the boundary crossing potential in rri/RRI governance processes. It is thus important to pay attention to the design of instruments and measures to guide and enable the actor-led integration of research and innovation systems to coalesce around broad principles of responsibility. This lesson connects both with Lesson 3 on intermediation and Lesson 13 on the important role of institutional entrepreneurs and leadership in the bottom-up activation and realisation of this process.

### **6.3.3 Lessons related to Actors, Agency and Institutionalisation processes.**

(10) Institutional Change: simultaneous institutionalisation and de-institutionalisation processes, organisational re-design and the creation of an rri/RRI culture.

Institutions are understood as stable patterns of social life such as rules and routines, as well as organisational forms. From this perspective, institutionalisation involves the stabilisation of patterns of behaviour, organisational structures (both inside organisations and between organisations) and processes and procedures into 'norms.' Institutional structures are hard to change. This means that processes of institutional change, i.e. the institutionalisation of new quasi rules and routines, ways of doing things, and organisational structures, must simultaneously involve processes of de-institutionalisation (or modification) of present persistent patterns.

The governance towards rri/RRI is a process that at the same time questions and challenges pre-existing understanding of what responsibility is, and how it has been embedded into practices. Rri/RRI is thus seen as the ongoing process of questioning current, established institutional patterns and norms – the 'status quo' or 'mainstream' - and struggles over the formulation of new guiding rules, routines and norms of practice and incentive structures. This is in particular the case in debates over future anticipated needs, values and well-being of society, and how to embed them into the cares and institutions of today.

In terms of shifting organisational cultures, the study shows that to overcome institutional patterns that are seen as non-compatible with new claims for responsibility organisations one should not create new, isolated separate organisational units, for example a sustainability or corporate social responsibility department. Rather, the broad institutionalisation of ideas of responsibility into the culture or 'DNA' of an organisation is supported through governance incentive mechanisms such as Key Performance Indicators (for multi-nationals) and through reducing organisational fragmentation to improve learning, adaptation and feed-back loops (in universities), thereby embedding particular normative goals and understandings of responsibility into all parts of the organisation.

(11) Capabilities: the systematic building of capabilities at the level of individuals, groups, and organisations enabling them to fully participate in rri/RRI transformation processes.

Capabilities-building is the practice to develop skills and competences to encourage and enable the formation of reflexive actors across the research and innovation spectrum, with the aim to increase the likelihood that reflexive actors are more likely to be normatively oriented to integrate societal responsiveness, integrative and boundary-crossing perspectives and futures oriented thinking, while familiar also with a suite of assessment and anticipatory methods. From this perspective, capabilities-building is a precondition for RRI as it enables actors to become fully contributing participants in responsible research and innovation processes.

(12) Capacities: the systematic and systemic building of resources at a societal level to enable rri/RRI to become part of a broader cultural shift

Capacity-building means ensuring that the resources (financial, organisational, and social and human capital) and the means (in terms of re-designing institutions and incentive structures) are present to create the conditions for responsabilisation processes. An overarching governance task then, is to build this collective capacity at the system-level to enable all actors to pro-actively participate in the normative goal to make research and innovation processes and product outcomes more responsive to societal cares (...) and more responsive and anticipative of potential downstream technology-society conflicts and crises that nevertheless cannot be, by their very nature, a-priori entirely anticipated nor entirely mitigated.

### ***(13) Institutional leadership and entrepreneurship***

This lesson is in essence about the enabling of key-actors, groups, organisations, and wider society to create spaces, resources, and support for values-driven institutional entrepreneurialism towards rri/RRI. This can be described at three levels: a) the key actors, or champions, of de-facto responsible research and innovation, who are critical in articulating 'visions' (see lesson 4) and in providing practical roadmaps and mobilising people, resources and financial capital to design and operationalise demonstration projects of their vision, i.e. translate normative goals of societal betterment into practical action; b) the critical middle-management in organisations; and c) the organisational culture itself, where an organisational culture of institutional entrepreneurialism involving the creation of a shared commitment to certain specified normative societal goals, involves mobilising this level also.

## **6.4 The lessons from discourse and practice as input for the framework**

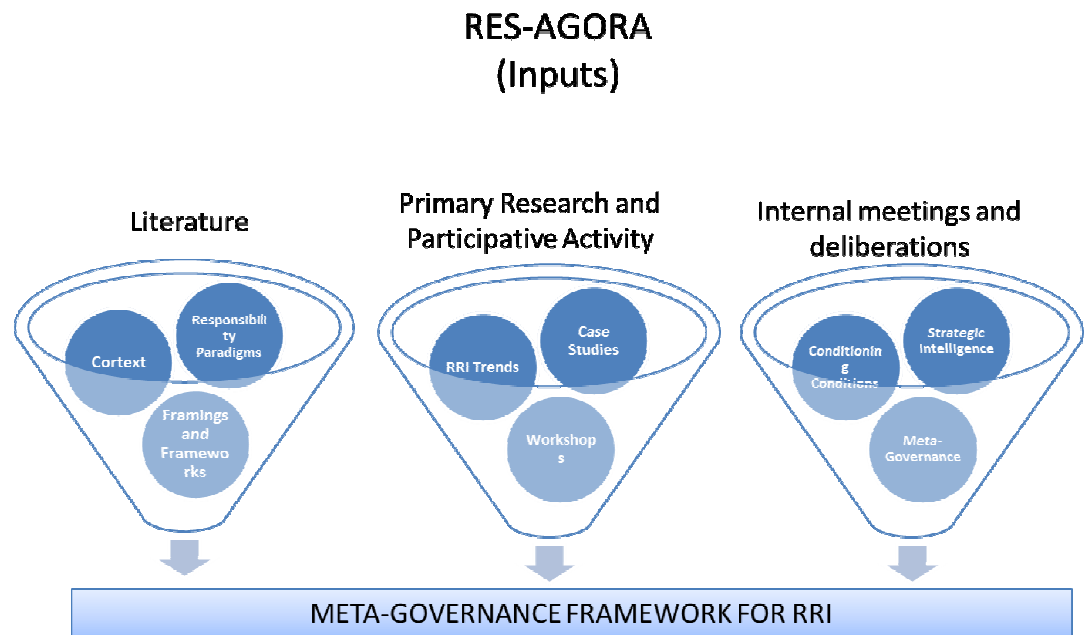
We have started this document with outlining our rationale and approach towards developing the Res-AGorA framework for RRI governance in chapter 1. An important design



question now is how the lessons from RRI ‘discourse’ and ‘practice’ discussed in this chapter, can substantiate the construction of the framework. This is a question about how we will synthesize and further develop our conceptual approach with the findings from our empirical program. Hence, this question will be addressed in the following ways:

- **Testing our assumptions and further conceptual underpinning:** a first conceptual starting point for our analysis has been that the governance of research and innovation, and thus of RRI, is distributed and heterogeneous. The lessons discussed in this chapter not only confirm this assumption, but also point to a number of challenges, together constituting a picture of what RRI governance is about.
- **Operationalizing the goal and character of the framework:** the second conceptual starting point relates to the question what we can do about it (i.e. RRI governance). We stated that the design and operation of governance mechanisms are socially constructed. Consequently, we have envisioned our framework as a thinking tool for strategic reflection on and constructive intervention in processes of (self-)governance. So, ‘we’ as Res-AGorA, aim for supporting ‘actors’ in crafting strategies for RRI governance. Here, the design question is about identifying who those actors are (target audiences) and designing the framework accordingly, but in relation to the *kind* of lessons we have to offer from our empirical findings and situated in the current rri/RRI landscape.
- **Developing the framework in a co-constructive way:** the framework presented in chapter 4 mainly builds on the input from three types of sources: a) literature, including the Responsibility Paradigms discussed in section 2.1, the ‘Cortex’ analysis (a historical observation and genealogies of sub-components of RRI as integrated through text using scientometrics, which is reported separately), and the Framings and Frameworks paper, which highlights six narratives of RRI (institutionalisation of historical emergence of ideas and discourses of RRI), b) primary research and participative activity, including the Case Studies discussed in section 2.3 (observing and learning from de facto rri, leading to transversal lessons, the identification of situations and fictive cases, and the synthesis of the voices of institutional entrepreneurs), the RRI Trends sub-project (differentiated organisational landscape of RRI in Member States and different levels of maturity of RRI as an integrated concept), which is reported separately, and a series of five workshops with stakeholders (technology controversy around fracking, technology controversy around GMOs, research funding, research performing, and research governance research and practice), where the framework was discussed and practically implying choices in what could be discussed there and what had to be added or re-arranged; and c) internal meeting/deliberations, which included defining the deductive original approach followed, the revision of literature and debates around the models of Distributed Strategic Intelligence (principles and requirements), of conditioning conditions, of governance failure, and of meta-governance, that is, of governance of governance, among other key debatable topics on which consensus was not always easy. The following figure summarizes the inputs used:

Figure 1: Inputs to the Res-Agora Governance Framework building process



Some of these entry points for designing the framework are discussed in the next chapter.

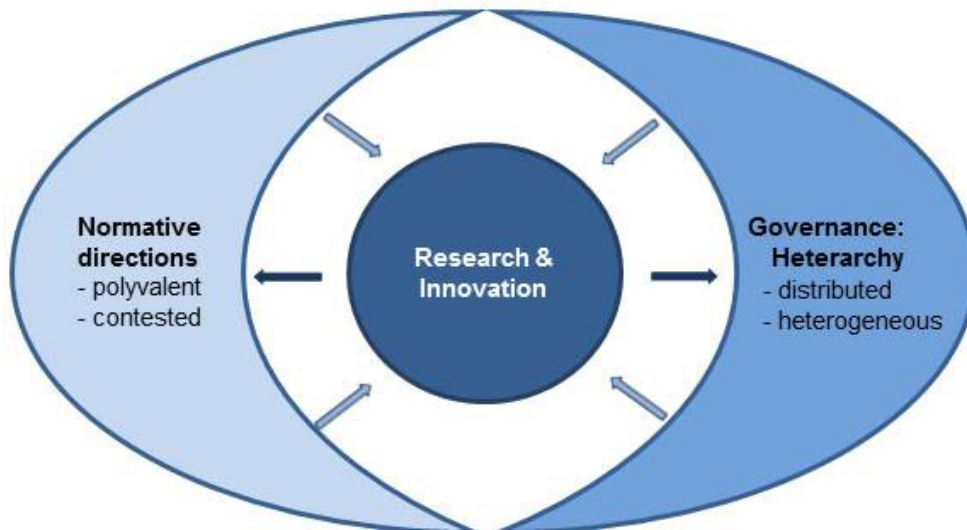
## 7. A meta-governance approach to navigating RRI

In this chapter we situate the governance of RRI within the governance of R&I: both conceptually and as explored through our case studies (section 3.1). Next we proceed with operationalising the idea of developing a governance framework that can be used for strategic reflection on, and strategizing action towards. RRI governance (section 3.2). Finally, we discuss what have been the particular design choices in the project: a framework discussed in the series of stakeholder workshops (section 3.3). The framework is discussed in chapter 4.

### 7.1 The lessons in meta-governance perspective

The lessons from our case studies have illustrated that research and innovation are governed by varieties of co-existing and partly overlapping (if not contradicting) governance arrangements ('heterarchy') and are driven by different actors' normative orientations ('poly-valent valuation'), visualised in the figure below. This is the situation in which RRI currently is being articulated (in various ways) and which it is supposed to transform.

Figure 2: de facto governance of Research & Innovation



### 7.1.1 Governance failure and meta-governance

The notion of ‘heterarchy’ points to the feature of RRI governance being an issue of multiple regulatory instruments (e.g. hard and soft regulation); across various R&I fields and national settings, involving a variety of organised actors (such as science organisations, industries, governmental agencies and intermediaries, parliaments, non-governmental organisations) with different interests, resources and power, who argue and negotiate in various inter-linked arenas on all kinds of rules and policy instruments.

An important lesson to be taken from scholarly literature on governance is that in such a complex and dynamic setting, every mode of governance will be sub-optimal or fail. For example, governance failure resulting from inappropriate or failed responses to ‘market failure’ (economic inefficiencies as the one evidenced with the financial crisis of 2008), ‘government failure’ (bureaucratic ineffectiveness as shown by the 9/11 terrorist attack, or ‘noise’ as the WikiLeaks scandal), legitimacy crisis in representative democracies, and social complexity, all support the claim for the need for meta-governance frameworks acknowledging the **heterarchical structure** of social systems, to draw on and facilitate self-organization or self-governance of actors concerned at the ‘micro’-level. The European research and innovation is such a system.

Jessop (2002) argues that a self-reflexive self-organization of substantively interdependent but formally independent actors is the mode of governance less prone to failure as it takes into account the complexity of the social world. Self-organisation, the author claims, would draw on *“continuing dialogue and resource-sharing to develop mutually beneficial new*

*joint projects and to manage the contradictions and dilemmas inevitably involved in such situations*”, where consensual dialogue and coordination between independent actors involved in complex reciprocal interdependence via partnerships, networking, consultation, negotiation, subsidiarity, etc. would guaranty not only achieving collective goals but also protecting associated social values (Jessop, 2002: 52).<sup>8</sup>

The significance of this take on governance of RRI is that it makes us aware of important features when it comes to involving a wide range of ‘stakeholders’ in attempts at governance and, in particular, in the definition of the objects of governance, as – insofar as governance practices help to constitute these objects – it will also lead to the transformation of the social world that is being governed. Similar to Jessop’s take on meta-governance as “organising the conditions for governance” (Jessop, 2002: 242) we will give the analysis of our findings from *de facto* governance of RRI a strategic twist and start to identify the dimensions in our lessons from RRI discourse and practice relevant for building on and constructively intervening in the governance of research and innovation and processes of ‘RRI in the making’.

### 7.1.2 Identifying meta-governance dimensions

A first dimension, in the conceptualisation of Jessop as well as in the list of lessons, is **interaction**, in dialogue as well as in resource sharing. Crucially for this dimension is that the governance framework should not neglect or try to downplay the contested nature of the ethical, social, cultural, economic relevance of research and innovation, quite the opposite: it should start from the polyvalent character of modern societies’ perceptions of the options and desirable directions of research and innovation (Nowotny & Testa 2010). This dimension also corresponds to our starting point of the collective, and hence contested and dynamic nature of RRI. A first ‘meta-governance dimension’ thus is about the qualities of interactions, allowing for contestation and facilitating deliberation in problem appraisal (sense making) and problem solving (decision making). Relevant lessons for this dimension are lessons 2 (Inclusion), lesson 3 (Mediation) and lesson 5 (Robust knowledge).

Tensions in RRI governance do, however, not only arise from different stakes, preferences, perspective, etc., but also from the distributed and heterogeneous nature of RRI governance. This is clearly illustrated by the lesson 7 (Multi-level governance), lesson 8 (Alignment of governance measures and instruments), and lesson 9 (Boundary Objects). These lessons can be read as complementary and mutually reinforcing. In fact all three speak to the wider finding which stresses that governance towards rri/RRI is more effective when it realises the integrative potential of the rri process itself. **Integration**, both between levels of governance and

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<sup>8</sup> Jessop (2002) distinguishes between the governance modes of a) market exchange, where free interaction between independent profit-maximizing actors is expected to act as an invisible hand providing the conditions necessary for progress; b) hierarchical command, where imperative top-down actions is assumed to assure coordination between actors toward a defined goal; and c) reflexive self-organization, which is the one we elaborate upon in this paper. According to the author, governance failures are outcomes highly probable and sometimes inevitable (as history has proven) to result due to the sheer nature of capitalism, to a problematic governance fit into a complex state system, and/or to coordination problems at the interpersonal, inter-organisational and inter-systemic levels.

across constituencies of actor in terms of standardisation, coherence and commensurability, is needed to be effective in creating a sufficiently stable and accepted governance system of mutually compatible instruments which give a common directionality. Therefore we identify 'positioning and alignment' as a second meta-governance dimension.

Lesson 6 (Timing) points to the interrelatedness of these first two dimensions. On the one hand, governance instruments and mechanisms structure the interaction captured by the first dimension and hence influence the ability to accommodate integration as well as counter pressures for autonomy, differentiation and flexibility, modifying responsibility responses to new or alternative societal cares or concerns, or political, economic and technological contexts. On the other hand, it is through these interactions that the quality of integration is dependent on the ability to account for changes over time, for example in costs and appropriateness of governance instruments. This interrelatedness is well captured by Lesson 4 (Anticipation and Learning) and Lesson 9 (Boundary objects). As such, it does not constitute a meta-governance dimension similar to the first two dimensions, but it sensitizes to the **interplay between pursuing goals for RRI governance strategies**, such as 'responsibilisation' and 'deep institutionalization' (lesson 1), and the **need for continuous learning**.

Finally, whereas the first two meta-governance dimensions capture RRI governance dynamics relevant to a particular concern, technology or activity; lesson 10 (Institutional change), lesson 11 (Capabilities), lesson 12 (Capacities) and lesson 13 (Institutional leadership and entrepreneurship) constitute a cross-cutting dimension of **institutional processes**, carrying important conditions to bring about change in terms of the first two dimensions.

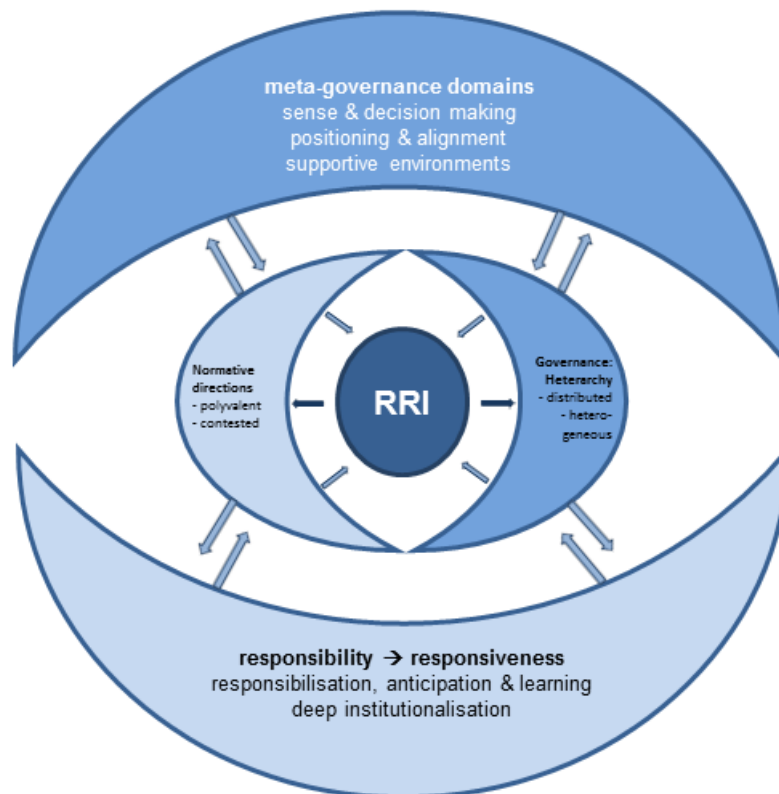
### 7.1.3 RRI governance in a meta-governance frame

In definitions of RRI, 'responsible' is often understood virtuously, emphasizing proactively taking care for the future rather than being concerned with accountability or liability for impacts in the past or present. Closely related, responsibility ascriptions highlight collective and participative aspects. These are typically conditioned by the features now listed under the 'institutional processes'.

However, as discussed in chapter 2, such new ascriptions of responsibility do not replace older ones, but come on top of these. The importance of discerning the different (but overlapping) responsibility paradigms is that they are being enforced with different regulatory mechanisms (hard and soft regulation or combinations). Individuals' readiness to comply with rules is not sufficient: the historical and ethical evolution and broadening of responsibility demands ('responsibilisation') comes along with a broadening of social arrangements involved, from individuals to organisations and systems and related interactions and procedures. So, 'responsibilisation' is also triggered through processes of interaction (the first dimension) and structured by the interplay between governance arrangements (the second dimension). Soft regulatory instruments for instance, including participative events, can serve the goal of supporting responsible social arrangements, but are in itself no guarantee for accomplishing responsive attitudes and actions. For that, the interaction with other governance instruments

and arrangements shaping research and innovation paths (e.g. think of costs and competition in relation to legal requirements), as well as institutional capacities have to be taken into account. Therefore, discerning the different nature of the ‘institutional processes’ dimension from the ‘governance processes’ dimensions, also enables to discern between the overarching RRI governance goals of ‘responsibilisation’ and ‘deep institutionalization’. We have visualised the resulting meta-governance architecture in the figure below:

**Figure 3: meta-governance of Research & Innovation**



## 7.2 Strategic reflection as a meta-governance tool

For whom would our meta-governance approach be useful and in what way? In Res-AGorA Deliverable D2.4 (Nielsen & Bedsted 2014) we have discussed typical activities such as setting priorities, defining policies, and developing evaluation and assessment tools. The actors involved in such tasks play a crucial role in mediating between levels of the innovation system by bringing together different actors and different interests as well as defining the framing for the practical implementation of governance instruments. Hence, these actors can be in the position to work as change agents, or institutional entrepreneurs.

For those actors the Res-AGorA framework can offer **support for reflecting on and intervening in RRI governance**. Addressing the key dimensions and challenges in RRI govern-

ance, as identified in the meta-governance frame, works as a means of **'strategic intelligence'**<sup>9</sup>: supporting actors in reflecting on their own position and abilities, as well as those of others, considering the dynamic interplay between (RRI) governance arrangements, the way actors are (not) involved in sense and decision making and institutional processes and conditions.

As stated in the beginning, our framework thus is not meant to define normative goals for RRI, such as addressing societal challenges, ensuring safety, promoting equity, etc. Instead, the Res-AGorA framework is about finding legitimate, accepted arrangements with other actors to deliberate and negotiate about such goals for RRI, to better align governance mechanisms and to bring about institutional transformation. In this way, our framework can also be used to devise governance strategies for RRI definitions and frameworks developed elsewhere.

The list of target audiences for our framework specified in Deliverable D2.4 covers intergovernmental organisations, policymakers, research funding organisation, research performers, export bodies and advocacy groups. On the one hand, our meta-governance approach speaks to all, as it builds on the collective nature of RRI governance and the challenges therein. That's why we aim for supporting actors not only to reflect on their own position and abilities, but also on those of others and how these work together in specific contexts. On the other hand, actors in above categories have different roles and will have different needs. Consequently, we will have to make choices in whether and how to tailor the final output of the Res-AGorA project. The next section discusses the design choices we made in light of preparing for the stakeholder workshops in Res-AGorA.

The implication for the framework design to be considered here is how to retain the reflexive function of our meta-governance approach while making it more specific and 'guiding' for actors to use the Res-AGorA framework. In Deliverable D2.4 we have identified three levels: analytical, strategic and procedural. The meta-governance frame discussed in the previous section is formulated at the analytical level. The framework presented in chapter 4 is formulated at the strategic level. Making the framework useful for different target audiences is however not only a matter of tailoring the procedural level. One consideration is that the strategic level is relevant for all individuals as well as organisations acting as **'change agents'**, while the analytical level is as much relevant for actors working as **'system builders'**, especially those actively operating in the RRI landscape. For example, for policy makers the three levels may function as levels of 'strategic orientation', 'programming' and 'performance'. Another consideration is that 'illustration' is maybe more helpful than 'specification' to retain the reflexive character of the framework. In this context we have been considering to use the Res-AGorA empirical program as a **repository of cases and lessons** illustrating the relevance of framework components in specific contexts.

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<sup>9</sup> Kuhlmann et al. (1999) defined strategic intelligence as "a set of – often distributed – sources of information and explorative as well as analytical (theoretical, heuristic, methodological) tools employed to produce 'multi-perspective' insight in the actual or potential costs and effects of public or private policy and management."

To sum up: in working towards the final output of the Res-AGorA project we will have to make design choices with regard to delivering the framework in a way it can provide practical guidance while maintaining reflexivity towards the complex and dynamic character of RRI governance (how for example the three dimensions are interrelated) and the long term perspective needed for bringing about transformation at a level of cultural change.

### 7.3 Design choices for the framework

Building on the idea of ‘strategic intelligence’ we have designed the framework as a collection of principles and requirements guiding strategic reflection. The rationale for this approach has already been stated in that RRI governance is characterized by processes of reflexive (self) organization. For guiding strategic reflection on these processes the principles are organised by the three dimensions as identified in section 3.1: social/political interaction, interplay of governance mechanisms and individual and institutional formation. We have ‘filled’ the dimensions of our governance framework with guiding principles derived from linking our conceptual starting points with the transversal lessons derived from the case studies, the meaning and relevance of the overarching lesson of responsabilisation and deep institutionalisation is as much dependent on how we can situate these in the current RRI discourse. We have made a start with that by the analysis of the responsibility paradigms in relation to governance, and was then taken up further with findings from the CorTexT analysis, the RRI Trends program (work package 5) and conclusions drawn from the series of stakeholder workshops.

Language and phrasing are part of the design choices as well. For the workshops, the phrasing of the goal of the framework and its principles have been presented in a more communicative style than the text presented in the next chapter, which conceptually stays closer to the meta-governance frame of section 3.1. We have conceptualized our approach and conducted our empirical studies mainly in a European context. Therefore we have assumed RRI governance to be working in the context of working constitutional democracies. This has been reflected in the framework by adding ‘democratic standards’ as a meta-condition.

## 8. Navigating RRI: a framework for RRI governance

Building on our meta-governance frame we have organized the framework with the three dimensions discussed in section 3.1. The first dimension is about how actors **interact**. The second is about how **governance mechanisms structure action and interaction**. The third relates to how **individual and institutional formation** can support the collective ability to direct and shape research and innovation responsibly. For each of these dimensions guiding principles describe key properties, or functions, of RRI governance that have to be fulfilled.



## 8.1 Principles and Requirements related with Sense & Decision Making

1. **Inclusion:** RRI governance is game-changing and its mechanisms are more likely to be transformative if they include the diversity of actors relevant to the problem or project at hand, in a way that engages them directly and effectively in debate or joint activities, where they perceive that their material interests and core values have been taken into account (multiple perspectives perspective, where well implemented processes avoid maintaining one unequivocal 'truth' up-front about a given project or activity, but rather the result of deliberation among motivated stakeholders). In fact, given the polyvalent and contested character of 'responsible' research and innovation, in many cases, no consensus will be achieved ('output legitimacy') – even more so 'input legitimacy' is indispensable. For example, a governance framework may lead to a resolution that actors do not see as mutually beneficial; they keep a different understanding of what responsible is and feel that the outcome is not beneficial for them<sup>10</sup>. Therefore, some of the actors involved will – especially with high level of contestation and material interest involved – not entirely endorse certain outcomes (e.g. certain hard regulations at the end of broad participatory processes). As Mayntz (2010) claims, in heterogeneous societies the "... very difficulty of defining what constitutes a legitimating output (...) emphasizes the importance of input legitimacy" (Mayntz 2010, p. 11). And as Borrás & Edler (2014) claim, even "if outputs are supported by majorities, the ability of the minority to accept that output still rests on the perception that the processes that defined the outcome was participative, open and transparent" (Borrás & Edler, 2014). This requires therefore that actors have an understanding of the problem and the governance instruments under discussion and perceive the processes of sense and decision making as legitimate, transparent and trustworthy. Guiding questions to follow this principle are: a) are all relevant actors being included/considered in the debates? b) Are all the included actors relevant and able to make effective contributions to the debates? The principle of inclusion therefore comes with two additional principles:

2. **Moderation:** while immediate interactions between actors are not always reasonable or feasible, appropriate organizational modes will be needed in the form of 'fora', that is, institutionalized places of interaction able not only to allow for diversity and the visibilisation of alternative views but also to 'bridge' different perspectives between contesting actors, after which some alignment of goals and procedures among the **parties** is expected. In cases of geographical or epistemological distance between discourses or interests of contesting (conflicting) actors, moderating processes can build trust, collect data and organize dialogue, enabling inclusion to be constructive, where related claims are taken seriously in R&I organisations, not just providing lip service to responsabilisation, as this is determinant for trust building. Allegedly, mutual learning about the perspectives of competing actors and their interest backgrounds could ease negotiation and alignment of views and practices towards RRI. Guiding

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<sup>10</sup> E.g. enforced access to licences (instead of voluntary agreements or negotiated patent pools or even traditional IP) in cases of neglected diseases, industry argues that if you do it, you lose jobs in Europe, this is as irresponsible as not opening up for those diseases, they will keep that view no matter how good the process was to get there. But they might have to accept the process when done "well", e.g. following a normative governance framework.

questions include: a) are the adequate moderation mechanisms being put in place? b) Are they perceived legitimate by the actors involved?

3. **Deliberation:** the deliberative quality of sense-making and decision-making is of paramount importance for the governance of RRI. This principle is closely related to two aspects: 1) Knowledge claims, which themselves are subject to negotiation and improvement (therefore, expressing the complexities, uncertainties and ambiguities involved can add to a robust knowledge base), and 2) Multiplicity of perspectives and positions, not only between organisational actors, but also faced by individual actors. Highlighting the different perspectives coming perhaps from various 'knowledges' helps to find synthesis and eventually compromise. Guiding questions include: a) are key substantive and procedural issues being discussed? b) Are the discussions leading to some level of consensus?

## 8.2 Principles and Requirements related with Positioning & Alignment

4. **Modularity and flexibility:** Legitimate and effective RRI governance will rest on carefully combining 'hard' and 'soft' regulatory mechanisms. This will allow for embedding processes of self-regulation and organisation properly in hierarchical systems of external control and accountability structures (e.g. supervision), up to political checks and balances. However, it will also concern the alignment of horizontally co-existing, if not competing or conflicting, governance arrangements, where flexibility of governance arrangements should not lead to arbitrariness. Guiding questions include: a) are the appropriate tools for RRI governance being used, b) how difficult are they to implement?, c) are there enough financial sources to support their implementation jointly or independently?, d) are the appropriate organizational conditions in place to implement them?, e) would they lead to the expected end goal as agreed based on issues involved? And f) are they easy to understand by the stakeholders involved?

5. **Subsidiarity:** while both hard and soft regulatory governance instruments build on overarching legal frameworks (e.g. European directives, but also national constitutions and higher level frameworks), subsidiarity requires a proper calibration of what is actually being regulated at various levels and how this will be mutually enforcing, where both bottom-up and top-down RRI governance approaches should be balanced attuned with the specific situation. Hence, complementary to the self-governance and the self-control expected from the integration of mutually constructed understanding of RRI values, some level of hierarchical command-and-control process is necessary in certain circumstances, performed mainly by formally independent actors, for which a built capacity is required as means of oversight and enforcement, which includes primarily a variation of soft and hard pressures like requiring transparency about RI governance practices, naming and shaming, secondarily sanctions, and accountability, among other. In this context, external authority should have a subsidiary (that is, a supporting, rather than a subordinate) function, performing only those tasks which cannot be performed effectively at a more immediate or local level. Guiding questions involve: a) do the mechanisms address the main concerns? b) are there immediate capabilities and technical know-how to implement them?, and c) are there appropriate internal or external capacities to support or enforce agreements ex-ante, during, or ex-post decision-making, performance and outcomes resulting from R&I?

6. **Adaptability:** RRI governance should be able to reflect different historical development of R&I systems. Therefore, such calibration will also be needed by political mechanisms, assessing whether governance arrangements still effectively and legitimately serve RRI goals, where both goals and costs and consequences of governance instruments and arrangements change over time. A way to facilitate adaptability vis-a-vis changing conditions and to cope with risk, the implementation of strategic intelligence mechanisms and measures put in place should be assessed regularly. Guiding questions include: a) Is the current understanding of the governance challenges still valid despite changes in the context and conditions?, b) if the supporting assumptions and mechanisms fail can we replace them without major problems?, c) what (positive and negative) non-intended effects may result from their implementation?, and d) how could they affect the current distribution of burdens and benefits among the stakeholders involved?

### 8.3 Principles and Requirements related with Developing Supportive Environments:

7. **Capabilities:** since research and innovation, and their assessment, are performed in human and social practices in the end, fostering RRI will crucially depend on the formation of reflexive individuals capable of recognizing, anticipating, communicating and pursuing collective manner societally desired processes and outcomes of research and innovation activities and their governance. The multifaceted nature of RRI governance specifically requires deliberative skills, vision and strategy, that is, a certain level of 'governance literacy' particularly important for next generation of researchers, programme managers, policymakers and members of civil society organisations, where new concepts of 'excellence' involving RRI-related values are determinant. This requires training as well as learning and 'un-learning' in practice. In fact, capabilities' building is a pre-condition for the existence of contestatory democracies and RRI governance requires independent actors able to interact, partner, network, monitor and oversee in a system characterized by creative corporatism and heterarchy, which needs to improve the reflexive self-organization definition of RRI. Guiding questions therefore imply: a) are there the necessary individual capabilities to achieve the intended goals related with RRI processes and outcomes? b) If not, how can they be developed?

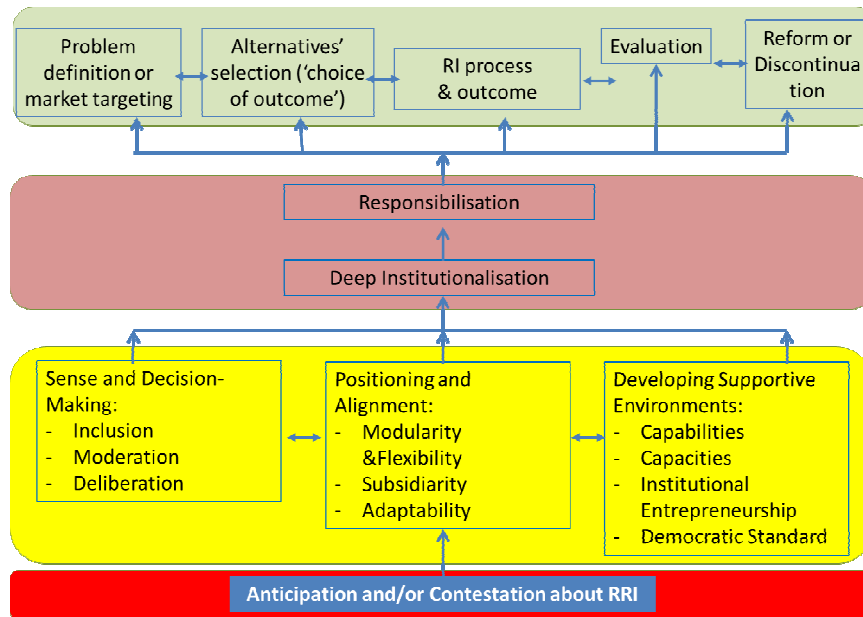
8. **Capacities:** for individual capabilities to unfold and express themselves, they need a supportive organisational and network infrastructure, such as access to information and resources for participation. Moreover, reflexivity and deliberation evolve in mutual interaction. This requires the availability of spaces for reflection, interaction and negotiation, appropriate incentive structures and an interoperable knowledge base, where the sharing of good practices is facilitated. While naturally the knowledge base to a problem or project will be scattered over evidence, assessments and framings by different actors, interoperability not only is needed for access, but also for explicating complexities, uncertainties and ambiguities, as mentioned under principle 3. Similarly to individual capabilities, systems' capacities involve answering guiding questions such as: a) are there the necessary systems' capacities to achieve the intended goals related with RRI processes and outcomes? b) If not, how can they be developed in a viable way?

**9. Institutional entrepreneurship:** both capability building and capacity building are not one-off activities but need leadership, continuous support, vision and strategy in order to facilitate collective learning, anticipation and change, which often takes much effort and debate to accomplish. Without the appropriate top-level political support, willingness, lobby work and the rewarding of institutional change, capability and capacity building supporting constructive sense making and decision making will easily turn into a chicken-or-egg problem. A key guiding question involve: are there the appropriate institutional conditions and leadership necessary to be played credibly by 'change agents' willing and able to transform status quo?

**10. Culture of transparency and tolerance:** Likewise, vigilance of equality, inclusiveness and the rule of law, and the ability to invoke legal or political means, are necessary conditions for fostering RRI at the different organizational settings. This is a key requirement in recognition of the de facto 'heterarchic' nature of research and innovation governance as highlighted above. In fact, only democratic values as the ones discussed here would make RRI effective and sustained overtime, where strategic/political leverage means, pertaining only to pluralistic societies that follow democratic standards, would allow enacting the RRI governance principles, of course not assuming that all aspects are 'within reach', but supporting the free ability to think about positions as well as those of others in deliberative and argumentative scenarios, would be a reflection of actors empowered by the appropriate institutional culture. A basic guiding question in this respect is: to what extend the governance mechanisms reflect a commitment to democratic principles and allows actions under the rule of law?

The following is a graphical representation of the ways the aforementioned set of principles and requirements contributes to improve research and innovation performed in a 'responsible' way, acknowledging a bottom-up process, where based on the existence of concerns and claims, current or foreseeable, with respect to responsible research and innovation, the governance principles are expected to improve responsabilisation as long as the application of the framework actively affect institutional and cultural change ('deep institutionalisation'). Only then research and innovation performance, in terms of research or innovation problem definition; alternative's selection (which in a way implies a selection of potential outcomes); research and innovation itself; and evaluation and revision and assessment (and potentially termination) are decided.

**Figure 4: Logic Model of the Res-Agora Governance Framework**



In the next section, we show how the Res-Agora framework translates into an RRI Navigator tool. We present this following a basic Q&A approach to facilitate reader's understanding of its specificities in a friendly and straightforward manner.

## 9. The RRI Navigator© - Why, what, how?

Research and innovation organizations need to be managed to achieve more 'responsible' work and products. The **RRI Navigator** (Res-AGorA) helps decision-makers to govern such organizations towards more conscious 'responsibility'. What is responsible will always be defined differently by different actor groups in research, innovation, and society – the **RRI Navigator** is designed to facilitate related debate, negotiation and learning in a constructive and productive way. The **RRI Navigator** supports identification, development and implementation of measures and procedures transforming research and innovation organizations in a way that responsibility becomes an institutionalized ambition.

**Q:** Why does Europe need a RRI Governance Framework? In fact, why is RRI important? Who would find value in a 'governance framework'?

**A:** Research and Innovation activities and outputs are under increasing public and political scrutiny. In response to this phenomenon, Responsible Research and Innovation (RRI) has become a relatively new concept implying the performance in ways –and/or obtaining results –that are socially and ethically acceptable. Since what is 'acceptable' is in fact a highly subjective judgement, policymakers and programme managers in Europe need to make sure

that researchers and innovators perform in ways (and/or obtain results) that meet the expectations of their stakeholders based on commonly constructed and agreed definitions and criteria as to what RRI is and what is not. This is done, basically departing from common understandings by policymakers and programme managers of the implications of such a challenge, as well as by following a set of principles and requirements, that is, following a governance framework to better 'navigate' towards RRI. We call this the 'Res-Agora' Governance Framework for RRI, and It is expected that by following it, research and innovation performed in Europe will effectively contribute to well-being in the area and beyond.

Q: What are its target groups? Who is expected to use it? How?

A: The Res-Agora Governance Framework points at several target groups, who may play one or several of the following roles: a) those who lead research and innovation organization and procedures towards more responsiveness and accountability to each participant and to society as a whole; b) those setting priorities, defining policies, and developing evaluation and assessment tools; and c) those who mediate between levels of the innovation system by bringing together different actors and different interests as well as defining the practical implementation of governance instruments. We call these actors 'change agents,' who are motivated and able to work as 'institutional entrepreneurs' seeking to lead research and innovation performed in Europe to be more responsive. These actors typically work at research funding organizations, boards of universities or of companies, or at professional organizations. The Res-Agora Governance Framework can therefore offer them support and guidance for reflecting on and intervening in RRI governance, who would have to facilitate collective definitions of RRI goals and of monitoring criteria, and implement appropriate instruments and governance arrangements.

At a second level/type of users, and building on the collective nature of RRI governance and the challenges therein, the Res-Agora Governance Framework should also inspire institutional actors such as intergovernmental organisations, research performers, export bodies and advocacy groups, and particularly those operating at the analytical level, the strategic level or the procedural level who are responsible for strategic orientation, programming or performance of activities related with R&I.

We therefore envision our framework to be used by actors facing dilemmas and complex situations challenging the governance of RRI and wanting to reflect strategically on their own position as well as those of others in navigating research and innovation towards RRI ambitions. Since actors categories vary and involve people and organisations with different roles and different needs, they will have to make choices in whether and how to tailor the Res-AGorA governance framework based on specific contexts.

Q: What are its positive and negative effects and wider impacts for each user groups (industry, CSOs, public administration, etc.)?

A: Pending.

Q: How was the framework developed?

A: The Res-Agora Governance Framework builds on the collective understanding of the project team of a) preliminary ideas and logic models found associated with research and innovation governance characteristics and determinants, b) existing de facto RRI governance arrangements, including activities such as Corporate Social Responsibility (CSR) schemes, societal mission oriented research funding practices, citizen science initiatives, ethical review or safety regulation, Technology Assessment, etc., and c) debates resulting from structured conversations and workshops with relevant stakeholders.

Q: How is this framework related with other governance mechanisms (law, guidelines, CSR, etc.) and existing RRI instruments (public engagement activities, Technology Assessment, Risk Assessment, etc.). Moreover, how different is it from other types of R&I governance initiatives? Why should target users use this framework instead of other existing instruments? What is unique of it?

A: The Res-Agora project proposes the current framework as a ‘thinking tool’ not only intended to make individuals, organizations and institutional systems more responsive towards societal needs and preferences, but also to make existing and new governance instruments and arrangements really integrative, allowing and encouraging contestation, learning, experimentation and, ultimately, institutional transformation at a systemic level, allowing RRI to emerge from a constructive, bottom-up perspective. The key to the Res-Agora project approach lies therefore in the reflexive, self-organised and collective nature of RRI, where governance dynamics are shaped by specific instruments and arrangements, and where the design and operation of all instruments (even the formulation and operation of hard law) are in fact not a given, but actively constructed through processes of problem framing (appraisal), coordination and negotiation. In this context, what is judged responsible and for what, is part of these interactions, where the governance of RRI takes place in processes of sense making and decision making in a collective way.

However, it is important to keep in mind that if the proposed RRI governance framework is to make a difference, the resulting actor strategies have to aim for effectively transforming present day practices of research and innovation towards ‘responsibilisation’. Given that there will always be multiple goals for RRI (from safety and sustainability to inclusiveness and responsiveness) as well as different instruments to promote it (from professional training and education, design principles, stakeholder and public dialogue to regulation by voluntary codes as well as hard law), the framework aims at facilitating strategic reflection on how goals and instruments interact and play out at different levels and contexts, in turn facilitating constructive interventions in de facto rri governance arrangements and challenges.

These processes involve, we claim, effective transformation towards a set of articulated normative goals embedding values into practices and processes and orienting action towards those goals. We call this ‘deep institutionalisation’ of responsible research and innovation, which represents in practice a process of cultural change.





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