Responsible Research and Innovation

Economies of worth and situations of dissonance in the case of a new policy concept

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Abstract

The notion of 'Responsible Research and Innovation' (RRI) has within the space of a few years gained increasing momentum in research and innovation policy discourse. This thesis looks into the case of the European Union, where the policy concept has gained particular traction. The role of documents is significant to the functioning of bureaucratic institutions, actively partaking in the assembling of policy agendas and initiatives. In inquiring into the case of the European Union, this thesis uses document analysis as method. This is done by a 'methodological situationalism', combining resources from Science and Technology Studies (STS) and the multidisciplinary field of valuation studies.

The interest of this thesis is twofold. Firstly, it explores how RRI materialised in research and innovation policy by inquiring into the situations conditioning its emergence. Two situations are here considered. The first is one unfolding within the EU, concerned with assembling a 'knowledge-based economy' driven by research and innovation and of directing research and innovation toward tackling societal challenges. The second is one of decades of research on the science-society relation, unfolding particularly within the field of STS. The thesis finds that the emergence of RRI in EU policy can be understood as enabled by the interactions and overlap of these two discourses, creating a particular situation in which it could materialise as a relevant and desirable policy object.

Secondly, this thesis explores how the RRI framework enables new valuation practices in research and innovation. This follows John Dewey's pragmatic turn in approaching value(s), as qualities necessarily enacted or performed. The valuation literature is here drawn upon, particularly the concepts and tools of Luc Boltanski, Laurent Thévenot and David Stark. Valuation practices are approached by identifying two 'orders of worth' in action in the documents – a civic order and a market order – each with distinctive evaluative principles for assessing worth. The tensions arising as different and possibly incommensurable evaluative criteria coexist in the same situation are addressed, inquiring into the potentials for 'dissonance'. The thesis finds that albeit conflicts due to such value system overlaps, there are potentials for fruitful and productive 'recombinations' in their interaction.

Acknowledgements

This is a thesis concerned with questions of value and, more specifically, how something comes into being as valuable. After countless hours spent in study halls, the writing of this thesis has on more than one occasions confronted me with questions of value. What is it worth? And ultimately; is it worth it? Approaching the finish line and looking back, I am left without doubt. The process of writing this thesis has been both challenging and rewarding, and I am grateful for having had the opportunity to immerse myself completely in the project.

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List of abbreviations

CEU	Council of the European Union
CIP	The Competitiveness and Innovation Framework Programme (2007-2013)
DG R&I	Directorate-General for Research and Innovation at the European Commission
DG RTD	Directorate-General for Research and Technology Development at the European Commission (known as DG R&I since 2011)
EC	European Commission
ERA	European Research Area
EU	European Union
FP	Framework Programme for Research and Innovation (2014-2020), or for Research and Technological Development (1984-2013)
RRI	Responsible Research and Innovation
SaS	Science and Society Programme under the 6th FP
SiS	Science in Society Programme under the 7th FP
STS	Science and Technology Studies
SwafS	Science with and for Society Programme under the 8th FP (Horizon 2020)
WP	Work Programme

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1 Introduction

1.1 The case of RRI and the European Union

Within the space of a few years, the notion of 'Responsible Research and Innovation' (RRI) has gained increasing momentum in the research and innovation policy discourse, gaining particular traction within the European Union. Since the European Commission's initial statements indicating its significance, the notion of RRI has evolved into the centrepiece of workshops and high-level conferences, expert reports (van den Hoven et al., 2013; Strand et al., 2015) and declarations (Rome Declaration, 2014), informational brochures (EC, 2012a; 2014a), edited volumes (Owen et al., 2013; van den Hoven et al., 2015; Koops et al., 2015) and a triannual journal dedicated entirely to the issue (Guston et al., 2014). As the policy concept has now been implemented as a so-called 'cross-cutting issue' of the European Commission's 8th Framework Programme for Research and Innovation, Horizon 2020 (2014-2020), one could safely assume the notion to be of some significance to present-day research and innovation policy.

In documents dedicated to the issue, RRI is presented as a framework developed to ensure the societal desirability of research and innovation, by aligning it with the ambitions, values and aspirations of European citizens (EC, 2012a). The framework places multi-actor and public engagement at its heart, as a means to foster "more societally relevant, desirable, and creative research and innovation actions and policy agenda" (EC, 2014a). The documents read that RRI means that "societal actors work together during the whole research and innovation process in order to better align both the process and its outcomes with the values, needs and expectations of European society" (EC, 2012a; 2014a). It is this new policy framework for ensuring more societally relevant, desirable, and creative research and innovation which is of interest in this thesis.

As the discourse has gained momentum, so have different versions of the RRI framework been adopted at national levels, e.g. under the respective research councils of the UK, the Netherlands and Norway. This thesis is concerned with one particular version of the RRI framework, namely that assembled at the level of the European Union. The starting point of

this thesis is a curiosity as to how the materialisation of the policy concept can be understood, as one seemingly catapulting from a nebulous phrase to a cross-cutting issue of the world's largest funding programme for research and innovation. As a programme committed to allocate a total of €80 billion within the space of seven years, the Horizon 2020 prioritisations have considerable impact on the research and innovation agenda in Europe. Implementing a new policy framework as a cross-cutting issue will therefore necessarily transform agendas, calls, proposals and projects in response. Consequently, the policy concept is being discussed extensively both at policy levels and in academic circles.

As the notion of RRI over the last few years has become an increasingly important term in research and innovation policy narratives, so has the academic literature on the issue grown in response. The concept is perhaps particularly discussed within the field of Science and Technology Studies (STS), in which this thesis is also positioned. In reviewing its academic representations, Ribeiro *et al.* find that despite its rise in prominence, the meaning and application of the concept is often loosely articulated, bearing similarities to what may be characterised as a 'buzzword' (2017:82). A commonality of the literature to date is exactly such emphasis on the ambiguities as to how exactly the concept is to be defined and what it may involve in practice (e.g. Owen et al., 2012; von Schomberg, 2013). In the words of Ribeiro *et al.*, we seem to be at a point in which a currently "complex and ill-defined concept" is being "debated and actively co-constructed by a multitude of actors inside and outside academia" (2017:95). The ambiguity surrounding the nascent policy concept makes for an interesting object of inquiry, and is a field this thesis seeks to contribute to.

In this thesis, I follow my initial curiosity as to how the RRI policy concept could emerge at the level of the European Union. Some authors have already begun significant work in tracing this development (de Saille, 2015; Owen et al., 2012). These contributions will be drawn on throughout this thesis as I seek to build upon this work. In doing so, I adopt a strategy which has yet to be employed in studying the emergence of RRI, namely that of approaching *situations* (Stark, 2009; Asdal, 2012). Such an approach allows for inquiry into the situations which can be argued to have conditioned the emergence of the framework at EU level, in the first place. The interest of this thesis is, however, twofold. I am concerned with both the materialisation of this new policy framework and, as will be explained more closely, the practices enabled in response.

1.2 The production of documents

The emergence of a new policy concept can be understood as the result of certain practices of governance. One such practice is the production and circulation of documents, fundamental to the workings of the bureaucratic institution and often epitomised as the very image of formal organisational practice (Hull, 2012). Documents are here viewed as partaking in the constituting of something as a relevant issue, as well as in rendering something governable in the first place, enabling certain actions (Asdal, 2012; 2014). Studying the production of documents therefore seems to be one promising strategy of approaching the emergence of a policy concept and the practices enabled in response. Moreover, such a document analysis approach is one to which the STS literature can contribute important resources, as will be elaborated on in chapter 2.

The production and circulation of documents is an essential activity of the European Union, actively taking part in the assembling of policy initiatives. Since the notion of RRI first gained traction in policy discourse, the European Union has funded and produced an extensive number of documents dedicated to the issue and in a variety of genres. Documents, in short, are instrumental in assembling policy objects and in achieving coordination within the organisational structure of the EU – of making something into a 'matter of concern' (Latour, 2004). Moreover, documents are observable and tangible elements of the policy-making process which may be located and traced, allowing the inquirer to follow its particular movements (Latour, 2010:70).

A method of document analysis enables a tracing of how RRI could emerge over times, as well as how such a policy concept effectively adds something to the world. Kristin Asdal is emphatic that equally important to what documents *are* is what documents *do*, and that they are *doing* something in the first place (2015:74). Such an approach allows for an attentiveness to documents as not simply mirroring an external reality, but as actively taking part in the modifying, adding to and transforming of that reality. As such, it is useful in approaching what actions a new policy concept enables in response. We have here arrived at the second attentiveness of this thesis.

1.3 The valuation practices of a new framework

How to approach the RRI framework documents as enabling certain actions? One strategy is to turn one's attention to practices of valuation, how the value of something is assembled somehow. Such an approach follows the pragmatic turn of John Dewey (1939) in considering value as neither subjective nor objective, but practical. This turn involves an analytical move from *value*, in the singular, and *values*, in the plural, to a process of *valuation*, whereas value is a quality necessarily being performed (Muniesa, 2012:26). Such an approach allows for investigations into such activities, while moving away from questions of what values 'really' are.

With such pragmatism follows methodological implications, as valuations are "empirically observable patterns of behaviour and may be studied as such" (Dewey, 1939:51). This allows for an empirically-oriented practice approach to questions of value, of which I follow in this thesis when approaching documents as sites of valuation. As a framework for 'responsible research and innovation', its documents necessarily enact certain values and, consequently, enable new valuation practices in terms of what is considered responsible or 'good' research and innovation. The documents dedicated to the issue of RRI may thus be understood as particular 'value agents' (Asdal, 2015a), and will in this thesis be studied as such.

1.4 Research questions and thesis structure

My interest in this thesis is twofold. I am concerned with both the materialisation of a policy concept and with its enactments in terms of valuation, seeking to gain insights into these concerns by approaching documents. This dual focus may best be described as two elements or dimensions, making up the main parts of this thesis. These two dimension are addressed by posing two research questions, each devoted a chapter of its own. It is important to emphasise that these are not isolated concerns. The two research questions are rather deeply interrelated, as is the activity of responding to them.

The first dimension of this thesis is a concern with the materialisation of RRI at EU level. I will inquire into how the emergence of the policy concept can be understood by looking more

closely at situations conditioning its emergence. In order to shed light on this, I ask the following research question:

> *What situations enabled the policy concept of RRI to emerge in EU research and innovation policy?*

In responding to this research question, I approach two specific situations. The notion of 'situations' as an analytical tool will be elaborated on in chapter 2 of this thesis. The first situation is one unfolding at EU level, concerned with assembling a new 'knowledge-based economy' driven by research and innovation, directed toward tackling societal challenges. The second situation is one of decades of research on the science-society relation, unfolding particularly within the field of STS. I will argue that it is these two situations' interacting and interfering with one another that conditioned a particular situation in which the RRI policy concept could emerge.

The second dimension of this thesis is a concern with the enactments of this new policy concept. More specifically, it is a concern with certain types of enactments, namely the enactment of values. In investigating the valuation practices of the documents concerned with RRI, I ask the following research question:

> *In what ways does the policy concept of RRI enable new valuation practices in research and innovation?*

I address this research question by inquiring into the 'orders of worth' at work in the documents, a notion first articulated by Boltanski and Thévenot (2006 [1991]) and further developed by David Stark (2000; 2009; 2011). Two distinctive orders of worth will be identified, each with distinctive evaluative principles for assessing worth. The conflicts which may surface from such an overlap of diverse value regimes will then be discussed by drawing on Stark's notion of situations of 'dissonance'. Lastly, the valuation practices enabled by the documents will be addressed and the potential benefits from such an overlap discussed.

This thesis consists of five chapters, this introduction constituting its first. The next chapter gives an overview of the theoretical and methodological framework I drawn upon in this thesis. The chapter first provides an overview of the valuation studies approach, initially

represented by the pragmatic turn of John Dewey and his *Theory of Valuation* (1939). Some key concepts and analytical tools from the field will then be laid out and linked to the aims of this thesis, particularly Boltanski and Thévenot's concept of 'orders of worth' (2006) and Stark's notion of 'dissonance' (2009). The chapter then demonstrates how the research questions of this thesis may be approached by employing a 'methodological situationalism', here by combining two notions of 'situations' (Stark, 2009; Asdal, 2012). Lastly, the chapter demonstrates how document analysis is considered a well-suited method for the purposes of this thesis, as well as the document collection and delimitation process.

Chapters 3 and 4 constitute the main part of this thesis. Chapter 3 addresses the first research question posed in this thesis, inquiring into the situations conditioning the emergence of RRI in EU research and innovation policy. The second research question of this thesis is addressed in chapter 4, inquiring into the valuation practices enabled by the RRI documents by using analytical tools from the valuation studies literature. By way of closing, chapter 5 provides some reflections on the approach of this thesis, as well as a few remarks regarding future studies on the issue.

2 Theoretical and methodological approach

This is a thesis positioned within Science and Technology Studies (STS), a field growing out of a preoccupation with science, technology and society and the relationship between them. Central to this field of research are insights into the reciprocal relationship between science, technology and society – that is, science and technology is actively shaping society, but society is equally active in shaping science and technology. In other words, they are understood as continuously and inescapably 'co-producing' on another (Jasanoff, 2004), effectively moving away from purely technological determinist or social constructivist perspectives. I draw on resources from this field of research throughout this thesis.

A fundamental attentiveness of the STS field is that scientific fact is not something located 'out there' in the world waiting to be discovered, but something produced in actual practices (Latour & Woolgar, 1979). I draw on these insights when approaching value as the product of certain practices, as something necessarily enacted or performed. This brings us to another essential analytical tool of this field, that is, the studying 'enactments' or 'performativity'. Such notions provide resources for "grasping the ways in which agents actively transform the world and add something new" (Asdal, 2012:379). I draw on these resources from STS in approaching documents as enacting something, as particular 'value agents' (Asdal, 2015a).

This chapter will provide an overview of the literature and analytical tools – from STS and the multidisciplinary field of valuation studies – drawn upon in this thesis. In doing so, I will outline how these resources are combined into an approach to answer my research questions. In the following, a valuation approach will first be outlined, as well as the analytical tools from this literature drawn upon in this thesis. Further, my approach to 'situations' will be laid out, combining resources from valuation studies and STS. Lastly, I outline an approach of document analysis and how such documents were collected and delimited.

2.1 Approaching valuation practices

We are continuously involved in activities which assemble the value of things. What characterizes such practices is that the value of something is being assembled somehow –

whether established, evaluated, negotiated, maintained, constructed or challenged (Doganova et al., 2014:87). Practices of valuation occur formally as well as in our day-to-day activities, as products, processes and practices come into being as valuable somehow, be it within organisations, communities, cultures or markets. At its heart, valuation studies encourage us to ask: How do certain things come into being as relevant and desirable – as valuable? How is value being determined, and by which tools and standards? And how are a multitude of possibly incommensurable evaluations being coordinated and handled in specific situations?

This thesis approaches the valuation practices of documents. More specifically, this thesis is concerned with the valuation practices of the documents produced in assembling the policy concept of RRI in EU research and innovation policy. This part of the chapter will lay out a valuation studies approach and some central analytical tools that will be drawn upon in responding to the second research question of this thesis: *In what ways does the policy concept of RRI enable new of valuation practices in research and innovation?*

A multidisciplinary approach, valuation studies has proliferated into various empirical fields. The field engages scholars in disciplines such as economic sociology and economics, management and organisational studies, science and technology studies, social anthropology, cultural geography, accounting studies and philosophy (Helgesson & Muniesa, 2013:3). The valuation approach has experienced increased interest and development within diverse disciplines particularly in recent years, as a 'comparative sociology of valuation and evaluation' has been declared (Lamont, 2012) and a publication dedicated to the field established (Helgesson & Muniesa, 2013). The roots of this particular field of interest, however, can be traced back further, to the work of John Dewey.

2.1.1 Dewey and the pragmatic turn

Studies of valuation have its roots in John Dewey's pragmatic turn in approaching questions of value (1939). One of the founders of the pragmatist school of American philosophy and a prominent contributor to the philosophical debate on value in the early twentieth century, Dewey was concerned with fields as varied as art critique, education and finance. Fabian Muniesa explains how Dewey critiqued the so-called 'idealistic-realistic controversy' dominating the discourse of his time, largely concerned with whether value was something intrinsic to the things deemed valuable or of the persons appraising them (2012:25). Dewey

attempted to pull the debate away from such 'subjective-objective' dichotomous schemes, of which Muniesa terms a 'flank movement' in approaching value (2012:25). Dewey later generalised his insights on the issue in *Theory of Valuation* (1939), proposing an outline of a programme.

At the outset, Dewey's pragmatic turn consisted of replacing the notion of *value*, in singular, and *values*, in plural, with *valuation* (Muniesa, 2012:25). In such a programme, value(s) is not regarded as some inherent quality, as something subjects or objects *have*. Instead, valuations are understood explicitly as practices, as something actively being *done*. In other words, Dewey's pragmatism implies an absolute denial of intrinsic value. This 'flank movement' is significant in analytical terms as it shifts focus away from value as something in and of itself, as some absolute and enduring property of persons and things. Valuation is instead referring to a practice or process, whereas value is a quality necessarily being performed or enacted (Muniesa, 2012:26). In this view, the sense of inherent value is merely an illusory product of our continuous valuation activities.

With such pragmatism follow methodological implications. "Valuations", writes Dewey, "are empirically observable patterns of behaviour and may be studied as such" (1939:51). This calls for a more empirically-oriented approach when addressing value, inviting researchers to investigate such activities while moving away from questions of what values 'really' are (Dussage et al., 2015:268). This thesis has its basis in Dewey's pragmatism, of analysing value as *the product of actions* rather than some inherent quality *explaining action*. As value in this view is something enacted, the analytical focal point is necessarily the practices through which value is performed. In this thesis, the practices to be investigated are those enacted by documents. In approaching these documents, I follow a main line of Dewey's programme – of considering value as neither subjective nor objective, but practical (1939).

2.1.2 Praise, prize, price: on economic and non-economic value

In his writings on valuation, Dewey devoted much attention to the implications of language and common speech when advocating for a 'pragmatic turn'. He demonstrates that there is a duality to the verb 'to value', and that this double meaning is significant as "there is implicit in it one of the basic issues regarding valuation" (1939:5):

> [W]hen attention is confined to the usage of the verb 'to value', we find that common speech

> exhibits a double usage. For a glance at the dictionary will show that in ordinary speech the words 'valuing' and 'valuation' are verbally employed to designate both *prizing*, in the sense of holding precious, dear (and various other nearly equivalent activities, like honouring, regarding highly) and *appraising* in the sense of *putting* a value upon, *assigning* value to. This is an activity of rating, an act that involves comparison, as is explicit, for example, in appraisals on money terms of goods and services (Dewey, 1939:5, emphasis in original).

Dewey points to this duality as suggesting the problem upon which schools were presently divided (1939:5). In everyday language, 'to value' may designate both *prizing*, of holding something dear of which has personal-emotional qualities, and *appraising*, of putting a value upon, of which has intellectual qualities, Dewey argues (ibid). He further notes that the terms 'praise', 'prize' and 'price' are "all derived from the same Latin word; that appreciate and appraise were once used interchangeably; and that 'dear' is still used as equivalent both to 'precious' and to 'costly' in monetary price" (1939:5-6). The emphasis here is that although they parse in different directions, these terms have common origins. He concludes such a separation to give us little help, as it is a position that "seems like an attempt to solve a problem by riding two horses going in opposite directions" (1939:5). Instead, there is a "need for their integration in behaviour – behaviour in which, according to common speech, the head and the heart work together, in which, to use more technical language, prizing and appraising unite in direction of action" (Dewey, 1939:65).

The excerpts from Dewey suggest his confrontation with the value discourse of the early twentieth century, specifically the 'value *versus* values' dichotomy prevalent in both common language and philosophical debate. David Stark argues Dewey's argument to be that how such 'false dichotomies' from everyday language become incorporated into analysis deserves attention (2009:9). In following the path of Dewey, Stark advocates for a 'sociology of worth' which does not recognize a strict demarcation between economic and other values (2000). He encourages a breaking out of what he calls 'Parson's pact', specifying that the field of economics is concerned with questions of *value*, in the singular, whilst economic sociology is concerned with questions of *values*, in the plural (2000:2). Stark argues that rejecting such strong distinctions between economic value, on one hand, and social or cultural values, on the other, permits instead studies of various forms of worth and how they are interwoven. In doing so, "we embark on an analysis of worth to develop tools for

understanding a richer calculus that integrates value and values, the intellectual and the emotive, valuation and the evaluative" (Stark, 2009:9).

In this thesis, I follow the valuation approach laid forward by Dewey as well as more recent contributions to the field, particularly that of David Stark (2000; 2009; 2011). Rather than adhering to static fixtures of economic *value*, on the one hand, and non-economic *values*, on the other, the economic and the non-economic is in this approach understood as mutually contingent. Dussage, Helgesson, Lee and Woolgar (2015) emphasise that what is vital is to acknowledge the commonalities between them, as they both denote the desirability of certain acts over others. Some separation of economic and non-economic registers is necessary in analysis, however, as there are differences as to how such values comes into being.

As emphasised by Dussage et al., people and institutions deal with ethical, social, moral and economic concerns in complex ways, attempting to arrange these values in acceptable combinations (2015:9). They further emphasise that whereas what counts as moral or ethical matters for what counts as economic and vice versa, these values are often composed differently in practice (ibid). In other words, the economic and the non-economic must be understood in their relations to each other, how they actively 'work upon each other', rather than as isolated entities. Simultaneously, the practices through which they come into being, and by means of what tools and technologies, necessarily carry certain distinctions, requiring some analytical separation. I apply such a separation in distinguishing between different 'orders of worth' in the RRI documents and in addressing their particularities.

Dussage et al. emphasise that as different values are composed differently in practice, they also remain in tension with each other (2015:9). An attentiveness to their distinctions therefore enables investigation into such frictions, to examine how different orders of worth articulate competing sets of values, and how the value of things is continuously maintained, challenged or negotiated. "Desirability must then become plural, as competing orders of desirabilities", Dussage et al. write, as "different values are made beside each other" (2015:9).

The tensions arising as different values are 'made beside each other' has been particularly addressed by David Stark (2009). Through his extensive ethnographic field studies of organizational innovation, Stark has become an influential theorist in the field of valuation.

His ethnographies range from 1980s Hungarian factory workers daily moving between organizational forms, to the 1990s New York digital media entrepreneurs and the arbitrage trading rooms of Wall Street. In these studies, Stark investigates how innovation challenges established standards for determining worth. He emphasises that as innovation represents something novel, disrupting patterns and existing categories, it necessarily obscures which measurements or standards should calculate value (Hutter & Stark, 2015:5).

In following the path of Dewey, the analytical focal point of Stark's cases is valuation as a particular process. His approach allows for studying the making of value over time, providing useful tools for such analysis. The resources provided by Stark are central to the work of this thesis. I have found two analytical concepts to be particularly useful resources in approaching the valuation practices of the RRI documents. Firstly, this is Luc Boltanski and Laurent Thévenot's notion of 'orders of worth', drawn upon and further developed by Stark. Secondly, this is Stark's notion of 'dissonance'. In the next sections, I will demonstrate how these tools, when used in combination, are particularly useful in inquiring into the second research question of this thesis.

2.2 Orders of worth and situations of dissonance

2.2.1 Orders of worth

The notion of 'orders of worth' is key to the analytical approach of Luc Boltanski and Laurent Thévenot. The notion was first presented in their 1991 work *De la justification*, later translated into English with the title *On Justification: Economies of Worth* (2006). Boltanski and Thévenot argue that society is not made up of one single social order. Such orders are rather multiple, overlapping and intertwined, they argue, identifying several 'orders' or 'economies' of worth in their work. Each order is here considered a systematic and coherent principle for evaluation, where actors claim the legitimacy of their assertions in accordance to a given order. They emphasise that one specific order of worth is not bound to one specific social domain, but rather coexist in the same social space. Boltanski and Thévenot delineate six such orders, or 'worlds', each driven by a particular rationality: the inspired world, the domestic or loyalty world, the world of fame or renown, the civic world, the market world, and the industrial world (2006).

‘Orders of worth’ is a key analytical concept also to the work of David Stark (2009; 2011). Following Boltanski and Thévenot, Stark argues that change should not be viewed as the passage from one social order to another, but as rearrangements in the patterns of how multiple and coexisting orders of worth are interwoven. He argues that thinking of change as *recombination* rather than *replacement* enables us to explore the multiplicity of evaluative principles at play in a given situation (2009:164). Stark, however, does not confine to the six orders proposed by Boltanski and Thévenot. Instead, evaluative principles are identified from one case to another as appropriate (Stark, 2009:13). I have found both approaches to ‘orders of worth’ to be helpful in this thesis. Although I initially did not operate with any predefined orders of worth, I found the two orders identified in the RRI documents to bear considerable similarities to orders identified by Boltanski and Thévenot. Although not strictly applied, the orders of worth identified in this thesis can be considered versions of those identified by Boltanski and Thévenot, as will be reasoned in more detail at a later point in this thesis.

In his studies, Stark finds not one, but multiple and coexisting evaluative principles for determining worth. Even the traders of Wall Street, a site in which Stark anticipated to be the prime example of evaluative unambiguity, turned out to recognize value in the diversity of principles of valuation, as an ‘ecology of evaluative principles’ (2009:137). It is in moments of uncertainty that the coexistence of competing orders of worth may lend themselves most visible to us. This may lead to the emergence of what Stark terms ‘dissonance’, which will be explained in more detail in the following.

2.2.2 Dissonance

‘Dissonance’ is by Stark described as arising when diverse or even antagonistic evaluative principles overlap (2009:27). A musical metaphor, the term indicates an unstable tone combination and temporary state of misunderstanding, suggesting that “some sound or sound constellation violates the aesthetic expectations of the listener” (Hutter & Stark, 2015:6). In a valuation perspective, a situation is dissonant when there is “more than one framework for assessing it, more than one value system for measuring worth” (Hutter & Stark, 2015:5). In other words, a sense of dissonance may arise when multiple orders of worth are in action and coexist within the same situation. Hutter and Stark write that it is change, or innovation, which spans such dissonance, subsequently opening up a horizon of uncertainty (2015:4).

In combination with 'orders of worth', Stark's notion of 'dissonance' is a useful analytical resource in this thesis. As has been mentioned, I will approach two distinctive orders of worth found to be drawn upon in the documents dedicated to the policy innovation of RRI. In this work, applying the notion of 'dissonance' allows me to inquire also into the tensions arising from this overlap. In addition, the notion is useful for exploring the products of such uncertainty. Stark characterizes dissonance as a situation of uncertainty demanding *search, inquiry,* and *discovery* (2009:204). Uncertainty can therefore also be productive by its capacity of enabling action, new solutions and creative entrepreneurship (ibid). On this basis, Stark argues dissonance to be a potentially creative force.

In his fieldwork, Stark found that conflicts of competing value criteria encouraged an organizational reflexivity (2009). This reflexivity enhanced their ability to face dissonance, by reconciling different orders of worth to deal with uncertainty (2009). Having multiple performance criteria can produce resourceful dissonance, argues Stark, and may in some cases be unavoidable. On this basis, he endorses non-hierarchical governance structures designed to accommodate such tensions and uncertainties of change – *heterarchy* – inviting multiple orders of evaluating worth (2009:27). These insights will be drawn upon towards the end of this thesis. In doing so, I explore how the sense of dissonance found in the RRI documents can create openings for potentially fruitful *recombinations* of evaluative principles and, consequently, enable new valuation practices (Stark, 2009:164).

2.3 A methodological situationalism

David Stark demonstrates how Dewey's work does not only provide theoretical insights into questions of value, but also guidance on the issue of methodology (2009:31). As previously explained, Dewey advocates for studying more closely the processes in which values are made *in situ*, rather than taking such practices as "unexamined traditions, conventions and institutionalized customs" (Dewey, 1939:64). As has already been briefly signalled, the turn from value and values to *valuation* has methodological implications, calling for a more empirically-oriented practice approach to the question at hand. I follow such an approach by tending to *situations* in responding to the research questions of this thesis. In doing so, I combine two notions of situations. Such a combination enables me to inquire into both the

valuation practices of the documents and that which enabled these valuation practices to come about, in the first place. The rational of approaching situations in this thesis will be reasoned in more detail throughout this subchapter.

2.3.1 Situations as sites of valuation

Stark argues that in following the path of Dewey, we must take lessons from developments within the field of STS (2009:9). As early strands of research in this field were occupied with studying the scientific institutions in which scientists were embedded and its structures, patterns and norms, the emergence of laboratory studies, often associated with the work of Bruno Latour and Steve Woolgar (1979), departed from this tradition. These studies marked a strategic move *into* the laboratories to ethnographically approach 'science in the making', with a specific interest in "the way in which the daily activities of working scientists lead to the construction of scientific fact" (Latour & Woolgar, 1979:40). Stark suggest a similar move in approaching value. He argues that to augment analysis of the organisations that evaluate, we must look at the evaluative and calculating practices within them (2009:9-10). This requires an analytical shift from *institutions* to *situations* (Stark, 2009:32).

In *Moments of Valuation: Exploring Sites of Dissonance* (2015), Michael Hutter and David Stark elaborate on the notion of 'situations' in more detail, as characterized by "the particular social assemblage of persons and things that are in place and in motion during a span of time" (2015:4). At the outset, the authors argue for adopting a *methodological situationalism*. The merits of such a methodology is that one can demonstrate not merely the outcomes, but the entire process of valuation – how multiple orders of worth are in place and in motion during a span of time, and how patterns are effectively being rewoven. In other words, having situations as the focal point of analysis allows us to gain insights into how multiple and even conflicting orders of worth are at play, actively shaping that which is considered valuable.

With a methodological situationalism follows the premise that valuations are activities spatially and temporally localised. Hutter and Stark argue that such practices take place in specific situations, at a given moment and in a certain space (2015:4). For one, valuations are considered as having a spatial mark. They are activities which may take place in spaces such as laboratories and scientific journals, newspapers and television programmes, meeting rooms and hallways – each with particular material characteristics and equipped with certain

technologies, tools and devices, Hutter and Stark explain (2015:4). Such 'devices' can be considered as objects with agency, they *do* something, either in a minimalist, instrumental version or in a maximalist, determinist version (Muniesa et al., 2007:2). Documents can be viewed as another such evaluative space and as an object with agency effectively *doing* something, as I will return to in the next subchapter of this thesis.

Valuations are in this view also considered as having a certain temporal mark – a more or less recognisable beginning and end (Hutter & Stark, 2015:4). Hutter and Stark argue that the duration of such moments may range from minutes to hours, months and years, consisting for example of a sequence of meetings, research or press coverage, or of an era of changing evaluation standards (2015:4). The longer the duration of such a moment, the more difficult it may be to recognize it, they emphasise, and it may sometimes be discernible only in hindsight (Hutter & Stark, 2015:4). The situation of RRI can perhaps best be described as in the midst of a valuation process of changing evaluation standards in research and innovation. With this, we move to another notion of 'situations' deemed suitable for inquiring into how the policy concept could emerge, in the first place.

2.3.2 Situations as 'contexts in action'

In addressing the first research question of this thesis, I approach the situations argued to have conditioned the emergence of RRI at EU level. In doing so, I am effectively approaching what is generally labelled as 'context'. However, the distinction between the notion of *context* and the notion of *situations* is intentional and significant here, as will be demonstrated by drawing on the work of Kristin Asdal. In "Contexts in Action –And the Future of the Past in STS" (2012), Asdal addresses the status of 'context' in STS, a notion particularly contested in material-semiotic strands such as actor-network theory. The criticism is directed towards the notion of 'context' utilized as an external, determining or explanatory force, reducing events, actions and actors to a given context (Asdal, 2012:381). Context tends to serve the role as explanatory resource, Asdal explains, commonly thought of as a "stable background to which our original findings and claims can relate" (2012:381).

The rise of actor-network theory can be interpreted as a response to such contextualization, as an anti-contextualizing strategy for "grasping the ways in which agents actively transform the world and add something new," writes Asdal (2012:379). This focus on the transformative

capacity of agents is often referred to as an *ontological politics* – or what Asdal refers to as a *philosophy of adding* (2012:384). In this sense, actor-network theory has primarily been occupied with that which is enacted, or *the new* (Asdal, 2012:381). Asdal writes that the limitations of such an approach is that the past, or that which enables events or utterances to happen, seem to get increasingly lost. In seeking to use actor-network theory resources as a historicizing method, Asdal asks: "How to combine the text and a concern with *the new* – the move "forward," the concern with what texts *do* – with a concern with contexts, "the past," that which enables or conditions the act, the text and the relevant utterance?" (2012:382).

Asdal proposes a way of approaching contexts as integral to the issue at hand by combining actor-network theory with the speech-act theory of Quentin Skinner (2012:382). Whilst the focus of actor-network theory has been what is *added* in a situation, Skinner's speech-act theory is more focused on the context, taken to mean the situation from which the relevant text or utterance sprang out of in the first place – without reducing it to a given 'outside' context, such as social class, interests, or anxieties (Asdal, 2012:386). Skinner is emphatic that utterances must not be reduced to symbolic expressions of the structure of the speaker's society, nor as a displaced or distorted form of some deep unacknowledged feeling (Asdal, 2012:387). There is rather an ambition, shared with actor-network theory, of taking actors and utterances literally and as unique events, rather than "to take it as a symbolic or displaced way of saying something else" (Skinner in Asdal, 2012:387). Asdal argues that drawing together actor-network theory and Skinner's speech-act theory enables us to grasp "not only the enactments but also the acts as the result of specific situations" (2012:388). She emphasises that the network in actor-network theory is that which enables action, and the context, or situation, to be retrieved is therefore not some external entity 'out there', but integral to the very utterance or action (2012:388).

I draw on this approach of contexts as *situations* in aiming to shed light on how RRI could emerge at EU level, enabling me to inquire into its materialisation as "the result of specific situations" (Asdal, 2012:388). It allows me to combine a concern with the new and the move 'forward' – the policy concept – and what the documents dedicated to the issue *do*, with a concern with 'the past' – the situations conditioning its emergence – which enabled this production of documents in the first place (Asdal, 2012:382). Asdal's work is also a resource in terms of approaching documents to inquire into situations, as it is exactly documents she analyses in her paper to make her argument.

Asdal notes that the word 'text' comes from the latin *texere*, meaning to weave, and that context derives from *contexere*, meaning to weave together or weave with (2012:388). As such, Asdal argues, context can be taken as that with which a text is woven together, and may be approached with a strategy of tracing such weavings (2012:388). I follow such a strategy when aiming to identify certain conditioning situations by document analysis. Asdal reminds us that in opting for such a strategy, we need to bear in mind that contexts, or *situations*, do not necessarily come in the singular. Instead, "radically conflicting contexts may interact within a text and together produce an issue, a concern, a sensibility – hence, a particular situation" (Asdal, 2012:388). I will argue that it is exactly the overlap or interaction of two situations which produced a particular situation in which RRI could emerge as a policy concept at the agenda of EU research and innovation policy. Before moving forward, some emphasis should be given to the combination of two notion of situations in this thesis.

2.3.3 Combining two notions of situations

As demonstrated in the above sections, the notion of *situations* bears significance here both methodologically and analytically. In addressing the two research questions of this thesis, I think it a constructive endeavour to combine the notions of situations presented by Stark and by Asdal. Combining these two outlooks allows the inquirer to observe both the specific situations in which valuation occurs and what such activities *do*, as well as the situations conditioning such enactments of value to come about, in the first place. I consider such a combination well-suited for the task at hand. I draw on Stark in approaching situations as certain spatial and temporal localities in which value is enacted, and on Asdal in my concern with situations as enabling these valuations to take place, in the first place.

Although relying mainly on ethnography in his work, Stark does not prescribe any specific method to be applied when approaching situations of valuation. Asdal, on the other hand, connects the notion of situations specifically to documents in her work. The combination of these two entries to situations can therefore be argued to be resourceful also in this sense, offering a flexible approach whilst providing some resources on approaching documents specifically. I concern myself with documents in responding to the research questions of this thesis. Although I also approach conferences and workshops in this work, my access to these events is exclusively through its documents – be it newsletters, summaries or reports. In the

following, the document analysis approach followed in my work with this thesis will be explained in more detail.

2.4 Qualitative document analysis

Documents are fundamental to the workings of bureaucratic institutions. In his ethnography of urban Pakistani government, Matthew Hull examines the implications of such a thorough paper mediation of relationships among people, things, places, and purposes in bureaucratic practice (2012). Hull argues that in studies of bureaucracy, writing has "remained the very image of a formal organizational practice, the central semiotic technology for the coordination and control of organizations" (2012:20). Cases in which this condition is not found are consequently taken as dysfunctional and therefore not properly bureaucratic, writes Hull (2012:21). As the functions and dynamics of bureaucratic organisations largely depend on the production and circulation of documents, such writings may serve as a rich source of data material when inquiring into how something is assembled as an issue, in the first place, and how the relationship between people, things, practices and purposes are enacted.

2.4.1 Documents as transformative

Document analysis must here not be confused with approaching texts as mere descriptions or reflections of an external reality. Hull argues that documents often are overlooked because researchers tend to look *through* paperwork rather than *at* it. He ascribes this 'blindness' partially to the fact that researchers produce and use documents in much the same way as those studied do. Documents, writes Hull, tend to be overlooked "because it's easy to see them as simply standing between the things that really matter, giving immediate access to what they document" (2012:12). In using document analysis as method, Hull emphasises that one must be attentive to the fact that documents are not merely representations 'between' things, but also a 'thing' in its own right (Hull, 2012:13).

Kristin Asdal places emphasis on a similar attentiveness to the transformative capacity of documents (2015b). Asdal is emphatic that equally important to what documents *are* is what documents *do*, and that they are *doing* something in the first place. Documents do not simply mediate reality, she argues, but do themselves "take part in working upon, modifying, and

transforming that reality" (Asdal, 2015b:74). She suggests this transformative capacity of documents, how they actively take part in modifying and sometimes even radically transforming an issue, to be approached as 'modifying work' (2015b:88). This relates nicely with that which was elaborated on in approaching situations. As previously noted, Asdal is emphatic that when tracing the weavings of a text, the situations conditioning it in the first place, the utterance must not be ascribed a determining external context with explanatory power. In the same way as utterances must not be reduced to a context 'outside' the situation at hand, documents must not be understood as mere representations of the 'outside' world (Asdal, 2012:387).

When approaching the research questions of this thesis by document analysis, I follow Hull's example of looking *at* documents rather than *through* them (2012). Such an attentiveness allows me to inquire into how documents enact certain relations between people, things, practices and purposes. In doing so, I am approaching what Asdal terms 'the transformative capacity of documents' – that documents are not merely representations of an external reality, but are rather actively partaking in the shaping, modifying and working upon that reality (2015b). Such an attentiveness is productive when looking at the documents dedicated to the RRI policy concept, as well as those conditioning the emergence of such documents. A document analysis approach allows me to analyse how these documents actively partake in modifying and working upon certain practices and issues.

2.4.2 Document collection and delimitation

As a bureaucratic institution, the European Union is a highly proficient document producing body. As a result, its bibliography is vast and encompassing wide areas. The search for documents did indeed feel like an overwhelming task at times due to the sheer volume of data available. I therefore, as a tentative strategy in the preliminary stages of searching for relevant materials, delimited my search to EU authored or funded documents addressing 'Responsible Research and Innovation' (RRI) specifically. Search engines served as useful starting points for locating relevant data in this initial search. In this work, I used the search engines of the publication archive 'EU Bookshop' and the database for EU law documents 'EUR-lex', including also documents part of the procedure leading up to the adoption of legal acts. The search engine at the EU's main website 'europa.eu' was also helpful in these preliminary searches.

At the time of this initial search for documents, undertaken in the period August – October 2016, the keyword search 'Responsible Research and Innovation' gave 11 results in the EU publication archive EU bookshop. The same keyword search gave 36 results in EUR-lex, whilst europa.eu gave 234 results when searching for 'Responsible Research and Innovation'. The results of the latter consisted mostly of other webpages integral to europa.eu, but also other documents in genres such as newsletter, report and brochure. As the task at hand is of a qualitative rather than quantitative nature, addressing every single one of the total 281 documents located in this initial search would be neither productive nor feasible. It would rather be an overwhelming if not impossible task given the limited scope of this thesis. As noted above, my starting point was a preoccupation with the documents concerned with the RRI policy concept specifically, its development and promotion their principle activity.

In this initial search, I identified 12 documents concerned exclusively with the notion of RRI. Excluded from this delimitation are webpages as well as documents in which the views are expressly identified as the author's own. As such, my starting point in collecting data was a concern with the documents which can be argued to promote the official EU position and perception of RRI. The genre of these documents ranged from the public informational brochure to the expert report, work programme, newsletter and declaration. More than anything, the activity of studying these documents spurred further questions: Where did this policy concept come from? And as a response to what?

Although search engines were valuable tools in the initial data collection process, it was ultimately the documents themselves which led way through the vast territory of EU authored and funded documents. In reading one document more closely, it would direct me towards another. This could be by directly addressing this relationship (e.g. "this builds upon …") or by more indirect interaction in footnotes or by paraphrasing. In other words, the document collection was largely undertaken through an attentiveness to how documents enact certain relations between people, thing, practices and purposes, as emphasised by Hull (2012).

This strategy may also be characterized as a version of a 'snowball method'. Such a method is perhaps most commonly known as one where interviewees point the researcher toward the next interviewee. In this case, it is the documents which have been doing the pointing. I have followed the enacted relational qualities between documents in working on this thesis, and it

is through such an exploratory approach to the material it has found its particular form. Such a strategy has been particularly useful in the sense that it has allowed me to effectively 'trace the weavings' of the documents concerned with RRI, as a strategy to inquire into what conditioned its emergence.

There are, of course, certain restrictions to such a document analysis approach. As I rely solely on documents as my means of inquiry, my access is necessarily limited to that which is documented. For instance, the approach does not provide insights into the 'backstage' practices and processes surrounding the emergence of RRI at EU level. I have not been a participant and observer of meetings, workshops and conferences in which documents are negotiated and worked upon, as possible by e.g. ethnographic methods. I do, however, have access to such processes in terms of its documentation. A benefit document analysis provides for this thesis should be stressed here, namely that it allows for developments to be studied over longer periods (Asdal, 2012). Documents are observable and tangible elements of the policy-making process, they may be located and traced, allowing the inquirer to follow its particular movements over time (Latour, 2010:70). This is appropriate for the tasks at hand, that is; studying the materialisation of RRI at EU level by a strategy of 'tracing the weavings' (Asdal, 2012:388), and further, studying the valuation practices enabled in response.

This thesis represents one strategy of approaching the issue of RRI and, consequently, one particular narrative of its materialisation. Although the documents are rendered in a certain order in the following, the work with producing this thesis has in no way been a straight-forward linear process. It may rather be characterized as a disorderly back-and-fourth endeavour of discovering, discarding and rediscovering, of following leads which have later became discouraged and rediscovering documents which at first glance may have appeared irrelevant. The nature of this process should be viewed in connection to Dewey's emphasis on what distinguishes inquiry from problem solving (1933). Stark places similar emphasis on this distinction made by Dewey, as he writes that it turns our attention from a *well-defined problem* to the more interesting case of a *perplexing situation* (2009:2):

> [I]t is artificial, so far as thinking is concerned, to start with a ready-made problem, a problem made out of whole cloth or arising from a vacuum. In reality such a "problem" is simply an assigned *task*. There is not at first a situation *and* a problem, much less just a problem and no situation. There is a troubled, perplexed, trying situation, where the difficulty is, as it were,

> spread throughout the entire situation, infecting it as a whole. If we knew just what the difficulty was and where it lay, the job of reflection would be much easier than it is (…). In fact, we know what the problem *exactly* is simultaneously with finding a way out and getting it resolved. (Dewey, 1933:201, emphasis in original)

As Stark, I follow Dewey in inquiring into situations rather than aiming at solving a specific and well-defined problem. It was precisely my curiosity into a certain perplexing situation which prompted me to articulate the particular research questions of this thesis, namely the situation of 'Responsible Research and Innovation' (RRI). In this thesis, I ask how we may understand its emergence and, further, what it does in terms of enabling certain valuation practices in research and innovation. The following two chapters address each of the two research questions posed in this thesis, respectively.

3 Situations in action: Approaching the emergence of a policy concept

The notion of 'Responsible Research and Innovation' (RRI) has in the space of a few years gained increasing momentum in EU research and innovation policy discourse. A workshop held in May 2011 by the European Commission's Directorate-General for Research and Innovation in Brussels is often referred to as the first public statements indicating its significance in EU policy (EC, 2011a; Owen et al., 2012; de Saille, 2015). Since then, the nascent policy term has evolved into the centrepiece of international workshops and high-level conferences, informational brochures (EC, 2012a; 2014a), expert reports (van den Hoven et al., 2013; Strand et al., 2015), and a declaration dedicated entirely to the issue (Rome Declaration, 2014). Today, the framework is deployed as a so-called 'cross-cutting issue' in the EU's 8th Framework Programme for Research and Innovation, Horizon 2020 (2014-2020).

An informational brochure dedicated to the issue reads that "Responsible Research and Innovation means that societal actors work together during the whole research and innovation process in order to better align the process and its outcomes, with the values, needs and expectations of European society" (EC, 2012a). In other words, it is a framework meant to permeate the entire research and innovation trajectory and for its direction towards societally desirable ends, of which EU officer and scholar René von Schomberg have termed the 'right impacts' (2011a; 2013). As well as implemented as a cross-cutting issue, RRI is an effort pursued under part 16 of Horizon 2020, 'Science with and for Society' (SwafS). In the SwafS Work Programme for 2016-2017, the RRI framework is presented as one engaging society, integrating the gender and ethical dimensions, ensuring access to science, and encouraging formal and informal science education (EC, 2017a:6). Together with 'governance', these aims make up the framework's six 'keys' or 'dimensions' at EU level (EC, 2012a; 2014a).

In reviewing the number of documents, conferences and workshops dedicated to its development and promotion, as well as its implementation as a cross-cutting issue, one could safely assume the RRI policy concept to be of some significance to the present-day research

and innovation policy of the European Union. Arie Rip describes the idea of RRI as one which in few years has 'catapulted from an obscure phrase to an issue in the European Commission's Horizon 2020 Program' (2014:1). But how could such a concept seemingly 'catapult' into the research and innovation policy agenda? How could it be assembled as a relevant and valuable policy object? The attention of this chapter is devoted to such a curiosity – to that which conditioned the emergence of the policy concept, in the first place.

3.1 Two situations

There are various strategies for approaching the materialisation of policy. The aim of this chapter is to demonstrate one such strategy. In the following, I will approach the emergence of RRI in EU research and innovation policy by inquiring into *situations*. As reasoned in the previous chapter, documents enact something, but they are also the result of specific situations. In such a view, "the situation as the context that needs to be "recovered" is that which conditions or enables a specific utterance to happen" (Asdal, 2012:388). I follow this strategy in seeking to 'recover' the situation which conditioned RRI to emerge as a desirable and relevant policy object. I do so by approaching its documents.

Asdal reminds us that in opting for such a strategy, one must bear in mind that contexts do not necessarily come in the singular (2012:388). She stresses that several contexts may be in action, in interaction, or even in radical conflict with one another within a single document. In other words, situations may interfere and interact with each another and together take part in producing "an issue, a concern, a sensibility – hence, a particular situation" (ibid). In this chapter, my aim is to demonstrate how two 'contexts in action' (Asdal, 2012), or rather, 'situations in action', produced a particular situation in which RRI could emerge. My aim is not to give an exhaustive overview of every event, document and utterance which eventually would lead to its advent. This would be an overwhelming and unfeasible task. My ambition is rather to discern two specific situations and how their interactions can be understood as having conditioned the emergence of a new policy concept.

The first situation to be 'recovered' or 'weaved out' of the RRI documents is one unfolding within the EU itself. This is an evolving discourse of assembling a new 'knowledge-based

economy' where research and innovation is considered the very motor of economic progress. It is a discourse in which economic growth is being inextricably linked to research and innovation, and in which research and innovation is being handled almost inseparably. Furthermore, it is a situation of increasingly directing of research and innovation toward tackling societal challenges – and the structural and material rearrangements made in response.

Stevienna de Saille (2015) has undertaken important work in analysing the emergence of RRI in the EU. By critical textual analysis, she discusses the formation of the European Research Area (ERA) amid a changing discourse of innovation and growth in the EU, and the process through which RRI was developed as a policy framework. As I inquire into the first situation, I draw significantly on these insights brought forward by de Saille. I seek to build further upon this work in doing my own readings of the documents identified as significant by de Saille, as well as some additional documents deemed relevant in this work. Moreover, I argue that the situation is more complex – or rather, that there is another situation that should be taken more into account in this work.

In order to more fully grasp how RRI could emerge as a policy concept, I argue that we must look more closely at a situation of decades of research on the science-society relation. Although several disciplines have contributed to this field of research, it can be viewed as a situation unfolding particularly within the field of Science and Technology Studies (STS). In 'weaving out' this situation from the RRI documents, I will connect it to the evolvement of the programme at EU level addressing the relationship between science and society specifically – from 'Science and Society' (SaS), to 'Science in Society' (SiS), and to the current programme, 'Science with and for Society' (SwafS), under which activities for the development and promotion of RRI are presently located. Before going into this situation in more detail, the first situation outlined here will be explored.

Research and innovation is increasingly being epitomized as the very motor of progress, and of economic progress in particular. This is true also in the case of the EU. As Stevienna de Saille (2015) demonstrates, the making of such a connection between research, innovation and economic growth is hardly new in policy discourse, but has increasingly been the case since the ambition of creating a European Reasearch Area (ERA) was conceived as part of a new a 'knowledge-based economy'. In the next sections, I draw on de Saille in tracing this

evolving discourse on research, innovation and growth within the EU. This development will be traced as far back as to the 1995 *Green Paper on Innovation* and to the current Europe 2020 strategy for the enhancement of Europe's economy. It must be emphasised here that this linking of science, innovation and economic growth did not first emerge with the documents presented here, but has on the contrary been a topic of policy discussions for decades (see e.g. Lundvall & Borrás, 2005). In other words, the aim is not to give a comprehensive historical overview here. Instead, the aim is to give a view of some central documents assembling these linkages into 'matters of concern' (Latour, 2004) at EU policy level, 'opening up' for certain actions, mobilisations and rearrangements in response.

3.2 A situation of assembling a new economy

The first situation to be 'weaved out' is one discernible from the very outset. It was at a Brussels workshop organised by the Directorate-General for Research & Innovation (DG R&I) in May 2011 that the European Commission (EC) gave its first official statements indicating the significance of RRI (EC, 2011a; Owen et al., 2012; de Saille, 2015). In a newsletter from the workshop, the opening remarks made by Director of the European Research Area Octavi Quintana are rendered as follows:

> The context is complex. After the very severe financial crisis, all policies are directed to go out of this crisis (Europe 2020) … Europe needs to overcome its problems and make very visible that we have values in Europe that are worth defending and putting at the top of the agenda (EC, 2011a).

A high-level conference on RRI would later be held in Odense in April 2012 under the Danish EU Presidency. European Commissioner for Research, Innovation and Science Máire Geoghegan-Quinn delivered the following remarks, as rendered in the conference report: "As the Europe 2020 Strategy makes clear, to overcome the current economic crisis we need to create a smarter, greener economy, where our prosperity will come from research and innovation" (Odense Report, 2012:10). This quote would later be printed at the back page of a four-page informational brochure, *Responsible Research and Innovation – Europe's ability to respond to societal challenges*, issued by the EC DG R&I later that same year (EC, 2012a).

In reading the documents from this initial workshop and conference on RRI, we may discern how a situation of exiting a severe financial and economic crisis is made integral to the nascent policy concept. Moreover, it is a situation where "our prosperity will come from research and innovation" (Odense Report, 2012:10), framed as the driver of a smarter and greener economy to exit the crisis. It is this situation the next sections will attempt to 'weave out' in more detail, as part of a long-lasting and evolving discourse at EU level, partaking in conditioning the emergence of RRI. In doing so, I turn first to the document made explicit connections to, namely *Europe 2020: A strategy for smart, sustainable and inclusive growth*.

3.2.1 Exiting the crisis: values to be gained, and to be regained

Europe 2020 is a 10-year strategy for the enhancement of Europe's economy in the period 2010-2020 (EC, 2010a). The preface signed José Manuel Barroso, President of the European Commission 2004-2014, paints a grim picture of the state of Europe. We are in a difficult predicament, as we have been hit hard by the economic and financial crisis. The last two years have left millions unemployed, brought with it a burden of debt and put new pressures on European social cohesion (EC, 2010a:2). It is in this situation of crisis the document is positioned, directed towards its betterment. It is a strategy for Europe "to emerge stronger from the economic and financial crisis" (EC, 2010a:2).

Europe 2020 is a strategy for gaining value in future years, more specifically in the period 2010-2020, but it is equally a strategy for regaining values lost in the past. "The steady gains in economic growth and job creation witnessed over the last decade have been wiped out", the document reads (EC, 2010a:7). It continues to read that the crisis has erased twenty years of fiscal consolidation and that Europe's growth potential has been halved, making "the task of securing future economic growth much more difficult" (EC, 2010a:7). In other words, we have witnessed a period of values lost, and in the meantime "the global economy is moving forward" (EC, 2010a:2). The Europe 2020 strategy is thus also one of catch-up, of regaining values lost in the economic and financial crisis.

The strategy is not merely concerned with the short-term of regaining its losses, as "the biggest challenge is the reflex to try to return to the pre-crisis situation" (EC, 2010a). The year 2010 must mark a new beginning, writes Barroso, "I want Europe to emerge stronger

from the economic crisis" (EC, 2010a:2). This is illustrated by three presented scenarios for the future growth of Europe. In one scenario, 'Lost decade', Europe has suffered a permanent loss in wealth and potential for future growth. In another, 'Sluggish recovery', Europe has suffered a permanent loss in wealth and start growing again from an eroded basis. Both scenarios depict growth paths below the pre-crisis estimate. In the remaining scenario, 'Sustainable recovery', Europe is able "to make a full return to earlier growth paths and raise its potential to go beyond" (EC, 2010a:9). As the desirable and 'only way to go' scenario, we learn that simply returning to pre-crisis growth is not a valuable, or even a viable, option. In other words, Europe 2020 is a strategy for gaining values in the future, regaining values lost in the past, and moving beyond the expected pre-crisis growth rates.

3.2.2 Research and innovation as the motor of a new economy

As indicated by its title, Europe 2020 is a strategy for 'smart, sustainable and inclusive growth' (EC, 2010a). In reading the strategy document, we learn that *sustainable growth* comes about when promoting a more resource efficient, greener and more competitive economy, *inclusive growth* by fostering a high-employment economy delivering economic, social and territorial cohesion, whilst *smart growth* is about bringing forward "an economy based on knowledge and innovation" (EC, 2010a:10). These three priorities are mutually reinforcing, reads the document, as "the point of entry into a new economy" (EC, 2010a:10). Although the priorities and initiatives of the strategy are many and multifaceted, it is the key role played by research and innovation in bringing about growth – 'smart growth' – which in the following will be discussed in more detail.

Generating this specific type of 'smart growth' means that "every link should be strengthened in the innovation chain, from 'blue sky' research to commercialisation" (EC, 2010a:12). This involves strengthening research performance and knowledge transfer, as well as "ensuring that innovative ideas can be turned into new products and services that create growth, quality jobs and help address European and global societal challenges" (EC, 2010a:11-12). The establishment of the flagship initiative 'Innovation Union' is at the heart of the Europe 2020 Strategy to enforce such a development, one of its aims to re-focus R&D and innovation policy on societal challenges, such as climate change, energy and resource efficiency, health and demographic change (EC, 2010a:32).

The strategy document stresses that 'smart growth' requires "strengthening knowledge and innovation as drivers of our future growth" (EC, 2010a:11). However, this emphasis on research and innovation as the solution to Europe's economic problems did not first emerge with the Europe 2020 Strategy. As will be demonstrated, the document can rather be understood as part of a lengthy and evolving discourse at EU policy level of inextricably linking research and innovation to economic growth. In reading the strategy, we learn that the headline target to ensure 'smart growth' is to achieve "the target of investing 3% of GDP in R&D" (EC, 2010a:32). This target of increasing GDP invested in research and development (R&D) is hardly new with the Europe 2020 Strategy. This targeting, as well as the wider discourse on the relationship between research, innovation and economic growth, can rather be traced back decades at EU policy level. I follow Stevienna de Saille (2015) as I here turn to the 1995 *Green Paper on Innovation* as marking a significant point of this discourse.

3.2.3 The European paradox: bridging the innovation gap

Susana Borrás (2003) writes that the mid-1990s marked a transition from 'technology policy' to 'innovation policy' in the EU. Borrás argues this to be the result of a gradual policy evolution over the last few decades, from science policy, to technology policy, to innovation policy, involving some 'truly paradigmatic changes' (2003:12). This did not merely imply an expansion of issues on the agenda, Borrás writes, but unleashed a reorganisation of policy-making at EU level (2003:10). The EC's 1995 *Green Paper on Innovation* can be viewed as a mark of this transition (Borrás, 2003:16). The objective of the green paper was to identify positive and negative factors on which innovation in Europe depended, and to formulate proposals for measures to increase its innovative capacity (EC, 1995:1). It was in this work a so-called 'European paradox' was identified, referring to the perceived failure of the region to translate scientific and technological achievements into marketable innovations.

The green paper reads that "the situation of the Europe Union in terms of innovation appears to be unsatisfactory, despite some first-rate scientific achievements" (EC, 1995:5). It addresses "the challenges of innovation for Europe, its citizens, its workers and its firms," referring to a backdrop of increasing global competition and rapid dissemination of new technologies (EC, 1995:4). It particularly points to the obstacle of inadequate input of GDP to R&D activities (2% in 1993) compared to USA and Japan (2.7% and 2.8%, respectively) (EC, 1995:24). The necessity for Europe to overcome its problems are manifested as clear, as

"innovation is an essential precondition for growth, maintaining employment and competitiveness" (EC, 1995:5). As a response to this identified paradox, the green paper calls for policy interventions for removing obstacles to help bridge this gap between research and innovation and, consequently, economic growth, employment and competitiveness.

In the following years, the green paper initiated a wide-scale consultative process in the European Commission 'on the problem of innovation in Europe', as addressed by the 1996 annual report *Research and Technological Development Activities of the European Union* (EC, 1996:16). "It is one of the paradoxes of the European Union that despite its internationally acknowledged scientific excellence, it launches fewer new products, services and processes than its main competitors," echoes the report (ibid). It continues to read that "this paradox has received much attention during recent years as innovation has become one of the main driving forces in economic competitiveness" (ibid).

De Saille emphasises in her work that although the refrain of the 1995 *Green Paper on Innovation* is familiar today, it produced a focus on how to put research more clearly in the context of innovation, specifically in the development of the 5th Framework Programme for Research and Technological Development (1999-2002) (2015:154). De Saille shows how this is reflected in its introduction of new thematic priorities, such as Competitive and Sustained Growth and three horizontal programmes for research and innovation to achieve this (2015:154). De Saille further points to another central document of this discourse, *Towards a European Research Area* (EC, 2000a), which will be approached in the following.

3.2.4 Towards a knowledge-based economy

At the turn of the century, the communication document *Towards a European Research Area* announced the EC's plans to realise the transition into a new 'knowledge-based economy' (EC, 2000a). The document reads that "the century we are now entering will be the century of science and technology" (EC, 2000a:4). It continues that, more than ever, "investing in research and technological development offers the most promise for the future," asserting research to account for an estimated 25-50% of economic growth (ibid). Its initial chapter, however, defines the current situation of research in Europe as 'worrying' (ibid). As the 1995 *Green Paper on Innovation*, the communication points to a lack of investment in research and innovation in Europe compared to rivals USA and Japan. In addition, it reads that Europe is

falling behind in high-tech areas and suffering from 'brain drain' to countries with higher GDP investments in R&D. Failing concerted action to rectify this situation, it reads, could lead to loss of growth and competitiveness in an increasingly global economy (ibid).

As stressed by de Saille, the communication proposes consolidating the successful transition into a knowledge-based economy by the creation of a European Research Area (ERA) (2015:154). Described as a 'fifth freedom' of the EU, the ERA would allow the circulation of knowledge in the same manner as goods, capital, services and workers within the single market. De Saille writes that to fund this, each Member State was to gradually increase R&D investments to 3% of GDP, in addition to increasing the EU funding of the Framework Programmes (2015:154). A well-funded internal knowledge market would help solve the region's predicament, as it would integrate and coordinate research actions to make them as effective and innovative as possible, foster excellence, create jobs and attract the best researchers (EC, 2000a:8).

The objective set out by the communication would be endorsed shortly after by the European Council, at a special meeting held on 23-24 March 2000 in Lisbon. In reading the presidency conclusions, we learn that the aim of the meeting was to "agree on a new strategic goal for strengthening employment, economic reform and social cohesion as part of a knowledge-based economy" (CEU, 2000). These strategic goals would make up the Lisbon Strategy, the action and development plan for Europe's economy in the period 2000-2010, the predecessor of Europe 2020 (2010-2020). In the presidency conclusions, the creation of the ERA is made part of the launch of the Lisbon Strategy, aimed at making Europe 'the most competitive and dynamic knowledge-based economy in the world' by 2010 (CEU, 2000).

De Saille writes that by its mid-term review, the Commission judged the Lisbon strategy to have failed, having not delivered significant progress toward its goals (2015:155). This was met with the production of a rejuvenated version of the strategy document, *Working together for growth and jobs – A new start for the Lisbon Strategy* (EC, 2005). According to de Saille, the Lisbon strategy was here "re-formulated away from long-term strategies for deepening integration to focus on the 'immediate target' (…) of jobs and economic growth (2015:155). She emphasises that although still targeting 3% GDP, it was now in the context of stronger emphasis on innovation as the 'beating heart' of a new knowledge-based economy (de Saille, 2015:155). The Commission's final evaluation of the Lisbon strategy in 2010, however, reads

that it had ultimately failed to deliver on its main targets, including that of reaching 3% of GDP invested in R&D and in completing the ERA (EC, 2010b).

It was this year the Europe 2020 Strategy was launched for the decade to come, materialising as part of this evolving discourse at EU level. The situation can be characterised as one of assembling a new economy, or "the most competitive and dynamic knowledge-based economy in the world" (CEU, 2000), largely driven by research and innovation. In replacing the Lisbon Strategy, Europe 2020 is in many ways an extension of its predecessor, placing research and innovation at its heart to spur European economic growth, employment and competitiveness. Such an extension is also visible in the Europe 2020 objectives. The obstacle identified by the 1995 *Green Paper on Innovation* of insufficient investments of GDP in R&D, sought overcome in the Lisbon Strategy by aiming for a targeted 3% of GDP, has been extended into Europe 2020, as an overall investment of 3% GDP by 2020 remains one of its 'headline targets' (EC, 2010a:32). Moreover, the strategy continues to pursue the aim of achieving the still-incomplete ERA (EC, 2010a:10).

As an evolving discourse linking research and innovation to economic growth, it is also a situation linking research more closely to innovation. The *Green Paper on Innovation* addressed Europe's incapacity of translating research into innovation, and consequently, to bring about economic growth, employment and competitiveness (EC, 1995). The articulation of this 'European paradox' and the actions enabled in response thus also inextricably links research to innovation, as the perceived gap between them must be overcome if such activities are to bring about economic growth. This research-innovation relation is equally enacted by Europe 2020, for example in its focus on strengthening "the entire innovation chain, from 'blue sky' research to commercialisation" (EC, 2010a:12). In other words, we are dealing with an evolving situation at EU policy level of connecting *research to innovation* as well as of connecting *research and innovation to economic growth*.

3.2.5 The overarching document and its implications

Europe 2020 is the principal strategy document of the European Union, reading that "all EU policies, instruments and legal acts, as well as financial instruments, should be mobilised to pursue the strategy's objectives" (EC, 2010a:20). As a document overarching all others, it necessarily enables certain trajectories and may equally restrict others, as all instruments are

to be directed towards the accomplishment of its objectives of growth. As such, the document may be viewed as a focal point amidst a relational web of strategies, policies, objectives and documents, of which all other entities must respond to. This includes the Horizon 2020 Framework Programme and, consequently, RRI as a framework deployed under it. As was demonstrated in the introduction of this subchapter, this situation of realising economic growth and exiting the crisis is made integral to the nascent policy concept of RRI.

The aim of this subchapter has been to 'weave out' an evolving discourse on the role of research and innovation in the economic prosperity and global competitiveness of Europe. As has been argued, it can be viewed as a dynamic situation of linking research and innovation to economic growth and, in the same turn, linking research more closely to innovation. In contrast to the optimistic tone of the Lisbon Strategy, reading that the "the Union is experiencing its best macro-economic outlook for a generation" (CEU, 2000), the Europe 2020 Strategy is positioned at the outset of a shattering financial and economic crisis with "no precedent in our generation" (EC, 2010a:7). This, in turn, puts considerably more pressure on a successful relationship between research, innovation and economic growth. As such, one could argue it to be a situation enabling research and innovation to be increasingly valued in terms of macroeconomic outputs and, simultaneously, enabling more funding to be directed towards research and innovation. This appears to be the case for Horizon 2020, its budget of €80b by far the largest budget of an EU Framework Programme to date.

This situation, however, is more complex. As I will demonstrate in the next subchapter, the EU research and innovation policy discourse has evolved into one increasingly occupied with directing research and innovation toward solving societal challenges. This discourse has already briefly been touched upon, as it plays out in some of the documents approached thus far. As such, this development can be viewed as intersecting and interacting with the discourse outlined above, as part of the same *situation*.

3.3 A directing toward societal challenges

In reading the Europe 2020 strategy, it was noted that 'smart growth' included research and innovation to "help address European and global societal challenges" (EC, 2010a:12). The

strategy further reads that the aim of the Innovation Union flagship initiative is exactly to re-focus R&D and innovation policy on 'the challenges facing our society', such as climate change, energy and resource efficiency, health and demographic change (EC, 2010a:12). The aim of this subchapter is to demonstrate how these articulations of an orientation toward 'societal challenges' is entwined in a dynamic discourse unfolding at EU level of directing research and innovation toward tackling such challenges. This is a discourse deeply entangled with that presented in the previous subchapter, and may thus be considered part of the same situation. This will be addressed in more detail throughout this subchapter.

It is not merely by reading the Europe 2020 strategy that we may discern links between a discourse of redirecting research and innovation toward societal challenges and the policy concept of RRI. The interactions of this situation and RRI can equally, and perhaps more clearly, be discerned by 'tracing the weavings' of the documents concerning RRI specifically. The 2012 informational brochure published by the European Commission, *Responsible Research and Innovation – Europe's ability to respond to societal challenges*, reads exactly that "the grand societal challenges that lie before us will have a far better chance of being tackled if all societal actors are fully engaged in the co-construction of innovative solutions, products and services" (EC, 2012a).

In seeking to 'recover' the situations conditioning the emergence of RRI, the policy concept appears as a response to a concern with solving such 'grand societal challenges'. This relation lends itself more visible to us when reading the brochure title, as RRI is juxtaposed exactly with "Europe's ability to respond to societal challenges" (EC, 2012a). The *Rome Declaration on Responsible Research and Innovation in Europe* reads similarly, that RRI will ensure that research and innovation "delivers on the promise of smart, inclusive and sustainable solutions to our societal challenges". It further reads that it "builds on the 2009 Lund Declaration, which called for an emphasis on societal challenges" (Rome Declaration, 2014). The Lund Declaration, as well as the wider situation it is made part of, will be read more closely in the following.

3.3.1 Tackling the 'grand societal challenges' of our time

On 7-8 July 2009, roughly 385 invitees from 35 European countries gathered in the university town of Lund, Sweden. The occasion was the Swedish EU Presidency Conference *'New*

Worlds – New Solutions. Research and Innovation as the Basis for Developing Europe in a Global Context'. The conference report reads that this was an opportunity to discuss what should come after the EU's current 7th Framework Programme (FP) (2007-2013), but that it was also an opportunity to discuss EU policy more widely (Lund Report, 2009:9). In his opening remarks, the Swedish Minister of Research and Higher Education Dr. Tobias Krantz said: "We are not only talking here about the context of the Framework Program, as it is only one of several instruments. In general terms the strategic approach must build on further development of all elements of the Lisbon Strategy" (ibid, 10). In other words, it was a conference to discuss the future research and innovation funding programme in the wider context of the strategy for the economic advancement of Europe.

The overarching theme of the conference was how Europe should "manage the emerging Grand Challenges" (Lund Report, 2009:7). At the heart of the endeavour was the launch of the Lund Declaration. In its initial paragraph, the declaration asserts that the global community is facing 'Grand Challenges' in areas such as "global warming, tightening supplies of energy, water and food, aging societies, public health, pandemics and security" (Lund Declaration, 2009). The European Knowledge Society, the declaration reads, must turn these challenges into sustainable solutions. As evident from its subtitle, the declaration urges that 'Europe must focus on the Grand Challenges of our time'. More specifically, the declaration states that "European research must focus on the Grand Challenges of our time moving beyond current rigid thematic approaches" (Lund Declaration, 2009).

This preoccupation at EU level of directing research and innovation toward tackling societal challenges did, however, not first emerge with the Lund Conference. The conference took place in the midst of a sequence of evaluative activities on the performance of the prior 6th FP and the current 7th FP. Prior to and shortly after the conference, views on the future FP's were presented by several evaluation reports. These included the report of the ERA Expert Group (EC, 2008), the FP6 *ex post* evaluation report (Rietschel et al., 2009) and the FP7 interim evaluation (Annerberg et al., 2010), as well as the interim evaluations of the Competitiveness and Innovation Framework Programme (CIP) for 2009-2013 (Wilkinson & Allison, 2010). Among the key calls for future FP's was the role of research and innovation in tackling societal challenges, such as ageing, energy dependence, and climate change. The February 2009 FP6 *ex post* evaluation report, for instance, argues that the future 8th FP should have 'Grand Challenges' as a main line of action, to "convert the problems, concerns and

questions of its citizens and other citizens of the world into a series of Grand Challenges and then act to meet them" (Rietschel et al., 2009:63).

De Saille demonstrates how this growing attention to societal challenges can be traced to the concerns of achieving the European Research Area (ERA) (2015). De Saille writes that the ERA Expert Group report (EC, 2008) reflects the lack of progress toward its achievement, calling for a 'clear purpose which is meaningful to Europe's citizens and political leaders' to create a 'compelling case for a real shift of resources' to complete the ERA (2015:155). In seeking to revive the ERA, the Council met in 2008 as part of the *Ljubljana Process*. At this meeting, the Council agreed on some long-term visions for the future of the ERA, including "citizens benefiting from the contribution of large-scale R&D efforts to solve major societal challenges" (CEU, 2008:4). De Saille argues that this included the 'themes' of previous FP's to be reframed as 'Grand Societal Challenges' (2015:155). The Lund Declaration, as we have seen, calls exactly for a focus on societal challenges to move 'beyond current rigid thematic approaches' (2009). On this basis, the focus on social challenges can be viewed as integral to the situation of achieving the ERA, as part of assembling a 'knowledge-based economy'.

This view is further enhanced by the report of the ERA Board, *Preparing Europe for a New Renaissance: A Strategic View of the European Research Area* (EC, 2009). The report calls for a 'New Renaissance', a "paradigm shift in how we think, live and interact together, as well as a paradigm shift in what the role and place of science should be" (EC, 2009:7). It reads that our world is changing as we are facing mounting challenges, and that to meet such challenges, we must start by changing the way we do research (EC, 2009:5). Consequently, the report calls for an ERA "driven by societal needs to address the 'Grand Challenges', such as climate change, energy supply, water resources, ageing societies, healthcare and sustainable prosperity for all" (EC, 2009:7). In other words, the directing toward societal challenges can be viewed as part of this 'New Renaissance' for Europe, as a strategy for achieving the ERA.

As outlined above, the report reads that the 'New Renaissance' involves a paradigm shift in what the role and place of science should be (EC, 2009:7). We must rethink the way science interacts with politics and society, reads the report, and "we must rewrite the social contract between the researcher and society, so that freedom of thought is balanced by responsibility for action" (EC, 2009:5). We may here draw some very direct lines to the RRI framework, as

one concerned with "Europe's ability to respond to societal challenges" (EC, 2012a) and with "aligning research and innovation to the values, needs and expectations of society" (Rome Declaration, 2014). It is as part of this evolving discourse of responding to societal challenges that the Lund Declaration (2009) emerges, which the *Rome Declaration on Responsible Research and Innovation in Europe* expressly 'builds upon' (2014). I return here to the Lund Declaration as a particular type of document, or 'device' (Muniesa et al., 2007).

3.3.2 The declaration as 'opening up'

Central throughout this thesis is the view that documents do not simply mediate reality, but actively take part in working upon it (Asdal, 2015b). Documents *do* something, and may thus be understood as certain *devices* in the sense that 'they act or they make others act' (Muniesa et al., 2007:2). As a certain type of document, or 'device', the declaration is consequently *doing* something, it makes others act by 'opening up' for certain actions. The Oxford English Dictionary (OED, 2017) defines a declaration as a noun which denotes "1 A formal or explicit statement or announcement". The noun further has seven sub-definitions, of which five are law or card game specific. Of the two remaining sub-definitions, the first reads: "1.1 The formal announcement of the beginning of a state or condition", and the second: "1.2 A written public announcement of intentions or of the terms of agreement".

One could argue both aforementioned definitions to be descriptive of the Lund Declaration. It is a written public announcement of *intentions or of the terms of agreement*, as it declares intentions of reorienting research toward challenge-led schemes, rather than themes – that "European research must focus on the Grand Challenges of our time moving beyond current rigid thematic approaches" (Lund Declaration, 2009). In this way, it can also be understood as working upon or modifying the 'terms of agreement' for research and innovation funding. The Lund Declaration may also be described as a formal announcement of the *beginning of a state or condition*, as it calls for a refocusing of the research and innovation funding structure at EU level. As such, the Declaration can be viewed as a device 'opening up' for certain manoeuvres and trajectories. One way it does so is by mobilising actors for action, as it "calls upon the Council and the European Parliament to take this process forward in partnership with the Commission" (Lund Declaration, 2009).

The declaration partakes in enabling certain actions to transpire, and thus for moving in a certain direction. Since the Lund Declaration, the EU's 8th Framework Programme for Research and Innovation, Horizon 2020, has come into being. A main funding pillar of Horizon 2020 is exactly 'Societal Challenges'. As such, one can argue the call of the Lund Declaration and wider discourse to have materialised into actual and tangible rearrangements of research and innovation funding structures at EU level. The 'Societal Challenges' funding category consists of seven articulated 'Grand Challenges', as well as the programme 'Science with and for society' (SwafS) – under which actions for the development and promotion of RRI are located. On this basis, we may understand RRI as enabled in part by this discourse, as a policy framework concerned with "Europe's ability to respond to societal challenges" (EC, 2012a). In the next few sections, another rearrangement with the transition to Horizon 2020 will be given some emphasis in connection to RRI.

3.3.3 A Common Strategic Framework

In 2014, Horizon 2020 replaced the 7th FP for Research and Technological Development (2007-2013). A noteworthy alteration made in this transition is that research and innovation funding were for the first time handled under one all-embracing programme. Prior to Horizon 2020, research and innovation funding had been separated in the Framework Programme for Research and Technology Development (FP) and the Competitiveness and Innovation Framework Programme (CIP). The merging of funding programmes realised with Horizon 2020 has roots in the Green Paper *Toward a Common Strategic Framework for EU Research and Innovation Funding* (EC, 2011b).

As indicated by its title, the green paper advocates for a common framework. It reads that evaluations of the then separate research and innovation funding programmes had identified shortcomings and deficiencies (EC, 2011b:5). These were the evaluations taking place around the time of the Lund Conference, and criticised particularly "the lack of a whole chain approach to research and innovation, the complexity of instruments, over-bureaucratic rules and procedures and a lack of transparency" (EC, 2011b:5). The Green Paper further reads that a way forward had been identified in this respect – a 'Common Strategic Framework' (EC, 2011b:6). This would cover all research and innovation funding currently provided through FP7, CIP and supplementary initiatives, reads the Green Paper, "on the basis of coherent goals and shared strategic objectives" (EC, 2011b:6). The green paper reads that this

means working together to deliver on Europe 2020 and on tackling societal challenges (EC, 2011b:6-7). The entanglements of the discourse concerned with research, innovation and growth and that of tackling societal challenges here becomes evident, as delivering on Europe 2020 and tackling societal challenges is assembled as 'coherent goals and shared strategic objectives' (EC, 2011b:6).

The Common Strategic Framework offers large potential, reads the green paper, as it suggests administrative simplification, standardised rules, easier access for participants and a more effective structure. It addresses a further deficiency of current organisation, where the various programmes supporting research and innovation cover "activities across the innovation cycle, yet often operating independently of each other" (EC, 2011b:6). The common framework, on the other hand, is a "streamlined set of funding instruments covering the full innovation chain in a seamless manner," it reads, from "research to market uptake" (EC, 2011b:7-8). The green paper thus addresses a perceived problem of handling research and innovation as separate. Merging them under one coherent framework will increase their output value, by ensuring a seamless process from research and innovation to market uptake – as well as decreasing the values spent on administrative costs. Effectively, this merging under Horizon 2020 enacts research and innovation as entities more valuable when handled together, further reinforcing the situation's inextricable linking of them.

With this merging of research and innovation funding under one coherent programme, we may draw lines to the emergence of RRI. Under the 6th FP, the programme 'Science and Society' (SaS) was established, replaced by 'Science in Society' (SiS) in the subsequent 7th FP. Although I will return to these programmes in more detail at a later point in this thesis, some emphasis should be given here. What these two programmes had in common was a preoccupation with the relation between science and society and the societal impacts of science (EC, 2002; 2007). With Horizon 2020, SiS was replaced by 'Science with and for Society' (SwafS). As with its predecessors, SwafS only has 'science' in its title. The SwafS programme, however, has the proliferation of Responsible Research and Innovation (RRI) as its main objective. So effectively, it is concerned with the impacts of both science *and* innovation, where its predecessors were occupied with science alone. In other words, it may appear that, at least in part, RRI is also a result of these programmatic changes. Through the structural reorganisation of the research and innovation funding schemes, RRI could emerge as a policy concept concerned with the societal consequences of both science *and* innovation.

3.3.4 A view of the situation as a whole

The two evolving discourses outlined here can be considered as part of the same *situation*. The entanglements of these developments have already been demonstrated to some extent in the previous sections, as bringing about economic growth and tackling societal challenges are presented as 'coherent goals and shared strategic objectives' of the Common Strategic Framework that would materialise as Horizon 2020 (EC, 2011b:6). These entanglements are discernible also in reading the Europe 2020 Strategy, in its aims to 're-focus R&D and innovation policy on the challenges facing our society' (EC, 2010a:12). In the following, I aim to further elucidate these entanglements and give a view of the situation as a whole.

René von Schomberg argues that the Lund Declaration gives an alternative justification for investing in research and innovation, in terms of responding to societal challenges (2013:59). He writes that it "defines a type of justification for investment in research and innovation toward *particular* positive outcomes and underlines a justification for research and innovation beyond purely economic terms" (ibid, emphasis in original). In other words, the situation is one 'opening up' for directing research and innovation toward addressing societal issues and objectives, beyond economic reasoning. However, the Lund Declaration also emphasises benefits in terms of economic growth in this refocusing:

> Meeting the Grand Challenges will be a prerequisite for continued economic growth and for improved changes to tackle key issues. It will involve women and men on equal terms in the development of society and cut across social, religious, generational and cultural obstacles bringing about new possibilities and increase the well-being and quality of life for all. Europe's leadership in meeting the global challenges will make it an attractive partner in global cooperation for sustainable development (Lund Declaration, 2009).

In reading this paragraph, the discourse on research and innovation responding to societal challenges appears deeply entangled with the discourse of bringing about growth, as meeting the 'Grand Challenges' will be 'a prerequisite for continued economic growth'. In addressing this, von Schomberg argues it to be based upon the assumption that sustainable economic growth is only possible when certain societal objectives are met – in the form of responses to the societal challenges (2013:59). In other words, economic value creation is made mutually contingent to societal value creation, such as gender equality, well-being and quality of life

(Lund Declaration, 2009). On this basis, one could argue that the situation does not merely justify or 'open up' for research to be directed towards societal objectives, but that it also 'opens up' for new strategies for economic value creation. We are dealing with a situation in which a particular type of economic growth is deemed desirable, as von Schomberg notes, in which sustainable growth is only possible when certain societal objectives are met (2013:59).

The situation, as a whole, can be viewed as enabling investments in research and innovation to be increasingly directed toward societal issues and, in the same turn, as enabling new strategies for economic value creation. Juxtaposed with 'Europe's ability to respond to societal challenges' (EC, 2012a), we may understand RRI as conditioned by a situation of pursuing this particular type of growth. In addition, the EC's informational brochure on RRI reads that "the grand societal challenges that lie before us will have a far better chance of being tackled if all societal actors are fully engaged in the co-construction of innovative solutions, products and services" (EC, 2012a). We may here understand the policy concept as a tool to increase Europe's ability to respond to such challenges, asserted by the Lund Declaration as a prerequisite for continued economic growth. As a situation of exiting a financial and economic crisis, additional pressure is put on the successful tackling of such challenges (EC, 2010a).

In the two preceding subchapters, I have attempted to 'recover' one situation, as a 'context in action' (Asdal, 2012), actively taking part in producing a particular situation in which RRI could emerge as a relevant and valuable policy object. As has been noted, contexts do not necessarily come in the singular (Asdal, 2012:388). In seeking to 'weave out' the particular situation in which the RRI framework could emerge at EU level, I argue that another discourse must be taken more into account. This is a situation of decades of research on the science-society relation, unfolding particularly within the field of STS.

3.4 A situation of research on the science-society relation

In reading the documents dedicated to RRI, we may discern a circulating narrative of a policy concept emerging in response to years of research and pilot activities seeking to improve the relationship between science and society. We may distinguish such a narrative in reading the

newsletter from the workshop held on RRI in Brussels in 2011, organised by the European Commission's (EC) Directorate-General for Research and Innovation (DG R&I). In his opening remarks, Director in charge of the ERA Octavi Quintana stated that "after several years of research on the relation between science and society, we evidenced that we need to involve civil society very upstream to avoid misunderstanding and difficulties afterwards" (EC, 2011a). Such a narrative of the motivations for a new framework was emphasized also at the high-level conference on RRI held the following year in Odense. At the conference, the European Commissioner for Research, Innovation and Science Máire Geoghegan-Quinn delivered the following message:

> After 10 years of action at EU level to develop and promote the role of science in society, at least one thing is very clear: we can only find the right answers to the challenges we face by involving as many stakeholder as possible in the research and innovation process (EC, 2012a; 2014a).

This message from the Commissioner is also printed in the informational brochure on RRI, *Responsible Research and Innovation – Europe's ability to respond to societal challenges*, issued by the EC in 2012. Furthermore, the *Rome Declaration on Responsible Research and Innovation in Europe*, signed in 2014, reaffirms this narrative, referencing to "more than a decade of research and pilot activities on the interplay between science and society" (Rome Declaration, 2014).

This circulating narrative of decades of research on the science-society relation points toward a long-standing and evolving programme within the EU Framework Programmes (FP). The development of this programme over time is described in the aforementioned informational brochure on RRI. It reads that the 'Science and Society' (SaS) programme was established in 2001 under the 6th FP, replaced by 'Science in Society' (SiS) in 2007 under the 7th FP. Under Horizon 2020, this programme has been replaced by 'Science with and for Society' (SwafS) (EC, 2012a). What they all have in common is that they address the relationship between science and society at large. It is under this programme the development and promotion of RRI is positioned, beginning under the SiS programme and today located under the subsequent SwafS programme. In this subchapter, I argue that the emergence of RRI, as well as the evolvement of the programmes through which it materialised and is located, was

conditioned by a situation of decades of research on the science-society relation, unfolding particularly within the field of STS.

Connections between RRI and STS have previously been recognised in the literature. Owen, Macnaghten and Stilgoe write that the motivations of RRI "builds on decades of research in science and technology studies, philosophy and beyond" (2012:753). I argue that how this policy concept can be understood as building on decades of such research should be given more emphasis, as is my aim to demonstrate in more detail. It should be emphasised that the documents themselves do not explicitly reference any specific tradition or field. They do, however, present RRI as a response to "more than a decade of research and pilot activities on the interplay between science and society" (Rome Declaration, 2014), pointing toward the SaS, SiS and SwafS programmes. I argue here that the evolution of these programmes has been enabled by developments within specific strands of STS research, concerned exactly with the relationship between science and society. On this basis, it is my argument that the research RRI is framed as a response to is, albeit not solely, but partially and significantly, research within the field of STS.

The literature in the field of the science-society relation is vast and encompasses a wide range of disciplines. This is not the place for an extensive literature review or history of the field. Instead, I delineate the focus of this section to research within the field of STS and, more precisely, to the strands of research concerned specifically with the relationship between science and society. In doing so, I will account for some significant shifts and analytical attentions in the field, connecting them to the RRI framework as well as to the evolution of the SaS, SiS and SwafS programmes. With regards to the limited scope of this thesis, some delimitation is again necessary here. In the following, emphasis will be given to the work of some influential scholars in the field, namely that of Brian Wynne (1992), Langdon Winner (1980; 1991) and Sheila Jasanoff (2003; 2004), as well as the joint work of Michel Callon, Pierre Lascoumes and Yannick Barthe (2009 [2001]).

3.4.1 Shifts in perception: From 'deficit model' to 'engagement model'

The relation between science, technology and society has been the analytical focal point of much research within the field of STS. As will be shown throughout these sections, many scholars in the field have been preoccupied with ascertaining the reciprocity of science and

society, the often-unintended societal impacts of scientific and technological development, and the significance of different types of knowledge and expertise. As such, these strings of the literature may be recognized as critiques of common understandings of science-society relations and of research and innovation governance founded upon such understandings. As will be demonstrated, certain parts of the literature urge researchers, innovators and policy-makers to take more responsibility for the wider societal impacts of their actions, particularly by facilitating public participation. To elaborate on this argument, a significant shift in perception in the field should first be briefly accounted for. This can be characterised as a shift from a 'deficit model' to a 'constructivist model' or 'engagement model'.

In his work, Martin Bauer traces the evolution of the research field concerned with public understanding of science (2009). Bauer writes that the relationship between science and society received increasing interest in the 1960s, focusing on the *scientific literacy* of citizens. Studies of such scientific literacy reported dismal results, in which a knowledge deficiency was attributed to the public (Bauer, 2009:223). Increased efforts in science education was here considered the proper form of intervention. This prompted a technocratic attitude, Bauer writes, indicating that a 'scientifically illiterate' public was not qualified to take part in decision-making (ibid). Effectively, such an understanding largely disqualified citizens to partake in democratic processes regarding science and technology.

New concerns emerged with the 'public understanding of science' (PUS) research field in the 1980s, although the diagnosis was still that of public deficit (Bauer, 2009:224). The research agenda here shifted from knowledge to attitudes, the idea being that 'the more you know, the more you love it', writes Bauer (ibid). He continues to write that this was built on the concern for scientific institutions that citizens did not express sufficient support for science. The idea was that if only given enough information, the public attitude would necessarily be a positive one. In other words, the so-called 'deficit model' can be described as one where public controversy is attributed to ignorance, irrationality or lack of information. Sturgis and Allum describe such a stance as one where the public is assumed to be 'deficient', whilst science is 'sufficient' (2004:57). This implies an internalist view of science, as a separate and pure domain in which scientists uncover objective truths to be diffused throughout society.

Such perceptions would later be challenged as researchers increasingly departed from this tradition, represented by a turn to constructivist or engagement approaches to public

understanding. Perceptions were here shifted from the *uncovering* of scientific facts to the *construction* of scientific facts and 'science in the making' (e.g. Latour & Woolgar, 1979). Central to this shift is Sheila Jasanoff's *idiom of co-production*, reasoning that science and society are mutually, essentially and continuously "co-producing" one another (2004). This has been particularly influential within strands of STS concerned with the science-society relation, as the notion of "co-production" implies that science and technology inescapably take part in producing the social order and vice versa. In other words, it recognises that decision-making in research and innovation concerns society in very direct ways.

Another significant attention of STS has been the shifting of analytical focus away from how laypeople understand, or rather, misunderstand, science. Instead, empirical studies of how laypeople actively *engage* or *interact* with science has received attention, for example how science-based claims and legislation interacts with local contexts, expertise and practises (e.g. Singleton, 2012). This has become known a shift from 'public understanding of science' (PUS) to 'public engagement with science' (PES) (Marres, 2007:761). Brian Wynne (1992) addresses this in the case of Cumbrian sheep farmers' response to scientific interpretations. In his work, Wynne shows how actions of scientific interpretation regulated the sheep farmers and simultaneously neglected their local expert knowledge, their resistance rationalised as irrationality and ignorance. Wynne found that in the case of the sheep farmers, such a 'deficit model' toward their concerns led to restrictions and substantial economic losses for the farmers, and, not least, unrepairable damage to the public credibility of science and scientific expertise.

In other words, the assertion that 'the more you know, the more you will love it' has received considerable critique within the field of STS. On controversial issues, writes Bauer, there has proved to be little if any correlation at all, as "well-informed and less well-informed citizens are to be found on either side of the controversy" (2009:224). It has also been reasoned that proponents and opponents in scientific controversies are likely to weigh different kinds of knowledge as important or relevant (Sturgis & Allum, 2004:57). In turn, the field of STS has developed a particular sensitivity toward techno-scientific controversies. Some of this work can be viewed as critiques of how such controversies are handled in practice. This will be exemplified in the following by drawing on the work of Jasanoff (2003; 2004) and Winner (1980; 1991), as well as the joint work of Callon, Lascoumes and Barthe (2009).

3.4.2 Responsibility critiques: calls for democratisation

Following insights into the wider and often unintended societal impacts of science and technology and how they necessarily 'co-produce' one another (Jasanoff, 2004), several STS researchers have advocated for a democratisation of its development. Jasanoff argues that there is a need for policy-makers to adopt set of 'technologies of humility', as there is no longer any question if increased public participation in science and technology decision-making is necessary (2003). She urges governments to reconsider the existing relations among experts, policy-makers and citizens in managing technology, stressing the need to create a more meaningful conversation between them (2003:227). This argumentation for a democratisation of research and technology decision-making in the field will here be further elaborated on.

Langdon Winner has been particularly influential in his argumentation of technology as inherently political. In "Do artefacts have politics?" (1980), Winner is emphatic that technology design should be more centred on its democratizing or non-democratizing effects. He demonstrates how unforeseen and often overlooked consequences of technology affect different aspects of society, such as gender equality, social mobility, power and wealth. With such insights into the wider often-unforeseeable consequences of technology, Winner urges relevant actors to take such wider societal factors more into account in the innovation design trajectory. In "Artefact/Ideas and Political Culture" (1991), Winner argues that not only should the possible societal effects be considered and worked on during the entire process, but all parties affected by the technology should take part and be involved in the process to engage in how it will or should look like, a guiding maxim he refers to as 'no innovation without representation' (1991:88).

Another significant contribution to this discourse is Michel Callon, Pierre Lascoumes and Yannick Barthe's *Acting in an uncertain world – an essay on technical democracy* (2009). The authors argue that political institutions must manage techno-scientific controversies by transforming them into productive conversations, thereby bringing about a 'technical democracy'. They demonstrate how so-called 'hybrid forums', conversations where citizens, experts and politicians come together, reveal the limits of traditional delegative democracies, in which quasi-professional politicians make the decisions and the techno-scientific is the domain of specialists alone (2009:34-35). "Delegative democracy prospers and demonstrates

its effectiveness when knowledge and identities are stabilized," they argue, "but it must be supplemented when uncertainties and the controversies they feed take hold" (2009:256). In other words, Callon, Lascoumes and Barthe argue the division between politicians, specialists and citizens to be outmoded in states of techno-scientific uncertainty. Instead, they argue for a continual process of 'hybrid forum' consultations as a necessary contribution to the ongoing 'democratization of democracy' (Callon et al., 2009:257).

In the preceding sections, I have demonstrated how attentions in the field of STS increasingly shifted from 'public understanding of science' (PUS) and a 'deficit model', toward 'public engagement with science' (PES) and a constructivist approach, accounted for by some influential work in the field. In the next section, I will demonstrate how this situation of decades of research enabled the emergence of RRI at EU level. In doing so, I turn first to the evolution of the SaS, SiS and SwafS programmes, developments through which the policy concept would eventually materialise.

3.4.3 The evolution of SaS, SiS and SwafS

In reading the EC issued brochure *Responsible Research and Innovation – Europe's ability to respond to societal challenges* (EC, 2012a; 2014a), we learn that the action plan 'Science and Society' (SaS) came into force in 2001 with the 6th FP, replaced by 'Science in Society' (SiS) in 2007 with the 7th FP, and by 'Science with and for Society' (SwafS) in 2014 with Horizon 2020. It was under the SiS programme that RRI was first conceived at EU level, to be further developed and promoted throughout SwafS. In demonstrating how the situation of decades of research within the field of STS can be understood as conditioning the emergence of RRI, the evolving character of these action plans at EU level should be given some emphasis. In doing so, I will inquire into how the developments of the action plans interact with developments within field of STS.

In 2001, the *Science and Society Action Plan* was launched, dedicated to improving the relationship between science and society at large (EC, 2002). The preface of the action plan reads that a recent Eurobarometer had indicated "the enormous amount of progress that needs to be achieved in this connection" (EC, 2002:4). The survey had reported that the public largely considered themselves poorly informed or uninterested in science, and that European citizens did not always have a positive perception of scientific and technological progress

(EC, 2002:7). In response, the 'Promoting of scientific education and culture' was put at the forefront of the action plan, including actions for public awareness, science education and improved dialogue with citizens (EC, 2002:9-15).

We may here draw some lines between the SaS action plan and a so-called 'deficit model' of approaching society, in which public scepticism is largely attributed to lack of information or irrationality (Sturgis & Allum, 2004). The action plan comparably attributes citizens' mistrust of scientists and their activities and negative perceptions of scientific progress to a lack of sufficient knowledge and interest. As such, increasing the 'scientific literacy' of the public is considered the appropriate form of intervention, reflected in the action plan's foremost strategy of increasing public awareness, science education and communication with citizens. On this basis, one could argue the action plan to reflect the idea that 'the more you know, the more you love it' – that sufficient information necessarily facilitates positive attitudes toward scientific and technological development (Bauer, 2009:224).

The action plan title 'Science *and* Society' may similarly be argued to imply a perception of science and society as largely separate domains. Such a perception of the science-society relation is further indicated when reading the objectives of the action plan, described as an "initiative to develop a stronger and more harmonious relationship between the world of science and society at large" (EC, 2002:32). One could argue here that the action plan's orientation towards making a better connection between the world of science, on the one hand, and the world of society, on the other, reflects the rationales of 'public understanding of science' research, in which science is perceived as an endeavour of uncovering objective facts about the world to be diffused to society at large.

The 2007 retitling of the action plan, from 'Science *and* Society' to 'Science *in* Society', marks a shift in perception, suggesting a view of science as necessarily embedded in society. This shift in both title and perception is explicitly stressed in the SiS 2007 Work Programme (WP), reading that "the change in perspective illustrated by the new title "Science in society" recognises that research activities are a specific type of social activity that is embedded in a wider societal context" (EC, 2007:4). We may connect this emergent attentiveness to science as a social endeavour to developments within the field of STS. Central to the shift toward a 'constructivist model' was an attentiveness to the construction of scientific fact and 'science in the making' (Latour & Woolgar, 1979), as well as recognising the reciprocal character of

the relation between science, technology and society, that they are necessarily and unavoidably 'co-producing' one another (Jasanoff, 2004). As such, one could argue the evolvement of the action plan, from SaS to SiS, to be enabled by such developments in STS research.

A report prepared on the outcomes of the 2005 *Gover'Science Seminar*, organised by the EC, further indicates such interactions between STS and SiS. The report reads that the seminar had gathered experts from disciplines such as STS, policy analysis and social science to look towards the future 7th FP (Stirling, 2006:14). It further reads that the participants had called for a need to "move away from the fragmented, introspective and reactive preoccupations of *science and society*, towards more integrated, open and proactive understandings of the inescapable place of *science in society*" (Stirling, 2006:40, emphasis in original). The bottom line recommendation of the seminar was moving towards a new mode of 'co-operative research' informed by and incorporating public engagement by more effective forms of symmetrical two-way deliberation, recognising "the undeniable policy imperatives for greater public engagement in the governance of science and technology" (Stirling, 2006:13).

Although the shift in title and perception is not explicitly attributed to any specific field of research in the 2007 SiS WP, the report from the 2005 *Gover'Science Seminar* can be argued to demonstrate such interactions. The 2007 SiS WP also actively recognizes and values such developments, calling for action "to harness the knowledge produced by history, sociology, philosophy of sciences and science and technology studies (STS) into policy practice" (EC, 2007:10). In addition, the first SiS action line, 'A more dynamic governance of the science and society relationship', includes calls such as 'research on the reciprocal influence of science and culture' and creating 'better understanding of the place of science and technology in society' (EC, 2007:10). As such, this evolvement of title, perception and calls for action in the SiS action plan may be understood as enabled by developments within the field of STS.

It is under the 2012 SiS WP that the notion of RRI first appears in an action plan (EC, 2011c). Although the main action lines are the same as in the 2007 WP, the 2012 WP reads that SiS activities "will focus on enabling RRI in the European Research Area," including calls dedicated to the development of a governance framework and international coordination (EC, 2011c:4). The RRI dimension is continued and enhanced in the subsequent 2013 SiS WP, reading that RRI "means that societal actors (researchers, citizens, policy makers,

businesses, civil society, …) work together during the whole research and innovation process in order to better align the process and the results with the expectations of society" (EC, 2012b:5). The document further lays out six elements characterising RRI: engagement of all societal actors, science education, gender equality, public access to scientific results, ethics and governance (EC, 2012b:6).

In 2014, the programme was renamed as 'Science *with and for* Society' (SwafS). The further development and promotion of RRI was to be pursued under this programme, now as a cross-cutting issue of Horizon 2020 (EC, 2014b). As we have seen, the RRI framework had already been defined under the subsequent SiS programme. In reading the 2012 SiS WP, we learned that RRI means that societal actors work together during the entire research and innovation process, to align the process and its outcomes with societal expectations (EC, 2012b:5). In other words, RRI appears to be a framework exactly *for and with* society. One can thus argue the title change to SwafS to be a response to the ambitions of RRI, rather than the other way around. This is also apparent when reading the SwafS 2014-15 WP, built largely around the policy concept definition and its six dimensions, as formulated under SiS (EC, 2015:4). In tracing the entanglements of RRI with developments in the field of STS, we must here ask: What is new with RRI and SwafS, compared to predecessors SaS and SiS?

In reading the SaS and SiS documents more closely, we find that the six dimensions of the RRI framework are hardly new. The main action lines of the 2001 SaS programme include science education, public awareness, dialogue with and involvement of civil society, gender equality and ethics (EC, 2002:32). Similarly, the main action lines of the 2007 SiS action plan are gender equality, science education, governance of the science-society relationship, and two-way communication between science and society (EC, 2007:5). Broadly speaking, the five RRI dimensions of governance, gender equality, ethics, open access and science education have all been addressed in various forms since the 2001 SaS action plan. The remaining RRI dimension, 'public engagement', has equally been addressed throughout the action plans. My argument here, however, is that it is the perception of the science-society relation and how this should be approached which is novel with RRI and SwafS. It is also with this dimension we may discern considerable interactions with the STS field of research.

Although the science-society relation and its governance has been at the centre of attention throughout the action plans, we may discern a significant change in perception with the RRI

framework. As we have seen, the 2001 SaS action plan approached this relation in terms of increasing public awareness and dialogue with citizens, with the ambition of heightening public scientific literacy, seemingly founded upon the idea that more knowledge fosters positive attitudes (Bauer, 2009). The 2007 SiS action plan viewed the relation between science and society as reciprocal, adopting a strategy for two-way communication to provide "a wider public with more scientific information and enabling the public to engage with scientists" to address "the ambiguous feelings expressed by citizens" (EC, 2007:30). In other words, the 2001 SaS and 2007 SiS action plans were concerned with public communication and engagement, but largely in terms of increasing public scientific literacy or enabling two-way communication to disband public ambiguities.

In reading the SwafS 2014-15 WP, what appears to be distinctive with RRI is that it puts public engagement throughout the entire research and innovation trajectory at its heart. It is a framework allowing all societal actors "to work together during the entire research and innovation process to align both the process and its outcomes with the values, needs and expectations of European society" (EC, 2015:4). "This approach to research and innovation", it continues to read, "is termed Responsible Research and Innovation (RRI)" (EC, 2015:4). The WP further reads that it aims to promote "Responsible Research and Innovation, i.e. the engagement of citizens and society in a co-creative research and innovation process" (EC, 2015:21). This juxtaposing of RRI with engagement and co-creation enhances the view that this is where its novelty lies. The 2014-15 Horizon 2020 WP reads that RRI 'touches mainly upon civil society engagement', and that it is 'supported by further activities', namely the dimensions of access to science, ethics, gender equality and science education (EC, 2014b:17). With this emphasis on public engagement, we may discern some parallels to the situation unfolding within the field of STS, of which will be discussed in the following.

3.4.4 Enabling RRI as a 'technology of humility'

The nature of the relationship between science and society, as well as how this relation ought to be governed, has for decades been a principal concern for considerable research within the field of STS. This evolving situation can be viewed as a critique of certain understandings of the science-society relation and, consequently, research and innovation governance and decision-making founded upon such perceptions. As such, it may be described as a situation urging scientists, innovators and policy-makers to take more responsibility for the wider and

often-unforeseen societal impacts of their actions (Winner, 1980; 1991), to acknowledge the value of different types of knowledge (Wynne, 1992), and to develop mechanisms for public engagement in science and technology decision-making (Jasanoff, 2003; Winner, 1991).

Callon, Lascoumes and Barthe call for a move toward a 'technical democracy', viewing uncertainty as a starting point for "an exploration intended to transform and enrich the world in which we decide to live" (2009:257). They argue such exploration should take place in 'hybrid forums', in organised dialogue between citizens, politicians and experts (2009:257). We may discern a similar rationality in the EC brochure dedicated to RRI, reading that it is a framework concerned with "co-creating the future by bringing together the widest possible diversity of actors" (EC, 2014a). The merits of such a "two-way, iterative, inclusive and participatory process of multi-actor exchanges and dialogues," the brochure reads, is that it fosters "more socially relevant, desirable, and creative" research and innovation (EC, 2014a). Such ideals seem to agree with Callon *et al*., considering such dialogic processes "the best means for arriving at an always provisional, acceptable, and accepted order" (2009:257).

Jasanoff argues that policy-makers need a set of 'technologies of humility' for systematically assessing the uncertain, ambiguous and uncontrollable, simultaneously acknowledging the limits of prediction, control and foresight (2003:227). She argues that from the start, the need for plural viewpoints and collective learning in finding resolutions to common problems must be acknowledged (2003:240). In doing so, methods and mechanisms must be developed for "different expert capabilities and different forms of engagement between experts, decision-makers, and the public" (Jasanoff, 2003:227). As such, RRI can also be viewed as a particular 'technology of humility', in acknowledging the need for plural viewpoints and collective learning as a framework where "all societal actors are fully engaged in the co-construction of innovative solutions, products and services", with the aim of developing "joint solutions to societal problems and opportunities" (EC, 2012a).

Placing public engagement at its heart, the RRI framework can be understood as enabled by these insights, calls and critiques from STS research. As has been argued, interactions with the field of STS can be viewed as conditioning the evolvement from SaS to SiS. The situation can equally be understood as conditioning the coming-into-being of RRI, as a policy concept concerned with research and innovation *with and for* society. Before concluding this chapter, another conspicuous entanglement of the situation of STS and the RRI framework should be

given some emphasis. This is the translation of the notion of 'co-production' (Jasanoff, 2004) in the RRI documents.

3.4.5 'Co-production' as a strategic manoeuvre

The preoccupation with notions of 'co-creation', 'co-construction' and 'co-production' is consistent throughout the EU documents dedicated to the issue of RRI. The four-page informational brochure issued by the EC reads that RRI "is about co-creating the future by bringing together the widest possible diversity of actors" (EC, 2014a), so that they are "fully engaged in the co-construction of innovative solutions, products and services" (EC, 2012a). The *Rome Declaration on Responsible Research and Innovation in Europe* reads similarly, that it entails "the co-production of knowledge" (Rome Declaration, 2014). In reading these documents in an STS perspective, Jasanoff's *idiom of co-production* (2004) comes to mind. In the following, this use of 'co-production' and adjacent terms in the documents will briefly be discussed and contrasted to the STS version of this notion.

In STS, 'co-production' is understood as an empirical-analytical term, in which we may gain explanatory power by thinking of science, technology and the social order as being produced together (Jasanoff, 2004). In an interview with *Future Earth*, Jasanoff stresses the distinction between "two versions of co-production – the Science and Technology Studies one and the commonsensical one" (Future Earth, 2014). She makes this distinction by labelling the latter 'Miramax co-production', as in a film context, those doing the script, the design, the editing, and the sound system all need to contribute to the final product. This version of co-production is "very consistent with one idea of democratising politics," argues Jasanoff (Future Earth, 2014). The thought is that all stakeholders around the table bring in perspectives not shared by the others, and that "you get a good product that can only come about if everybody has brought their insight into it," Jasanoff argues (Future Earth, 2014).

In the RRI documents, the use of terms such as 'co-production', 'co-creation' and 'co-construction' are referring to "bringing together the widest possible diversity of actors (…) that would not normally interact with each other" (EC, 2014a). This version of 'co-production' and adjacent terms is in the documents presented as a practice to be actively and strategically implemented in research and innovation trajectories to bring about socially desirable outcomes. In other words, the RRI version of 'co-production' is about jointly

producing through collaborative engagement, and may thus seem to build on the idea of what Jasanoff calls 'commonsensical co-production', that "you get a good product that can only come about if everybody has brought their insight into it" (Future Earth, 2014). In this sense, 'co-production' is regarded as something to be strategically planned and consciously carried out in practice. In contrast, the STS version of 'co-production' is something which occurs regardless of strategic motives to do so, as something which takes place regardless of our intentions.

We may view this 'displacement' of the notion from STS theory to RRI framework as an interesting case of *reproduction* or *translation* (Law, 1999). John Law problematizes the issue of 'speaking for' a theory or tradition in STS, asserting that to 'represent' a certain theory necessarily also betrays its object, its original. He asserts that *traduction*, fidelity, is also *trahison*, treason, as each translation necessarily changes the object represented or spoken for (1999:1). In drawing on Law's discussion, the translation of STS research to RRI policy framework can be understood as both fidelity and treason. The translation of the notion of 'co-production' can be viewed in light of this discussion by Law, as well as the representations of STS research in the RRI framework and the SiS and SwafS action plans more broadly. As theory and tradition is translated into policy, its meaning is inescapably transformed, displaced and given new properties (Law, 1999).

3.5 Situations in interaction

The ambition of this chapter has been to inquire into the materialisation of RRI by a strategy of approaching *situations*. In doing so, I have sought to 'recover' the situations enabling the policy concept to emerge as a desirable, appropriate and necessary policy object, by way of approaching its documents. In doing so, two 'situations in action' (Asdal, 2012) have been 'weaved out' of the documents. It is my argument here that RRI could emerge as the result of a 'drawing together' or 'coupling' of these two situations in significant ways (Asdal, 2014). In the following, I will demonstrate in more detail how these situations interact and interfere with one another, together producing "an issue, a concern, a sensibility – hence, a particular situation" (Asdal, 2012:388). As has been demonstrated throughout this chapter, the two situations are both 'in action' in the RRI documents, together taking part in assembling it as a

relevant policy object. To demonstrate more thoroughly the 'drawing together' of these two situations, I briefly turn my attention to the motivations for creating SaS – to the very outset of the programmes through which RRI eventually would materialise.

The *Science and Society Action Plan* reads that it is part of the process of creating a European Research Area (ERA), and that it is a follow-up of the Commission's working paper *Science, society and the citizen in Europe* (2000b), which had launched the debate in this connection (EC, 2002:3). The working paper reads that there is a need to create "an open dialogue between researchers, industrialists, policymakers, interest groups and the public as a whole," as there are growing concerns with public skepticism (EC, 2000b:5-6). Simultaneously, it reads that since the creation of the ERA was put on the agenda as a central plank in Europe's 'knowledge-based economy', it can only be achieved by "an economy geared to innovation and a society fully committed to it" (EC, 2000b:6). "Since this will affect Europe's economic future, scientific/social issues in Europe also have to be looked at against the backdrop of governance in Europe," the working paper continues (EC, 2000b:6).

It was this working paper which would facilitate the initiative for and realisation of the SaS action plan, expressly a 'follow-up' of this document (EC, 2002:3). As outlined above, the calls of the working paper were largely based on a concern with assembling a 'knowledge-based economy' and an ERA. The working paper reads that new relations are needed between science, technology and society "because of the impact of science and research on competitiveness, growth and jobs and on the quality of life in Europe" (EC, 2000b:5). In this way, we may view the SaS action plan as enabled by the situation outlined in this chapter of a new 'knowledge-based economy' driven by research and innovation, in the first place – as a tool to achieve "an economy geared to innovation and a society fully committed to it" (EC, 2000b:6). This can be interpreted as the two situations interacting and interfering with one another, as it was exactly as part of the evolvement of this programme, from SaS to SiS to SwafS, that RRI materialised – an evolvement conditioned by developments within the field of STS.

Based on the discussions of this chapter, the emergence of RRI can be understood as conditioned by a 'drawing together' and 'coupling' of two distinctive situations in significant ways (Asdal, 2014:321). As has been argued, it is a policy concept enabled by a situation of decades of research on the science-society relation, particularly unfolding within the field of

STS. This is a situation urging policy-makers to take more responsibility in tackling uncertainty and the often-unforeseen wider societal consequences of scientific and technological development, stressing the need for 'technologies of humility' (Jasanoff, 2003) and a 'technical democracy' (Callon et al., 2009). RRI is simultaneously enabled by a situation of assembling a new 'knowledge-based economy' driven by research and innovation, in which the tackling of societal challenges is framed as a prerequisite for continued economic growth (Lund Declaration, 2009).

One could argue the two situations 'weaved out' in this chapter to have quite disparate objectives. The first situation outlined is one mainly concerned with the capacity of research and innovation to generate economic growth, with the objective of assembling a 'knowledge-based economy' and to exit the economic crisis, in which addressing societal challenges is one means to achieve this. The second situation is one concerned with a democratisation of scientific and technological decision-making, as insights into the reciprocal relation between science, technology and society, as well as the risks of insurmountable, undesirable and unintended societal impacts, are central concerns to research within the field.

Albeit different objectives, the RRI framework could emerge as a policy tool of value to both situations. As a framework largely concerned with public engagement, it is a tool for ensuring continued economic growth driven by research and innovation, as a policy tool to increase 'Europe's ability to tackle societal challenges' (EC, 2012a), with a fully committed society in doing so. Simultaneously, it is a democratising tool for voicing societal concerns, needs and expectations, of performing a 'technical democracy' (Callon et al., 2009) – as a particular 'technology of humility' (Jasanoff, 2003).

4 Economies of worth: Valuations of a new policy concept

In the previous chapter, I demonstrated how the emergence of RRI at EU level can be understood as conditioned by the overlap of two situations. In this chapter, I turn my attention to how such an emerging framework enables new valuation practices in research and innovation. What characterizes such practices is that the value of something is being assembled somehow, whether established, evaluated, negotiated, maintained or challenged (Doganova et al., 2014:87). In other words, approaching the RRI documents with a valuation perspective allows for inquiry into how the value of research and innovation is being assessed and by what principles or standards. Not least, it enables a study into how a multitude of possibly incommensurable values and evaluative principles are coordinated, overlap, intertwine and coexist in the same situation (Stark, 2009).

This part of the thesis aims to respond to the following research question: *In what ways does the policy concept of RRI enable new valuation practices in research and innovation?* In doing so, the EU authored and published documents dedicated principally to the issue of RRI will be read more closely, some of which have already been drawn upon in the previous chapter. To discuss the valuation practices of these documents, however, a more thorough reading is necessary. As such, this chapter takes up where the former left off, namely by tracing the proliferation of the RRI discourse at EU level. This will be done by following some of the documents concerned with the issue, as well as newsletters and reports from workshops and conferences dedicated to the framework's development. Considering the extensive volume of publications on the issue at EU level, and with regards to the limited scope of this thesis, presenting every document in detail would be an unfeasible task. My aim is rather to trace some central documents in the proliferation of RRI at EU level.

After having traced the proliferation of the RRI discourse at EU level in the first subchapter, the valuation practices of the documents will be discussed in more detail, based on a few selected documents. This will be done by identifying *orders of worth* in the documents, drawing on the work of Boltanski and Thévenot (2006) and David Stark (2009). After having discussed such orders of worth at work in the documents, the potentials for *dissonance* will

be addressed, drawing mainly on the work of Stark. Lastly and based on these discussions, I will sum up how RRI can be understood as a policy object enabling new valuation practices in research and innovation, before the potentials for productive 'recombinations' (Stark, 2009) of dissonance are addressed.

4.1 Tracing the proliferation of RRI

A workshop held 16-17 May 2011 in Brussels titled 'DG Research workshop on Responsible Research & Innovation in Europe' is often referred to as the first public statements indicating its significance in EU policy (e.g. Owen et al., 2012; de Saille, 2015). Organised by the European Commission Directorate-General for Research and Innovation (DG R&I), the workshop invited experts in academia and policy to reflect on and develop a shared understanding of RRI together with DG R&I representatives. In reading the workshop's closing day remarks held by EU officer Gilles Laroche, we learn that it was a follow-up of a workshop held in 2010, 'New Ways of Doing Research', concerning "how ways of doing research are changing to address societal challenges" (EC, 2011a:11-12). A report from this prior workshop reads that it was concerned with "the question of responsibility for ensuring that research meets societal challenges" (EC, 2010c:18). In other words, the RRI workshop was an extension of an event discussing responsibility as ensuring that research and innovation meets the societal challenges, as expressed by the Lund Declaration (2009).

The purposes of the Brussels workshop were threefold, as thoroughly depicted in an informal newsletter summarising the workshop design and inputs (EC, 2011a). Firstly, it was to bring together key players and stakeholders in Europe for collective reflection and mutual learning on RRI. Secondly, the purpose was to develop a shared understanding of the concept, and thirdly, to formulate policy recommendations of actions and processes which would support this development (EC, 2011a:2). As is clear from these objectives, the nascent policy concept of RRI was at this stage in an early phase of development at EU level. The workshop was an opportunity to discuss what RRI should be comprised of and formulate recommendations to support the development of such a policy. "Your advice is important to help us build a policy for the years to come," stated Director in charge of the ERA Octavi Quintana in his opening

remarks, “notably for the Common Strategic Framework that will begin its life in 2014 and for the European Research Area” (EC, 2011a:2).

At the workshop, the participants discussed elements of a possible definition of RRI. One element brought up was that it should be based on European values. This was challenged in terms of value pluralism and whether we can assume that we all agree on and share the same values (EC, 2011a:16). The participants also drew lines to the evolving character of the SaS and SiS programmes, and expressed hopes that the subsequent programme would be called ‘Science for Society’ (EC, 2011a:11). By the second day, discussions were organised under the umbrella “An ERA for Society, With Society, By Society” (EC, 2011a:21). We may here draw lines to the ‘Science with and for Society’ (SwafS) programme, which would begin its life under the Horizon 2020 programme in 2014. The reflections from the Brussels workshop were later summarized in a report prepared for DG R&I (Sutcliffe, 2011). Although the motivations at policy level were still unclear at the time, it was evident that this promised new framework was important to the EC. In giving attention to the framework and seeking to develop it, the policy concept was already here being made into a valuable object.

4.1.1 Signalling more concrete intentions

In the months following the initial meeting in Brussels, several international workshops of varying scope and size were held across Europe to discuss the nascent policy concept. The discourse on RRI reached beyond EU level. The framework was also discussed at national levels, such as in the Netherlands and the UK, of which were already in the process of formulating an RRI framework under their respective national research councils.

A French-British workshop was held just one week after the Brussels meeting, gathering experts from academia and policy at the Residence of the French Ambassador in London, 23-24 May 2011. The idea for the workshop had emerged during a French-British collaboration on the environmental impacts of nanotechnologies at the UK Embassy in Paris. Richard Owen, Phil Macnaghten and Jack Stilgoe had around the same time been tasked with developing an RRI framework for the Engineering and Physical Sciences Research Council (EPSRC) and the Economic and Social Research Council (ESRC) in the UK (Owen, 2011). The London workshop programme included presentations and roundtable sessions on

definitions of RRI, UK and French experiences with responsible innovation and governing emerging technologies, as well as the case of nanotechnologies (French Embassy, 2011).

Owen, Macnaghten and Stilgoe write that it was at this workshop the paper "Prospects for Technology Assessment in a Framework for Responsible Research and Innovation" by EU officer and scholar René von Schomberg was circulated (2012:753). In the paper, von Schomberg describes RRI as a framework for directing research and innovation toward the 'right impacts', arguing these normative targets to be those anchored within the values articulated in the EU Treaty (2011a). He defines RRI as a "transparent, interactive process by which societal actors and innovators become mutually responsive to each other with a view to the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products (in order to allow a proper embedding of scientific and technological advances in our society)" (2011a:9). This has become the most cited definition in the literature (Ribeiro et al., 2017:87), further employed in a report on ICT's, the first EU published report in which RRI made an appearance, edited by von Schomberg (2011b).

Representing the European Commission (EC) at the workshop was officer Gilles Laroche of the DG R&I. He informed that the DG R&I had last week had "a kick-off workshop in Brussels", its purpose to define what RRI should cover (Laroche, 2011). He further informed that since January 2011 the DG R&I, which up until recently had been known as the Directorate-General for Research and Technological Development (DG RTD), did not only govern research but also innovation, stating that "this is a big change for us" (Laroche, 2011). He further presented three points as the basis for the EC initiative on RRI. Firstly, the Europe 2020 strategy to solve grand societal challenges, secondly, the Europe 2020 and Innovation Union focus to boost innovation in Europe, and lastly, the commitment to have the ERA fully in place by 2014. He also listed that ambition of developing this framework was based on ten years of research under SaS and SiS (Laroche, 2011).

It was at this event that the EC signalled more concrete intentions for the advancement of an RRI framework at EU level (Laroche, 2011; Owen et al., 2012). For the two remaining years of the 7th FP, they would fund an RRI programme under SiS, including projects aimed at developing governance frameworks. Laroche further announced that a recommendation from the commission to the member states on RRI would be adopted in 2012. In addition, an RRI expert group would be established the next year to advise the EC, they would meet with the

national ethics committees and seek an opinion from the European Group of Ethics, and they would seek to develop a recommendation on RRI for the ERA. Laroche stated that they also had in mind a legislative initiative through the ERA, although this would be a so-called 'soft law' approach (Laroche, 2011). Such promised initiatives and activities further enhance the EC's signals of the importance of RRI. The value of the concept is enacted not merely discursively, but in the institutional embedding in programmes, the creation of spaces for its development, and in announcing plans for its implementation in organisational structures.

4.1.2 Roots in 'responsible development' of nanotechnologies

As briefly mentioned above, the idea for the London workshop had grown out of French-British collaborations on the responsible development of nanotechnologies. Similar roots for the beginning discourse on RRI at policy level can be discerned in the EC, of which merits some consideration.

It was with the emergence of Nanotechnologies and Nanosciences (N&N) a discourse of 'responsible development' first gained momentum, a term some authors argue to be a root of RRI (Rip, 2014; de Saille, 2015). De Saille argues that as nanotechnology was considered an enabling technology, crucial to Europe's economic future, N&N were made thematic priorities in both the 6th and 7th FP, as well as in the SaS and SiS programmes (2015:156). As an emerging and potentially disruptive field of science and technology, its wider societal and environmental impacts were difficult to predict. As a response, the EC developed a Code of Conduct for Responsible Nanosciences and Nanotechnologies Research (EC-CoC), voluntary guidelines for all Member States, as part of it *Roadmap* (EC, 2010d) for creating broad public consensus for N&N. In addition, many EU projects were funded to investigate and promote EC-CoC and responsible development of N&N, such as the FramingNano project (2007-2009) and the NanoCode project (2009-2011), both funded under the 7th FP 'Science in Society' (SiS) programme.

De Saille writes that it is in this context we may detect one of the very first uses of the term 'Responsible Research and Innovation', as part of a workshop on constructive technology assessment and scenario-building on N&N in the Netherlands in 2007 (2015:156). The workshop was part of the project Frontiers (2004-2009), funded under the 6th EU FP, the workshop summarised in the paper "Co-evolutionary scenarios: An application to

prospecting futures of the responsible development of nanotechnology" (Robinson, 2009). The project consisted of a research network of 14 European research institutes aiming to coordinate activities in enabling nanotechnologies for research in the life sciences. Part of the project was a Technology Assessment (TA) Programme, under the Ethical and Societal Aspect (ELSA) package. The paper poses and explores the notion of 'Responsible Research and Innovation of nanotechnologies' as an opportunity to develop tools for exploring potential co-evolutions of nanotechnology and anticipatory governance (Robinson, 2009).

NanoCode was a multi-stakeholder dialogue project, providing inputs to implement the 'European Code of Conduct for Responsible Nanosciences & Nanotechnologies Research'. The objective of NanoCode was to define and develop a framework aimed at supporting the successful integration and implementation of the EC-CoC at European level and beyond (NanoCode project, 2011ab). In the final report, it was agreed that the principles and guidelines of the EU-CoC were universally valid, beyond N&N research, and suggested to extend the scope of the EU-CoC as a standard for *responsible innovation*. They therefore recommended "to extend the scope of the EU-CoC (e.g. emerging technologies, or science in general), encompassing perspectives along a product's elaboration and life cycle stages (e.g. an "Innovation CoC") in alignment with the Innovation Union flagship initiative" (NanoCode project, 2011a:9).

Gilles Laroche, representing DG R&I, weighted these proposals from the NanoCode project in his presentation at the London meeting. The first report delivered to the EC in end-2010 had suggested to extend such a code to not only cover research, but also innovation, embracing not only N&N research, but all emerging technologies or science in general. The EC-CoC had first been adopted in 2008, and was supposed to be revised in 2010. Laroche stated that the EC, however, had decided not to update the EC-CoC as initially planned, but rather, await the projects final report and see how it would fit with the awaited recommendation on the development of the wider framework for Responsible Research and Innovation (Laroche, 2011). Although this will not be expanded on further here, the situation of N&N can be viewed as another noteworthy conditioning situation for the RRI framework.

4.1.3 The best science *for* the world

The conference *'Science in Dialogue. Towards a European Model for Responsible Research and Innovation'* was held one year later, 23-25 April 2012 in Odense as part of the Danish EU Presidency. The goal of the high-level conference, inviting more than 160 delegates from Europe to participate, was 'to further a mutual understanding' of the notion of RRI through presentations, panel debates and workshop discussion (Odense Report, 2012:4). The workshop sessions ensued each group to propose their recommendations for further developing and implementing the framework throughout science, innovation and society. In the conference report preface, the Danish Minister for Science, Innovation and Higher Education Morten Østergaard states that "we need to shift the focus from aspiring to creating the best science in the world to aspiring to creating the best science *for* the world" (ibid, 2012:3). The presidency conference reportedly marked a needed shift in this direction, as an opportunity to "discuss how the relationship between science and society can be strengthened and become more productive to the benefit of both science and society" (ibid).

The preface emphasises that dialogue and cooperation will help improve our understanding of complex issues and our grasp of ethical dilemmas, but that the idea of RRI "is also about increasing the quality of our investments in science" as "the probability of scientific results being relevant, robust and having a positive impact on society will increase if a sense of scientific social responsibility and responsiveness to society's concerns and wishes can be fostered" (Odense Report, 2012:3). This is also an opportunity for research and innovation carried out in the private sector, reads the preface, as the likelihood of new technologies being successful increases if their development is based on public needs and concerns. Therefore, continues the preface, "an open and inclusive approach based on dialogue between different sectors will help Europe heighten its innovative capacity" (ibid).

The preface further reads that the Danish Presidency had on 31 May 2012, just over a month after the conference, obtained a general agreement in the European Council on the structure and main line of activities in Horizon 2020, in which the agreement "defines the relationship between science and society and the promotion of Responsible Research and Innovation as one of the cross-cutting issues in the programme" (Odense Report, 2012:3). As such, the policy concept of RRI was further enforced as a valuable framework, now agreed to be

implemented in the structure of the Horizon 2020 Framework Programme for Research and Innovation (2014-2020).

It was in the aftermath of these workshop and conference discussions the first EC authored and issued document dedicated entirely to the policy concept would materialise. In 2012, the DG R&I published the four-page informational brochure *Responsible Research and Innovation. Europe's ability to respond to societal challenges*. The brochure initially states that the DG R&I is "determined to bridge the gap between the scientific community and society at large" (EC, 2012a), presenting the first official EU version of the policy concept to the public. The brochure reads that RRI "means that societal actors work together during the whole research and innovation process in order to better align both the process and its outcomes, with the values, needs and expectations of European society" (EC, 2012a). In other words, we are dealing with a policy concept aiming to bridge the gap between science and society by aligning research and innovation with the values, needs and expectations of society.

The brochure further launches the six *keys* making up the RRI framework, consisting of 'Engagement', 'Gender Equality', 'Science Education', 'Open Science', 'Ethics,' and 'Governance' (EC, 2012a). These keys had already been presented at the time of the high-level conference in Odense in 2012, as well as at the Brussels and London workshops in 2011, albeit with somewhat different wording and as 'aspects' or 'action lines' rather than 'keys'. As I argued in chapter 3, it is the key of 'Engagement' which is most protruding in the descriptions of RRI as "an ambitious challenge for the creation of a research and innovation policy driven by the needs of society and engaging all societal actors via inclusive participatory approaches" (EC, 2012a).

As in the case of the conference and workshops, the brochure partakes in assembling the importance of RRI at EU level and political will for its further development and proliferation. With time, the signals of more concrete intentions would materialise. In 2013, the EC received the Report of the RRI Expert Group, *Options for Strengthening Responsible Research and Innovation in Europe* (van den Hoven et al., 2013), the EC's final document emphasising the significance of the framework ahead of European Parliament's vote on the Horizon 2020 budget. As Horizon 2020 began its life in 2014, the framework had been implemented as a cross-cutting issue. In the first Horizon 2020 Work Programme (2014-15),

the promotion of RRI would "support the relationships between science and society" as a cross-cutting issue as well as through part 16 of the Work Programme 'Science with and for Society' (EC, 2014b:17). In practice, reads the Work Programme, "RRI is a package aiming to better engage society all across Horizon 2020 Research and Innovation activities," touching "mainly upon civil society engagement" and supported by further activities enabling easier access to scientific results, gender equality, ethics and formal and informal education to science (EC, 2014b:17).

4.1.4 Declaring its significance

The four-page informational brochure on RRI was reprinted with several minor edits in 2014, presenting it now as a cross-cutting issue of Horizon 2020 and reframing the six *keys* as *dimensions* (EC, 2014a). It was this year, as Horizon 2020 came into force, that the *Rome Declaration on Responsible Research and Innovation* was signed. The Declaration was drafted 21 November 2014 as part of the conference *'Science, Innovation and Society: achieving Responsible Research and Innovation'.* The conference had been held in Rome under the Italian presidency of the Council of the European Union, and was approved by the council the same day. The declaration's definition of RRI bears resemblance to that of the brochure, as "the on-going process of aligning research and innovation to the values, needs and expectations of society" (Rome Declaration, 2014).

As with the Lund Declaration, we are here dealing with *the declaration* as a specific type of document. As a particular 'device' (Muniesa et al., 2007), the declaration is a written public announcement of intentions, which may signal the beginning of a new state or condition (OED, 2017). In the case of the Rome Declaration, it reads that "we believe the conditions are now right for responsible research and innovation to underpin European research and innovation endeavour and therefore call on all stakeholders to work together for inclusive and sustainable solutions to our societal challenges" (Rome Declaration, 2014). As such, the Rome Declaration can be read as an announcement of the significance of RRI, signalling the beginning of a new state or condition – that the 'condition is now right' – in which the concern for society's 'values, needs and expectations' are to underpin European research and innovation, embodied in the RRI framework. The declaration calls on European Institutions, EU Member States, R&I funding and performing organisations, businesses and civil society to make RRI "a central objective across all relevant policies and activities, including in

shaping the European Research Area and the Innovation Union" (Rome Declaration, 2014).

The preceding sections have traced the proliferation of the policy concept of RRI at EU level by following some central workshops and conferences through their respective reports and newsletter, and some central EU authored and/or published documents dedicated to issue. In the following, I will inquire into what orders of worth are at play in the documents and how the policy concept enables new valuation practices in research and innovation. Due to the limited scope of this thesis, it would be unfeasible to look closely at every document dedicated the issue. I will therefore focus particularly on a few central documents active in assembling the policy concept and often referred to, namely the informational brochure *Responsible Research and Innovation – Europe's ability to respond to societal challenges* (EC, 2012a; 2014a) and the *Rome Declaration on Responsible Research and Innovation in Europe* (2014), as well as the newsletter from the 2011 Brussels workshop *'DG Research workshop on Responsible Research & Innovation in Europe'* (EC, 2011a) and the report from the 2012 Odense conference *'Science in Dialogue – Towards a European Model for Responsible Research and Innovation'* (Odense Report, 2012).

4.2 The moral economies of a new policy concept

One strategy for approaching the valuation practices enabled by a policy innovation such as RRI is to inquire into the *orders of worth* at work in the documents. In *On Justification: The Economies of Worth* (2006), Luc Boltanski and Laurent Thévenot delineate six 'orders of worth', each understood as a systematic and coherent principle for evaluation and driven by a certain rationality through which actors claim the legitimacy of their assertions in accordance to a given order. Boltanski and Thévenot are emphatic that one specific order is not bound to a specific social domain, but rather coexist is the same social space. They argue that society is not made up of one single social order, but that such orders are rather multiple, overlapping and intertwined.

David Stark draws inspiration from this work when addressing orders of worth in his ethnographic case studies. Rather than confining to the six orders of worth identified by Boltanski and Thévenot, Stark identifies the evaluative principles at play from one case to

another (Stark, 2009:13). Stark is emphatic that change should not be viewed as *replacement*, as the passage from one social order to another, but as *recombination*, as rearrangements in the patterns of how multiple orders are interwoven (2009:164). This, he argues, enables us to explore the multiplicity of evaluative principles at play in a given *situation*. In his studies of situations of valuation, Stark finds not one, but multiple and coexisting evaluative principles for determining worth.

In the following, I draw upon the work of both Stark and Boltanski and Thévenot. I follow Stark's strategy of looking at the multiple and coexisting evaluative principles for determining value at play in the documents dedicated to the development and proliferation of the RRI policy concept. I do so by inquiring into how different orders of worth are drawn upon in the documents. As Stark, I have not operated with already defined 'worlds' or 'orders' when approaching the material, but aimed to discern these along the way. In reading the documents more closely, however, I found the orders of worth identified to correspond considerably to polities brought forward by Boltanski and Thévenot. I therefore argue that the orders of worth in action in the RRI documents can be understood as versions of some of the specific orders identified by Boltanski and Thévenot. In the following, two orders of worth will be identified in the documents and discussed in a valuation perspective: a *civic order of worth* and a *market order of worth*.

4.3 A civic order of worth

First is a value regime I suggest calling a *civic order of worth* based upon a *civic economy*. This bears resemblance to the civic polity articulated by Boltanski and Thévenot as one of the six orders of worth identified in their work (2006). As there are significant parallels between Boltanski and Thévenot's civic economy and the civic order of worth identified in the documents, their work and characteristics of such an economy is useful to draw upon here. Boltanski and Thévenot describe a civic polity as one basing "civil peace and the common good on the authority of a majestic and impartial Sovereign placed above private interests" (2006:107). This sovereign of the civic polity, they argue, is created "by the convergence of human wills that comes about when citizens give up their singularity and distance themselves from their private interests to take only the common good into account" (2006:108). For

Boltanski and Thévenot, the civic world is rooted in the collective will, collective action and the collective good. In other words, one attains worth in the civic economy by sacrificing particular and immediate interests in favour of the collective (2006:190).

Merriam-Webster's dictionary defines 'civic' as something "of or relating to a citizen, a city, citizenship, or community affairs" (Merriam-Webster, 2017). The term denotes a specific geographical locality and delimitation, such as a town, city or nation. Furthermore, it denotes citizenship in such a community, as well as the duties or activities of persons by virtue of this affiliation. In this thesis, it is my argument that the civic order of worth refers to the transnational community of the European Union and, consequently, European citizenship. Civic duties are thus referring to activities and duties by virtue of being a citizen of Europe. Such boundaries are not entirely fixed, however, as civic may in some cases also refer to the global community and duties as global citizens. As such, drawing upon a *civic order of worth* here means that it is the community, its citizens, and their duties as such which are being addressed, where value comes about when research and innovation is aligned with the collective will, collective action and the collective good, as will be discussed more thoroughly throughout this section.

As will be argued, it is both the *value* of the collective and the *values* of the collective which are being addressed in the documents. In other words, valuation practices along this order may enact both the collective as a valuable entity, in and of itself, and the values shared by the collective as valuable. Furthermore, we will see that in the documents, value is something which comes about through collective will and collective action, 'co-production', through which research and innovation is endowed capacity to bring about socially desirable outcomes to the benefit of the collective good. It is exactly valuation practices in terms of the collective will, of collective action, and of the collective good which are distinctive of what is here termed a civic order of worth. In the following, I turn first to the shared values of the collective of Europe, which is to steer research and innovation activities, as well the value of being a collective, in the first place. Further, I inquire into the process of 'co-production' thought to facilitate collectively desirable outcomes of research and innovation. Lastly, how the 'social contract' between science and society is subject to re-evaluation and re-valuation in the documents will be addressed.

4.3.1 The values of the collective and the value collective

Throughout the course of its development at EU level, albeit in slightly varying forms, RRI is described as a concept for aligning research and innovation with the values, needs and expectations of European society (EC, 2011a; 2012a; 2014a; Rome Declaration, 2014). As asserted by the initial statements of the brochure, RRI is as a framework for "reconciling the aspirations and ambitions of European citizens and other research and innovation actors" to "better align both the process and its outcomes, with the values, needs and expectations of European society" (EC, 2012a; 2014a). Such a definition is noticeable also at EU level at the time of the *'Science in Dialogue'* conference in Odense in April 2012. The European Commissioner for Research, Innovation and Science Máire Geoghegan-Quinn delivered a message stating that "research and innovation must respond to the needs and ambitions of society, reflect its values, and be responsible" (Odense Report, 2012:10), also quoted at the back of the brochure (EC, 2012a; 2014a).

In reading the documents, we see research and innovation being evaluated in terms of its ability to respond to the shared values of European society. These values of European society, or here the collective, are made into evaluative principles which research and innovation is to adhere or tend to. The report from the high-level conference in Odense stresses the need for a shift from the best science *in* the world to the best science *for* the world (Odense Report, 2012:3). As such, RRI is effectively juxtaposed with this shift to the best science *for* the world. In other words, it is by its alignment with the shared values of the collective, whether 'Europe' or 'the world', that value comes about in research and innovation. Drawing upon a civic order of worth, research and innovation is valued by its capacity to bring about socially desirable outcomes responding to the values of the collective.

These are valuations along a civic order of worth also in the sense that value comes about when bringing forward collectively desirable ends, rather than serving individual or sectoral interests. It is the abandonment of individual interests and aspirations in favour of the collective which is being valued (Boltanski & Thévenot, 2006:108). Along this order, the scientist bringing forward ground-breaking discoveries or the best science *in* the world, for the sake of e.g. renown or scientific progress alone, is not valuable if it does not or will not benefit society. The Rome Declaration states exactly that "scientific excellence today is about more than ground-breaking discoveries" (2014). Neither will a trajectory of research or

innovation with the objective of economic gains alone be deemed valuable within the civic economy, if it does not seek to provide impacts benefiting also the collective. Along this order, individual or sectoral interests or aspirations of those engaging in research and innovation are necessarily overruled in favour of the 'common good'.

As far, we have seen how the collectively shared values of European society are enacted as the legitimate value-base in which to steer research and innovation. In reading the documents more closely, however, we may also recognise another way in which a civic order of worth is drawn upon, namely how European society is mobilized as a certain value-collective and is valued as such. Boltanski and Thévenot argue that a characteristic of the civic world is collective action by means of unifying, mobilizing or assembling (2006:191). They argue that the principal mode of relations in this world "is the *association* that makes it possible to turn a multitude of individuals into a single person. To create a *collective*, it is necessary to *assemble*, *regroup*, reunite, *unify*" (emphasis in original) (2006:191). Transcending the divisions that separate, Boltanski and Thévenot argue, enables collective action and a condition of solidarity (2006:190). Drawing upon a civic order of worth may thus involve e.g. crystallizing collective identities and shared values, highlighting the unifying power within the community and strengthening conditions of solidarity. Such a strategy is visible in the very first official statements indicating the significance of RRI at EU level. At the Brussels conference in 2011, Director in charge of the ERA Octavi Quintana stated that:

> Europe needs to overcome its problems and make very visible that we have values in Europe that are worth defending and putting at the top of the agenda. We have achieved already quite a lot and we should keep defending these values at the core of society and science" (EC, 2011a).

Although it is unclear what exactly these 'values in Europe' are, it is maintained that *we, as a community, share values, in the first place*. We may thus understand such utterances to assemble the European community as a particular value collective. Not least, these "values in Europe" are "worth defending and putting at the top of the agenda" (EC, 2011a). As such, the European community of shared values is enacted as valuable in and of itself, as something worth defending and putting at the top of the agenda. This can be viewed as a strategy to 'assemble, regroup, reunite, unify', to enact a certain collective and mobilize for collective action, as argued by Boltanski and Thévenot as characteristic of the civic order of worth

(2006:191). It may thus be understood as a strategy of crystallizing a certain supranational identity of shared values – the European community – in order to strengthen a condition of solidarity and to enable collective action for the collective good.

What is conspicuous here is the obscurity of what exactly these 'values of European society' are. Although my aim is not to settle this question, nor embark on an extensive analysis of what these values *in fact are*, the issue deserves some attention. In addressing this matter, EU officer René von Scomberg takes a pragmatic stance in writing that we cannot aspire to the abstract ideals of the Aristotelian 'good life', as there are competing conceptions of what is considered 'good' (2011a; 2013). We can, however, "make an appeal to the normative targets which we can find in the Treaty of the EU" (2013:57). The Rome Declaration reads that decisions in research and innovation must consider the principles on which the EU is founded, "i.e. the respect of human dignity, freedom, democracy, equality, the rule of law and the respect of human rights, including the rights of persons belonging to minorities" (2014), which is a direct quotation of Article 2 of the EU Treaty. As such, the values enshrined in the Treaty as a legitimate normative basis for research and innovation to bring about socially desirable outcomes, what von Schomberg terms the 'right impacts' (2011a; 2013), is somewhat reflected in the documents. Central to the RRI framework, however, is public engagement as a means of articulating exactly such 'values of European society'. This form of collective action as a mode of 'co-production' which will be discussed in the following.

4.3.2 'Co-production' as a valuable process

When reading the documents, it becomes evident that RRI is not merely concerned with ensuring socially desirable outcomes of research and innovation, but equally with the processes to achieve such desirable outcomes. The brochure reads that RRI "means that social actors work together during the whole research and innovation process" and that it is about "engaging all actors via inclusive participatory approaches" (EC, 2012a; 2014a). René von Schomberg (2013) argues that two interrelated dimensions can be identified in the RRI framework. He argues that firstly, there is a product dimension in terms of overarching normative anchor points, and secondly, there is a process dimension reflecting a deliberative democracy (von Schomberg, 2013:64). The first dimension, concerning the social desirability of the outcomes or products of research and innovation, has been discussed above. The second dimension, concerning the process thought to lead to such desirable ends, will be

discussed in the following. This is a concern with involving "all societal actors" to "better align both the process and its outcomes with the values, needs and expectations of society" (EC, 2012a; 2014a).

As briefly discussed in chapter 3, the documents often depict the process of public engagement as "co-production of knowledge" (Rome Declaration, 2014), "co-construction of innovative solutions, product and services" (EC, 2012a; 2014a) and as "co-creating the future" (EC, 2014a). This vision of co-producing research and innovation bears resemblance to what Sheila Jasanoff distinguished as a commonsensical version of co-production and adjacent terms of which is "very consistent with one idea of democratising politics" (Future Earth, 2014). Jasanoff illustrates this by referencing to a film context, whereas the persons doing the script, the design, the editing, the sound system and so on all need to contribute in order to bring about a good final product. Jasanoff further argues that the thought behind this mode of co-production is that all stakeholders involved bring forward unique perspectives to the process and that "you get a good product that can only come about if everybody has brought their insight into it" (Future Earth, 2014).

We may discern similar valuations of engagement as 'co-production' when reading the documents on RRI. The brochure reads that "public engagement in research and innovation fosters more socially relevant, desirable, and creative research and innovation actions and policy agenda" (EC, 2014a). Public engagement, as a means of co-production, is here made into a valuable process in the sense that positive outcomes, that is, 'socially desirable, creative, and relevant research and innovation', can only come about if all societal actors have brought their unique perspectives into it. At the Odense conference in 2012, European Commissioner for Research, Innovation and Science Máire Geoghegan-Quinn stated exactly that "different perspectives bring different and, sometimes, better solutions" (Odense Report, 2012:10). In order to bring about different and perhaps better solutions, "all societal actors" must bring their insights into the process "via inclusive participatory approaches" (EC, 2012a; 2014a).

The focus on multi-actor and public engagement as a means to 'co-produce' research and innovation, and consequently, to bring about collectively desirable outcomes, draws upon a civic order of worth. As Boltanski and Thévenot argued, the civic economy is rooted in the collective will, collective action and the collective good. In the documents, it is exactly

through collective action and will that positive outcomes are produced, or co-produced, to the benefit of the collective good, or European society. The documents read that bringing together "all societal actors" (EC, 2012a; 2014a) and "different perspectives" (Odense Report, 2012:12) will essentially bring about "more socially relevant, desirable, and creative research and innovation" (EC, 2014a) and "sometimes, better solutions" (Odense Report, 2012:12). Such valuations are driven by a civic economy, as worth comes about when we, as a community, are collectively engaged in research and innovation trajectories. We see here clear resemblances to the version of 'co-production' Jasanoff argues to be "very consistent with one idea of democratising politics" (Future Earth, 2014).

Boltanski and Thévenot are emphatic that the civic order of worth is best illustrated in democracies and best exhibited through democratic processes (2006:191). One could argue that the RRI framework represents a move towards a democratisation of research and innovation policy and a *technical democracy*, as advocated for among others by Callon *et al.* (2009). The documents are actively acknowledging a wider array of knowledge, experiences and concerns as valuable in the shaping of research and innovation agendas through public engagement. Laypeople and other stakeholders are framed as having legitimate non-expert and values-based ideas, questions and concerns that may feed valuable insights into the research and innovation process. Although obscure as to what degree citizens will be enabled to influence research and innovation agendas in practice, this promised movement towards a technical democracy permeates the documents.

With democracy follows civic duties. The Rome Declaration reads that RRI "requires that all stakeholders including civil society are responsive to each other and take shared responsibility for the processes and outcomes of research and innovation" (2014). Again, we may discern a civic order of worth in the documents. The declaration asserts that we, as a community, have collective responsibility for the future impacts of research and innovation and civic duties relating to the process ensuring that such impacts are, in fact, desirable. In addition to the civic duties of all stakeholders to take shared responsibility for research and innovation outcomes, the Rome Declaration portrays the further promotion of RRI in EU policy and beyond as a civic duty in itself:

> Therefore, we, the participants and organisers of the conference "Science, Innovation and Society: achieving Responsible Research and Innovation" held in Rome on 19-21 November 2014 under

> the auspices of the Italian Presidency, *consider it as our collective duty* to further promote Responsible Research and Innovation in an integrated way (Rome Declaration, 2014, my italics)

The signing of the declaration is framed as the conference participants enacting a collective duty. The declaration further 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" (Rome Declaration, 2014). The declaration thus calls on a wider range of actors in society – from government to business and civil society – to perform their collective duty through the further promotion of RRI.

4.3.3 Bridging the gap: a re-(e)valuation of the 'social contract'

The documents' re-evaluation and re-valuation of the science-society relation should also be given some emphasis in terms of a civic economy. The opening paragraph of the brochure on RRI reads that "the Directorate-General for Research and Innovation of the European Commission is determined to bridge the gap between the scientific community and society at large" (EC, 2012a; 2014a). This determination is further expressed throughout the opening paragraph, as earlier measures to bridge the gap are presented, namely the Science and Society (SaS) action plan of 2001, replaced by Science in Society (SiS) in 2007 (EC, 2012a; 2014a). As such, the RRI framework may be understood as a measure to help 'bridge the gap', and furthermore, as valuations of a certain science-society relation. This will be elaborated on in the following, first by drawing on the work of Arie Rip.

Arie Rip writes that the emergence of RRI represents an opening for a new 'social contract' between science and society (2014). Approaching RRI as an evolving social innovation gradually being articulated, he argues the roles and responsibilities of actors and stakeholders in research and innovation to be the subject of innovation. In doing so, he traces the historically evolving division of moral labour in society and how the words 'responsible' and 'responsibility' are used to articulate roles and duties. Such roles can be part of long-term 'settlements', he writes, often referred to as the 'social contract' between science and society (Rip, 2014:3). Rip argues that the evolving discourse of RRI, bound up with larger changes (or multi-level dynamics, Fisher & Rip, 2013), indicates an emerging next phase of settlement between science and society – or at least that there are openings for this (Rip, 2014:5).

In reading the documents, this 'new social contract' may also be viewed as re-evaluations and re-valuations of the science-society relation. A commonality of the workshop, conference, brochure and declaration is that they all address perceived deficits of the present-day science-society relation. RRI is framed as a policy concept to amend this relational deficiency, as a response to the perceived 'gap' between science and society in which the Directorate-General for Research and Innovation (DG R&I) is 'determined to bridge' (EC, 2012a; 2014a). We learn that since 2001, the DG R&I has worked toward 'bridging the gap' (EC, 2012a; 2014a). Despite these efforts, there is still a perceived gap to be overcome between the scientific community and society at large. In looking more closely at the changes made to the title of the action plan concerned with the science-society relation, we may discern re-evaluations of the nature of this relation over time, or rather, re-valuations of how this relation ought to be.

As was argued in chapter 3, the Science *and* Society (SaS) programme, adopted in 2001, indicates an understanding of science and society as largely separate spheres. The title change to Science *in* Society, adopted in 2007, suggests a reciprocity or interrelatedness of science as necessarily embedded in society. This change can be understood as a re-evaluation of the nature of the science-society relation. The brochure reads that the focus of SiS had since 2010 been to "develop a concept responding to the aspirations and ambitions of European citizens: a framework for Responsible Research and Innovation (RRI)" (EC, 2012a; 2014a). The 2014 updated version of the brochure announced that SiS has now become Science *with and for* Society (SwafS), under which RRI is pursued (EC, 2014a). This retitling does not merely *re-evaluate* the nature of the science-society relation as necessarily reciprocal. It may also be read as a *re-valuation* of the science-society relation itself, that science *ought to be* with and for society. We are thus dealing with valuations along a civic order of worth, of a 'social contract' in which research and innovation is to be pursued 'for and with' the collective which is European society.

4.3.4 Maintaining the collective

In this section, we have seen how the documents largely draw upon a civic order of worth in establishing the RRI framework, concerned with the interests of the European collective and the activities and duties of citizens in virtue of such citizenship. This economy of collective will, collective action and the collective good is perhaps the most easily discernible order of

worth drawn upon in the framework. It permeates the documents, visible even in the very definition of RRI as a policy concept to 'align research and innovation with the needs, values and expectations of society' (EC, 2012a; 2014a). As has been demonstrated throughout this section, the civic economy is visible in the evaluations of research and innovation in terms of its ability to serve society and the collective good by responding to the values of European society and, consequently, ensuring socially desirable outcomes.

Boltanski and Thévenot are emphatic that in the civic world, one attains worth by sacrificing particular and immediate interests "by transcending *oneself*, by refusing to place *individual interests* ahead of *collective interests*" (italics in original) (2006:190). They also note, however, that "people's attachment to their own particular interests, their selfishness and their *individualism*, are such strong tendencies that the creation and maintenance of collectives requires a tireless *struggle*" (italics in original) (2006:190). As will be argued, such a struggle between orders of worth, between concerns for the collective and for the individual, is discernible also in the RRI documents. This will be demonstrated by looking more closely at another order of worth in action in the documents, namely a *market order of worth*.

4.4 A market order of worth

A second value regime identified in the documents is one which may be characterized as a *market order of worth*. To demonstrate this, I return to Boltanski and Thévenot and another economy presented in their work, namely their portrayal of the market world as one identified by competition and rivalry (2006:196). Boltanski and Thévenot demonstrate that along such a market order, value is measured by its position in the market. Evaluation takes place in terms of market worth, or in other words, its price, in which "*money* is the measure of all things, and thus constitutes the form of evidence" (italics in original) (Boltanski & Thévenot, 2006:202). They elaborate that "the *competition* between beings placed in a state of *rivalry* governs their conflicts through an evaluation of market worth, the *price*, which expresses the importance of converging desires. Worthy objects are *salable* goods that have a *strong position* in a market" (italics in original) (2006:196). As such, the market world is one motivated by the interests and desires of individuals rather than of the collective, in contrast to the civic world.

In the following, I draw largely on Boltanski and Thévenot's characterisation when referring to a market order of worth. Such an economy is one drawing upon evaluative criteria in terms of the market worth, marked by rivalry and competition, when the value of something is to be judged. Such evaluations of worth may be in terms of e.g. commercialisation, the price and competitive advantage. As such, it is an economy tending to individual and organisational interests above the interests of the collective good. However, I will argue here that the market order of worth is drawn upon not only in terms of individual researchers, innovators or organisations, but also the European region as a whole. The ambition of facilitating European economic growth and competitiveness will here be argued as drawing upon such a market economy, in terms of competitive advantage in the *global* market. In the following sections, I will demonstrate how the RRI documents draw upon a market order of worth in terms of the successful translation of research and innovation into marketable products, market uptake and market success, and the global competitiveness and economic growth of Europe.

4.4.1 Private interests and market-driven innovation

As previously noted, the report from the high-level conference in Odense stressed the need for a shift from the best science *in* the world, to the best science *for* the world. This shift, however, is not thought to be beneficial merely in terms of positive societal impacts. The Odense conference was an opportunity to "discuss how the relationship between science and society can be strengthened and become more productive to the benefit of both science and society" (Odense Report, 2012:3). The report reads that these benefits are also applicable "when we talk about the large amount of research and innovation that is being carried out in the private sector" (Odense Report, 2012:3). In other words, this shift which RRI has come to represent is held to benefit not just society, but also science, including research and innovation carried out in the private sector. Such cases of evaluating the emerging framework in terms of private interests is what I will refer to as drawing upon a *market order of worth*.

In reading the Odense report, we learn that strengthened dialogue between science and society poses benefits also for science, including the private sector. The report preface reads that although such dialogue is valuable in improving our understanding of complex issues and ethical dilemmas, the idea of RRI "is also about increasing the quality of our investments in science" (Odense Report, 2012:3). The report stresses that the probability of scientific

results being 'relevant, robust and having a positive impact' increases by improved societal dialogue. In turn, the "likelihood of new products and technologies being successful increases if they are developed on the basis of a sound understanding of public needs and concerns" (Odense Report, 2012:3). In other words, the documents can be viewed as simultaneously drawing upon both the civic and the market order of worth. RRI is constituted as valuable as it improves our grasp of complex ethical and societal issues and brings about socially desirable research and innovation, but is in the same turn also valuable in terms of increasing the probability of technologies and products being more successful in the market.

Such valuations of the quality of investments in science in terms of its prospective market value and the successful market uptake of innovations permeate the documents. The 2012 informational brochure reads that mutual learning is needed to develop joint solutions to societal problems and opportunities and "to pre-empt public value failures of future innovation" (EC, 2012a). The updated 2014 version of the brochure poses the same argument, albeit phrased somewhat differently, that public engagement fosters more socially relevant, desirable, and creative research and innovation, "leading to wider acceptability of science and technology outcomes" (EC, 2014a). The Rome Declaration emphasizes similar values of the RRI framework, that "it builds trust between citizens, and public and private institutions in supporting research and innovation" and, consequently, "reassures society about embracing innovative products and services" (2014).

When viewing the above-mentioned benefits in a valuation perspective, we may understand such evaluations as being along a market order of worth. Worth is here evaluated in terms of increasing the quality of investments in science by ensuring societal desirability through public engagement, further increasing the probability of the products and technologies of research and innovation to succeed in the market. In this sense, the policy concept may be interpreted as a framework for performing what is commonly described as market-driven or open innovation (see e.g. Chesborough, 2003). In contrast to the civic order of worth, where citizens are addressed as having civic duties to help bring about socially desirable processes and outcomes for the 'common good', citizens are along the market order of worth actively framed as *consumers*. Research and innovation is along this order given commercial and economic interests and objectives, to not only serve society but also the individual or sectoral interests of actors in terms of market value and success.

4.4.2 Delivering on promises of growth and competitiveness

Along a market order of worth are also valuations of the policy concept as instrumental in strengthening European economic growth and competitiveness. Although initially defined by the Rome Declaration as the on-going process of aligning research and innovation to the values, needs and expectations of society, the document further reads that "the benefits of Responsible Research and Innovation go beyond alignment with society: it ensures that research and innovation deliver on the promise of smart, inclusive and sustainable solutions to our societal challenges" (Rome Declaration, 2014). This assertion can be viewed as a reference to the title of the document *Europe 2020: A strategy for smart, sustainable and inclusive growth*, the EU's economic growth strategy for the period 2010-2020 (EC, 2010a).

As argued in the previous chapter, the emergence of RRI can be viewed as conditioned in part by an evolving discourse of connecting research and innovation more closely to economic growth, in which the Europe 2020 Strategy is a central document. The evaluative principles of such a discourse, in which the value of research and innovation is assessed in macroeconomic terms, are at play also in the documents concerning RRI. In reading the Rome Declaration, we learn that the value of RRI goes beyond societal alignment. It is also being valued by its prospective capacity to help ensure the fulfilment of the strategic goals of the Europe 2020 strategy and the surrounding discourse of delivering smart, sustainable and inclusive economic growth.

Along a market order of worth are also valuations of RRI in terms of its prospective ability to enhance European global competitiveness. As mentioned, the Odense conference report stressed that RRI would increase the likelihood of products and technologies succeeding in the market. "As such," reads the report, "an open and inclusive approach based on dialogue between different sectors will help Europe heighten its innovative capacity" (Odense Report, 2012:3). The EU expert report *Options for Strengthening Responsible Research and Innovation* reads similarly, that RRI fosters "the competitiveness of the European economy and its innovative capacities" (van den Hoven et al., 2013:56). The report reads that Europe is facing competition in providing solutions to global societal challenges. Thus, the consideration of ethical and societal aspects in research and innovation can lead to more successful products, "and therefore an increased competitiveness" (van den Hoven et al., 2013:20). This aspect was also addressed at the 2011 Brussels workshop, highlighting that

"Responsible research is seen as a competitive advantage" in a global economy (EC, 2011a:4).

Boltanski and Thévenot emphasise that competition is a distinctive trait of the market order of worth. The market world is one governed by "the *competition* between beings placed in a state of *rivalry* (…)" (emphasis in original) (2006:196). As demonstrated, we may discern such a condition of rivalry being performed in the documents. The competitive advantage provided by RRI is here not thought to benefit only individuals or organisations, but Europe, as a whole and as a collective, in a global competitiveness perspective. The RRI framework is here enacted as valuable by its capacity of enhancing the competitiveness of the European region in a condition of global rivalry of responding to societal challenges. In other words, we may perceive the market order of worth being drawn upon in a variety of ways. In reading the documents more closely, we may discern evaluative principles of value in terms of the quality of investments in research, the market uptake and success of products, as well as European economic growth and global competitiveness.

4.4.3 Economic and non-economic entanglements

In summing up this section, the entanglements of economic and non-economic values, the market order and the civic order, should be given some emphasis. In his work, Stark advocates for rejecting strict distinctions between economic *value*, in the singular, on the one hand, and social and cultural *values,* in the plural, one the other (2000:3). In doing so, "we embark on an analysis of worth to develop tools for understanding a richer calculus that integrates value and values, the intellectual and the emotive, valuation and the evaluative" (Stark, 2009:9). Investigating the economic and non-economic together permits studying various forms of worth, and importantly, how they are interwoven. Dussage, Helgesson, Lee and Woolgar stress that what is vital is to acknowledge the commonalities between economic and social value/s, as they both denote the desirability of certain acts over others (2015:9). "Desirability," they write, "must then become plural, as competing orders of desirabilities: different values are made beside each other" (Dussage et al., 2015:9).

The documents' drawing upon both a civic order of worth and a market order of worth can be understood as the simultaneous 'summoning and producing' of both economic *value* and social and ethical *values* (Dussage et al., 2015:8). In reading the documents, public

engagement in research and innovation is valued in the non-economic terms of creating socially responsible and desirable outcomes, but is simultaneously valued in economic terms, as increasing the probability of market uptake and success to the benefit of also organisations and firms. The economic value and success of a product is here made dependent on its ability to respond to or align with societal values. Comparably, the framework is enacted as valuable by its ability of directing research and innovation towards solving global societal challenges, but in the same turn, the prioritisation of solving these societal challenges will heighten Europe's innovative capacity and global competitiveness, spurring economic growth in the region. In a valuation perspective, we may read the documents as practices in which the economic and the non-economic are deeply entangled, effectively 'made beside each other' (Dussage et al., 2015:9).

Dussage *et al.* explain how people and institutions deal with ethical, social and economic concerns in complex ways, attempting to arrange these values in acceptable combinations or 'matches' (2015:9). However, they continue, the economic and the ethical, cultural or social are values "often composed differently in practice, and thus also remain in tension with each other" (2015:9). In reading the RRI documents, we see how the different orders of worth in action are presented as harmonious and even mutually enforcing, rather than in opposition to one another. However, as different orders of worth are simultaneously at play within the same situation, so are different evaluative principles. Stark argues that it is exactly in such conditions *dissonance* occurs (2009:27). Although the orders are made commensurable in the documents, there are necessarily tensions as different evaluative principles overlap.

In the next sub-chapters, I will inquire into two identified tensions, creating potentials for dissonance within the RRI framework. The two possibly dissonant situations to be discussed have some fundamental distinctions, of which I argue may be recognised as two *types* of dissonance. The first is a type of latent dissonance within the documents and situation itself. As will be demonstrated, this tension may be recognized from the very materialisation of RRI at EU level, in the 'meeting' of the two situations I have argued conditioned its emergence in the first place. Secondly, I will argue that there is potential for another distinctive type of dissonance. This is a tension between the valuations of science, specifically, enacted in the documents and another prominent discourse concerning the value and values of science not rendered in the documents at all.

4.5 Dissonance at the overlap: the civic and the market

A musical metaphor, *dissonance* indicates an unstable tone combination and temporary state of misunderstanding, suggesting that "some sound or sound constellation violates the aesthetic expectations of the listener" (Hutter & Stark, 2015:6). Figuratively speaking, the term refers in a valuation perspective to situations in which several value regimes are at play, causing a temporary state of uncertainty as to how the value of something is to be assessed. Hutter and Stark describe a situation as dissonant "when there is more than one framework for assessing it, more than one value system for measuring worth" (2015:5). In his work, Stark demonstrates how dissonance occurs as a result of diverse and possibly antagonistic evaluative principles overlapping (2009:27).

As we have seen, several orders of worth are simultaneously being drawn upon in the documents concerned with the development and promotion of RRI. As each of the two orders overlapping is equipped with distinctive evaluative principles for assessing value, there is potential for dissonance to occur in response. The objective of this sub-chapter is to inquire into this tension between the two orders of worth in action in the documents, namely the valuations enacted along a *civic order of worth*, on the one hand, and a *market order of worth*, on the other. In doing so, I will return to the work of Stevienna de Saille and her identification of a tension of which I will argue can be understood as dissonance at the overlap of these two distinctive value regimes.

In doing so, I have sought to 'recover' the situations enabling the policy concept to emerge as a desirable, appropriate and necessary policy object, by way of approaching its documents. In doing so, two 'situations in action' (Asdal, 2012) have been 'weaved out' of the documents. It is my argument here that RRI could emerge as the result of a 'drawing together' and 'coupling' of these two situations in significant ways (Asdal, 2014). In the following, I will demonstrate in more detail how these situations interact and interfere with one another within the same documents, together producing "an issue, a concern, a sensibility – hence, a particular situation (Asdal, 2012:388).

The dissonance addressed in this sub-chapter is one unfolding in the documents themselves. If we return to the discussion of the previous chapter, however, we may discern this potential

for dissonance at the very outset. In chapter 3, we saw how the emergence of RRI can be understood as enabled at the overlap of two situations, interacting and interfering with one another and together producing a particular situation in which it could materialise (Asdal, 2012). The two orders of worth identified in the documents may also be discerned in the two situations conditioning its emergence, in the first place. The evolving discourse at EU level of a 'knowledge-based economy', connecting research and innovation more closely to economic growth, employment and competitiveness, can be understood as drawing on a market order of worth. The second situation of research on the science-society relation, particularly in the field of STS, can be viewed as drawing on a civic order of worth in its concern with the societal implications of science and technology and with promoting its democratisation. The meeting of these two situations can be viewed as conditioning a situation in which RRI could emerge in the first place and, equally, as leaving us with a potentially dissonant situation in valuation terms at the very outset, as different evaluative schemes overlap.

4.5.1 Opening up, closing down

In the documents, the policy concept of RRI is framed as one exclusively opening up for new research and innovation opportunities. Owen, Macnaghten and Stilgoe, all active contributors to the development of the RRI framework in the UK, describe the primary purpose of the concept as to "inclusively and democratically define and realize new areas of public value for innovation," taking us "beyond the 'closing down' framing of conventional ethical reviews" and should thus "be viewed as creating opportunity" (Owen et al., 2013:35). Although Owen *et al.* are emphatic that the framework may exacerbate tensions, e.g. between economic growth and environmental sustainability (2013:30), this 'opening up' framing is prevalent throughout the EU documents dedicated to the issue.

The Rome Declaration reads that RRI "engages new perspectives" and allows "to identify solutions which would otherwise go unnoticed" (2014). The brochure reads likewise, stating that engagement will "foster more socially relevant, desirable, and creative research" (EC, 2014a). As previously noted, such valuations along the civic order are made commensurable with those along the market order, in terms of ensuring market uptake and success and economic growth. What is notable here is the absence of the possibility that slowing down, halting or even closing down a trajectory of research or innovation might in some cases be considered the socially desirable option. In such cases, what is to be given more emphasis? It

is in such moments of uncertainty that the coexistence of competing orders of worth may lend themselves visible to us, leading to the emergence of *dissonance* (Hutter & Stark, 2015). The following sections will discuss the tension between the civic and the market order of worth at work in this emerging framework of 'opening up', leaving the unfavourable option of 'closing down' unaddressed.

Stevienna de Saille addresses this issue as she demonstrates how the EU policy framework "produces several tensions which will need to be addressed in order for RRI to become truly responsible to the needs, ambitions, and values of European society" (2015:163). She argues that since the deployment of RRI is through the European Research Area (ERA), it is legally bound to the economic goals of the European Council (2015:159). She further stresses that both the ERA and the Innovation Union advocate less regulation to allow greater risk-taking in research and to bring innovations more quickly to market (de Saille, 2015:162). On this basis, de Saille points to the fundamental tension between objectives of speeding up innovation, ensuring it goes successfully to market and produces immediate economic growth and job creation, on the one hand, and the possibility that slowing down, changing or even halting a trajectory of research or innovation might be considered necessary, even though they might be highly profitable, on the other (de Saille, 2015:163). De Saille concludes that this may largely be a result of timing and embeddedness in pre-existing structures that might adjust over time, but that it may also signal "that there are irreconcilable objectives inherent in the application of 'responsibility' to innovation" (2015:159).

In approaching the documents with a valuation perspective, one can argue that the possibly 'irreconcilable objectives' identified by de Saille can equally be understood as a situation of incommensurable evaluative principles overlapping, namely those belonging to a civic order of worth and a market order of worth. Whilst the civic order is concerned with the interests of the collective, the market order is largely concerned with individual, sectoral or institutional interests. Whilst value comes about in a civic economy through demonstrations of will for the common good, value is realised in a market economy through commodification, the price, and success in the market. Whilst the civic world is marked by collective action and collaboration, the market economy is marked by competition and rivalry. Although presented as harmonious in the documents, tensions may arise in such a situation as multiple evaluative principles overlap, producing a state of ambiguity. For example, will a trajectory of research

or innovation be discontinued, even if it is economically viable, if it does not prove to be socially desirable?

This ambiguity is increased by the interchangeable use of the notion of *social desirability* and *acceptability* in the documents. The brochure reads that the RRI framework will bring about socially *desirable* research and innovation, but in the next turn, ensure public *acceptability* (EC, 2012a; 2014a). Owen *et al.* characterize the novelty of RRI as a framework going beyond risk assessment and managing undesirable consequences, addressing instead "what sorts of futures we want science and innovation to bring into the world" (2013:29). Rather than asking what we *don't* want research and innovation to do, it asks what we *do* want it to do (Owen et al., 2013:29). One may argue here that the former question of possible negative impacts concerns public *acceptability* or *unacceptability* of risks, whilst the latter, of asking what impacts we do want, concerns the social *desirability* of research and innovation, in the first place. The interchangeable use of these terms in the documents, carrying fundamental distinctions, brings with it further ambiguity as acceptable research and innovation is not necessarily desirable. What evaluative principles are to be given more emphasis in such situations of dissonance, in which civic value and market value may inescapably and mutually exclude one another? As such, the RRI situation may be understood as potentially dissonant, as there is more than one framework for assessment and, consequently, more than one value system for measuring worth (Hutter & Stark, 2015:5).

4.6 Dissonance at the divide: the values of society and the values of science

So far, the potential for dissonance between the orders of worth draw upon in the documents themselves has been addressed. In this sub-chapter, I direct my attention to another type of dissonance. In the following, I will argue that there are potentials for dissonance between the value of science as enacted in the documents and that performed in another long-lasting and substantial discourse on the value of science, of which is not present in the documents at all. This tension consists of the valuing of research in terms of its ability to respond to societal values and socio-political issues, on the one hand, and in terms of a distinctive value system of science, the 'scientific ethos', on the other. Such dissonance will be demonstrated by

comparing and contrasting the valuations of the documents with the work of Robert Merton (1938).

Owen *et al.* note that the RRI framework's promotion of inclusive participation in research "exacerbates the tension between the principle of participation and that of scientific freedom, one that is hardly new but is of particular relevance to RRI" (2012:754). This tension may be less keenly felt for innovation, they argue, as the value of public involvement in product development is widely acknowledged, whether described as market-driven innovation, open innovation, or values-sensitive design (2012:754). This tension may, in other words, be understood as one specific to research. It is my argument here, however, that this conflict reaches far beyond public participation, on the one hand, and scientific freedom, on the other. I argue here that the potential for dissonance may be understood as antagonistic evaluative principles of assessing the value of science and what scientific excellence looks like.

4.6.1 Antagonisms of society-led and 'pure' science

As we have seen, RRI is in the documents presented as a framework concerned with aligning research and innovation with "the values, needs and expectations of society" (EC, 2012a; 2014a). As previously argued, the framework can be read as a response to the Lund Declaration (2009) and its surrounding discourse's call to redirect research towards solving societal challenges and, consequently, facilitate economic growth. RRI is recurrently juxtaposed with Europe's ability to respond to such challenges (EC, 2012a; 2014a), and has public engagement at its heart to bring about socially desirable outcomes, of which EU officer René von Schomberg has termed the 'right impacts' (2011a; 2013). Such practices of evaluating science by its capacity to address and impact socio-political and economic issues necessarily evoke tensions. Although hardly new, this tension is particularly relevant here as the RRI framework seems to enhance it. To detect such a possible conflict, we must turn our attention to a long-lasting discourse of science in which its value is evaluated on quite contrasting criteria, represented here by Robert Merton's work *Science and the Social Order* (1938).

The coupling of science with societal values represents a departure from Mertonian conceptions of a clear demarcation of science from non-science (1938). A founder of the Sociology of Science, Robert Merton was particularly concerned with the ethos of science,

which he in later works introduced as comprised by four sets of institutional imperatives or norms, often referred to by the acronym CUDOS (Merton, 1942). "The ethos of science is that affectively toned complex of values and norms which is held to be binding on the man of science," writes Merton (1942:268-9). It is this, he argued, which distinguishes and separates science from other spheres of social life, and through which science is endowed capacity to produce reliable knowledge. Merton claimed that conflicts arise when the expansion of political, religious or economic authority limits the autonomy of the scientist, when 'anti-intellectualism' questions the value and integrity of science, and when non-scientific criteria of eligibility for scientific research are introduced (1938:336). "Science must not suffer itself to become the handmaiden of theology or economy or state," contended Merton (1938:328).

Merton maintained that the 'goodness' of science should not be based upon criteria of social applicability, be it religious, political or economic. He found such utilitarianism deeply problematic, arguing that changes in institutional structure may in fact curtail, modify or possibly prevent the pursuit of science (Merton, 1938:321). He argued that so-called 'extra-scientific commitments', such as a commitment to provide economic growth or to strengthen a technology or industry's legitimacy, interdicts scientific autonomy. According to Merton, such external influences corrupt both the ethos of science, its autonomy and its very position in society:

> For if such extra-scientific criteria of the value of science as presumable consonance with religious doctrines or economic utility or political appropriateness are adopted, science becomes acceptable only insofar as it meets these criteria. In other words, as the 'pure science sentiment' is eliminated, science becomes subject to the direct control of other institutional agencies and its place in society become increasingly uncertain (Merton, 1938:328-329).

We may distinguish a fundamental tension when contrasting Merton's valuations of science, and not least, his warnings of the application of non-scientific evaluative criteria, with those of the documents. From a Mertonian perspective, the ambition of RRI to align research with societal values and expectations, in which the 'goodness' of science is to a large extent determined by its applicability and ability to resolve socio-political issues, renders itself deeply problematic. Merton viewed such extra-scientific commitments of political, societal or economical nature as irreconcilable with the values of science itself, or the 'scientific ethos' and its norms "expressed in the form of prescriptions, proscriptions, preferences, and

permissions" (1942:269). In such a view, the entry of non-scientific evaluative schemes into the domain of science would risk inhibiting its ability to produce reliable knowledge and even challenge its very position in society (Merton, 1938:321). The antagonism of such valuations of science may foster a situation of dissonance.

The documents on RRI conflict with this ideal, as 'co-production' between different social spheres is here the ideal method of pursuing science, actively seeking to bring society and its values 'into' science and vice versa. As Mertonian conceptions of science deems a clear demarcation between science and non-science, the RRI framework actively seeks to transcend this perceived demarcation, determined to 'bridge the gap' (EC, 2012a; 2014a). In comparing the work of Merton with the documents, we may also detect two contrasting versions of the science-society relation deemed desirable. Whilst the RRI framework, as discussed, holds involvement of all societal actors in research the most prudent relationship, Merton saw science as a separate domain with its distinctive value system as one best kept separate and untainted by other social spheres.

4.6.2 Value systems in conflict

In *Science and the Social Order* (1938), Merton argued that hostility toward science arises from the conclusion that the results or methods of science are inimical to the satisfaction of certain values (1938:322). He claimed such incongruence to rest upon a feeling of incompatibility between the sentiments embodied in the scientific ethos and those found in other institutions, be it economic, humanitarian, political or religious. The same reasoning applies to the social acceptance of science, Merton explains, except in these instances, science is thought to facilitate the achievement of approved ends. In such cases of public acceptance, "basic cultural values are felt to be congruent with those of science, rather than emotionally inconsistent with them" (Merton, 1938:322). Merton argued that conditions of hostility or acceptance are based on concrete systems of values, emphasizing that the scientific sphere and ethos must not be infiltrated by the value systems of other domains (1938:322).

In contrast to Merton's insistence for their separation, the RRI documents can be viewed as actively and strategically seeking to align such perceived systems of values. One could argue that the aim of "aligning research and innovation with the needs, values and expectations of

society" (EC, 2012a; 2014a) to ensure "wider acceptability of science and technology outcomes" (EC, 2014a) and to "pre-empt possible public value failures" (EC, 2012a) is a rationality following Merton's causality of what conditions hostility and acceptance – arising when either congruence or incongruence is felt between the values of science and of other domains of society. The policy concept can thus be viewed as a tool for facilitating acceptance rather than hostility by seeking to align the values of society with those of science. In contrast to Merton, such overlaps are in the documents not thought to inhibit the pursuit of science or scientific excellence. As will be demonstrated, such alignment is rather viewed as enhancing scientific quality and excellence.

The report of the Odense conference reads that the "quality and relevance" of research "will be heightened if research is carried out in dialogue with the end users of new technologies, with authorities and with stakeholders" (Odense Report, 2012:3). Equally so, the 2012 version of the brochure states that "a sound framework for excellence" is one framed around "widely representative social, economic and ethical concerns and common principles" (EC, 2012a). In presenting the benefits of the RRI framework, the Rome Declaration reads: "Thus, excellence is about more than ground-breaking discoveries: it includes openness, responsibility and the co-production of knowledge" (Rome Declaration, 2014). The commonality of the conference report, brochure and declaration is that scientific excellence and quality is constituted as not merely confined to the nature of its discoveries, but equally how it performs scientific social responsibility in delivering socially desirable outcomes. This is further exemplified by the Odense conference's juxtaposition of the RRI framework with a move from the best science *in* the world to the best science *for* the world (Odense Report, 2012:3).

We may again discern a potential situation of dissonance when contrasting the documents recombination of what constitutes excellence and quality in science with the work of Merton. Merton's 'pure science' is characterized by a detached and disinterested science sphere, untainted by the value systems of other social domains, whereas exchanges between science and society necessarily interferes with the scientific ethos. The documents, on the other hand, actively seek to transcend this perceived demarcation, determined to 'bridge the gap' (EC, 2012a; 2014a). What Merton characterized as different and incompatible value systems is in the documents presented as rather mutually enforcing and as heightening scientific quality and excellence. In other words, the value of research is in the documents enacted in new

ways in terms of quality and excellence, of which may foster potentials for dissonance in the divide between the quite contrasting evaluative principles of Mertonian conceptions.

4.6.3 A redistribution of moral labour

One final distinction should be made here between the valuations of the documents and the Mertonian discourse of science. The documents present the RRI framework as not only concerning citizens and other stakeholders, but also the researchers themselves to consider the wider societal impacts and the social desirability of their work. The Odense conference report stresses the need for scientists to have 'a sense of scientific social responsibility' and responsiveness to society's concerns and wishes (Odense Report, 2012:3). As will be demonstrated in the following, there is potential for dissonance as divisions of labour are reassembled. To demonstrate this, I turn first to the work of Erik Fisher and Arie Rip (2013), demonstrating how tensions, dichotomies and ambivalences remain visible in renegotiations of the division of moral labour in science.

Fisher and Rip argue that the culturally accepted responsibility of scientists is working toward progress by conducting good basic research, whilst others, such as governmental agencies and professional ethicists, have been responsible for controlling the social consequences (2013). Scientists taking responsibility for considering broader societal impacts of research will necessitate confronting and renegotiating such divisions of moral labour, they continue (2013:178). Actors will have to change their practices, Fisher and Rip argue, which are deeply embedded in established structures of institutions and norms (2013:178). They argue that this division of promotion (scientists/innovators), on the one hand, and control (governments/ethicists), on the other, is a challenge for RRI as it seeks to transcend this culturally accepted division of labour (Fisher & Rip, 2013:178). They write that these interactions may even heighten such tensions, or at least make them more visible (2013:179).

The preface of the Odense conference report reads that the probability of science being relevant, robust and having a positive impact on society will increase "if a sense of scientific social responsibility and responsiveness to society's concerns and wishes can be fostered" (Odense Report, 2012:3). Although acknowledging that much can be done by embedding RRI at political and structural levels, a key message at the Odense conference was that "the mindset of responsibility starts with the individual researcher or innovator" (ibid). The report

continues with encouraging "researchers to engage in society, to be open to dialogue and to have an eye for public concerns and ambitions – all with the ambition of building better science for the world" (ibid). This tasking of researchers with the social scientific responsibility of their endeavours involves, as argued by Rip (2014), a renegotiation of the 'social contract' between science and society, or as worded by Fisher and Rip, a redistribution of moral labour (2013).

To recognise the potential for dissonance in this situation, we may turn to Merton's identification of four sets of scientific imperatives taken to comprise the ethos of modern science, of which have been influential in views of scientific values (1942). The Mertonian norms of communism, universalism, disinterestedness and organized scepticism, often referred to by the acronym 'CUDOS', may be viewed as an example of established internal control mechanisms to ensure the quality, integrity and rigour of research. Such established norms can be understood as what Fisher and Rip describe as the culturally accepted responsibilities of scientists, whilst others have traditionally been responsible for the wider societal impacts (2013:178). In such ambivalences of the roles and duties of science and scientists, potentials for dissonance may arise, as the documents ascribe responsibilities of considering the wider social impacts also to scientists, beyond the self-regulatory practises established within the scientific community.

We may see such culturally accepted responsibilities of scientists in terms of internal principles of self-regulation enacted at EU level. In March 2017, the European Commission adopted a revised edition of the *European Code of Conduct for Research Integrity,* required adhered to by all Horizon 2020 funded projects (EC, 2017b). The code of conduct, developed by the European organisation of academic societies All European Academies (ALLEA), aims to promote "the responsible conduct of research to help improve its quality and reliability" (EC, 2017b). The primary purpose of the framework is to "help realise this responsibility and to serve the research community as a framework for self-regulation," presenting the four principles of 'Reliability', 'Honesty', 'Respect' and 'Accountability' as fundamental to good research practices (ALLEA, 2017:3). Although this code of conduct will not be discussed in detail here, it is noteworthy that the RRI framework and the Code of Conduct are kept as separate frameworks of values. As with the case of Merton's norms, there may be potentials for dissonance in this divide of internal values systems of self-

regulation, on the one hand, and external values systems of social, political and economic desirability and responsibilities for the wider impacts of science, on the other.

The two preceding sections have been concerned with two specific types of potential dissonance arising with the RRI framework, as demonstrated by a closer reading of the documents dedicated to its promotion and development. We have seen how a latent dissonance may be identified in the documents themselves, as a civic order of worth and a market order of worth overlap. We have also seen how there are potentials for dissonance in the divide between the valuations of science enacted in the documents and another enduring discourse on the value/s of science, here represented by the work of Robert Merton (1938) and what Fisher and Rip call the 'culturally accepted responsibilities of scientists' (2013).

Ambiguities arise as the RRI framework, concerned with researchers' responsibilities for considering societal impacts, overlaps with frameworks traditionally accepted as ensuring good scientific practice in terms of self-regulation within the scientific community. In his work, Stark investigates how innovation challenges established standards for determining worth (2009). As innovation represents something novel, disrupting patterns and existing categories, it "necessarily obscures which measurements or standards should calculate values" (Hutter & Stark, 2015:5). We may understand the policy innovation of RRI here as disrupting the patterns and existing categories of scientific practice, necessarily obscuring which standards of evaluation are to be given more emphasis, or how the valuation practices of different frameworks are to be recombined. This may be considered a situation of potential dissonance, as there is more than one framework for assessment, more than one value system for measuring worth (Hutter & Stark, 2015:5). In the following, some abridgments of the different elements of this thesis will be made to emphasise the valuation practices enabled with the policy innovation of RRI.

4.7 Enabling new valuation practices

As this thesis is close to approaching its end, the entanglements of its dimensions should be given some further emphasis and elucidation. In this thesis, two research questions have been addressed. The first research question asked: *What situations enabled the policy concept of RRI to emerge in EU research and innovation policy?* The second research question of this

thesis asked: *In what ways does the policy concept of RRI enable new valuation practices in research and innovation?* Although these two research questions have been addressed separately in this thesis by two dedicated chapters, responding to them has been an interrelated endeavour, and should thus not be viewed in isolation. As we have seen, the valuation practices enabled by RRI are rather deeply entangled with the situations conditioning the emergence of the new policy concept in the first place.

In chapter 3, it was argued that the emergence of RRI at EU level can be understood as conditioned by the interactions of two situations and how they were effectively interfering with one another and being 'drawn together' in the same documents. The first situation was one concerned with assembling a new 'knowledge-based economy' and exiting an economic crisis, in which research and innovation is framed as the driver of economic growth and the tackling of societal challenges one means of achieving this. The second situation was one concerned with responsibility critiques of science and technology governance, urging policy-makers to take more responsibility for the wider societal consequences of research and innovation by democratising its deliberation and decision-making. It was in the drawing together of these two situations that RRI could emerge as a relevant and valuable policy object – as a democratising tool and, simultaneously, as a policy tool for ensuring continued economic growth.

In chapter 4, two distinctive 'orders of worth' were identified in the RRI documents, each with certain evaluative principles for assessing worth – a civic order of worth and a market order of worth. The interrelatedness of the research questions posed and the activity of responding to them here lends itself visible, as the two situations identified in chapter 3 may be understood as drawing predominantly upon a market order of worth and a civic order of worth, respectively. The first situation can be argued to draw largely upon what has here been characterised as a 'market order of worth' in its concern with linking research and innovation to economic growth and global competitiveness to assembled a new economy and to exit an economic and financial crisis. Comparably, the second situation can be argued to largely draw upon a 'civic order of worth' in its concern with democratising questions of science and technology to ensure that it comes to the benefit of the 'common good', advocating for wider engagement of civil society in decision-making. In this view, it may seem that the interactions of these two situations created an enabling and, simultaneously, potentially dissonant situation at the very outset.

The emergence of RRI enables certain valuation practices in research and innovation in response. In light of the inquiries of this thesis, the policy concept can be argued to enable practices in which the value of research and innovation is increasingly evaluated in terms of its capacity to respond to societal values, needs and expectation and, consequently, its ability to bring about collectively desirable outcomes. Such valuations are enabled by the drawing upon a civic order of worth, in which the collective is the entity in which science and innovation is to serve. Simultaneously, the drawing upon a market order of worth enables research and innovation to be increasingly evaluated in economic and macroeconomic terms, in which research and innovation is to serve interests at the level of individuals and organisations, as well as the economic growth and competitiveness of Europe in a global perspective. As has been argued, there are potentials for dissonance as antagonistic evaluative principles overlap and coexist in the same situation.

Another situation of potential dissonance has also been identified in this thesis. This is an antagonism between the valuations of science in the documents, in terms of its ability to respond to socio-political and economic issues, and another influential discourse of science not present in the documents at all, in which the scientific ideal is a 'pure science' detached from other social domains. It should be emphasised here that the Mertonian conception of a 'pure science' and the concern with the 'scientific ethos' is not particularly prevalent in either of the situations outlined to have conditioned the emergence of RRI. Strands of research within the field of STS have, in fact, been preoccupied with challenging such conceptions, arguing science and society to be inevitably 'co-produced' (Jasanoff, 2004), contending a purely autonomous science sphere to be at all achievable. Such conceptions are, nonetheless, still held highly in the discourses of the scientific ideal, in which science are practices best driven by its own systems of value. The RRI framework can be viewed as representing quite contrasting ways of valuing science, in terms of its ability to deliver on civic and market values, rather than by the internal value system of science and scientific production.

The overlap of different value regimes produces tensions as competing orders of desirabilities are 'made beside each other' (Dussage et al., 2015:9). The documents can be understood as attempting to deal with social, economic and ethical concerns by arranging these diverse values in acceptable combinations, as harmonious or mutually enforcing. As Dussage et al. emphasise, however, the economic, ethical, cultural and socials are values "often composed

differently in practice, and thus also remain in tension with each other" (2015:9). As has been demonstrated, Stark characterises such situations of antagonistic evaluation principles overlapping as 'dissonance' (2009). As a closing discussion, I will look more closely at how a situation of dissonance may in fact be productive, viewed as a potentially creative force.

4.7.1 Possibilities of benefiting from ambiguity

Before making concluding remarks, some emphasis should be given to how a sense of dissonance can create openings for potentially fruitful *recombinations* of evaluative principles and, consequently, enable new valuation practices (Stark, 2009:164). Dissonance and the subsequent tensions between orders of worth may open a horizon of uncertainty. However, Stark is emphatic that dissonance may equally be a creative force. He argues that uncertainty demands *search, inquiry,* and *discovery* and thus enables action, new solutions and creative entrepreneurship (2009:204). Stark found considerable ambiguity in his ethnographic case studies, where action was made possible precisely because there was uncertainty about which order of worth was in operation (2009). He found that some actors were "attempting to benefit, not from asserting or fixing their worth in one order, but by maintaining an ongoing ambiguity among coexisting principles" (2009, xiii-xiv).

Such coexistence of multiple performance criteria can produce a resourceful dissonance and may in some cases be unavoidable, Stark argues, encouraging a continuous organizational reflexivity to enhance the ability to deal with uncertainty (2009:27). On this basis, Stark endorses governance structures designed to accommodate such uncertainties, the *heterarchy*. This involves inviting multiple orders of evaluating worth in non-hierarchical structures, as "neither harmony or cacophony, but an organised dissonance" (ibid). Stark emphasises, however, the necessity of a discursive pragmatism in relation to such organized dissonance. He writes that there is need for a collective sense of 'rhythm and timing' to make temporary settlements to 'get the job done', but with the knowledge that "this is not a once-and-for-all resolution of the disagreements" (ibid).

In this regard, we may view the potential dissonance of the RRI framework not unequivocally as an unproductive ambiguity, but also as a potentially creative force. In such a view, the coexistence of multiple evaluative criteria in the documents may lead to potentially fruitful *recombinations*. For one, such uncertainty may spur an organizational reflexivity within the

EU concerning the valuation of research and innovation, and which evaluative criteria are to be applied in the funding and assessment of Horizon 2020 projects and outcomes. One example of such reflexivity may be argued to be found at EU level in the production of indicators for monitoring RRI activities. The EU funded reports *Indicators for monitoring and promoting Responsible Research and Innovation* (Strand et al., 2015) and *Metrics and indicators of Responsible Research and Innovation* (Ravn et al., 2015) deliberate on how and what new evaluative principles should be implemented to assess research and innovation projects with an RRI dimension. This development may potentially lead to a fruitful recombination at EU level of how funding is distributed, how projects are assessed and by what evaluative frames.

Such a resourceful dissonance may occur also at the level of individual research and innovation organisations. Employing the RRI framework in projects requires what Stark characterizes as *search*, *inquiry* and *discovery* (2009) in terms of developing new practices for applying for funding in Horizon 2020, and new processes for conducting research and innovation, e.g. by including public engagement. In this sense, there is possibility for fruitful recombinations of frameworks for conducting good research in terms of self-regulation, such as Merton's CUDOS norms and the aforementioned *Code of Conduct for Research Integrity* (ALLEA, 2017), with a framework for Responsible Research and Innovation (RRI). Exactly how the RRI framework enables new valuation practices, and possibly challenges or obstructs established evaluative principles, at project-level or in concrete institutions may be an interesting field of study for future research.

In addition, there are potential scenarios for organised dissonance in each case of public engagement in research and innovation projects. In aiming to involve "all societal actors via inclusive participatory approaches" (EC, 2012a; 2014a), a multitude of evaluative principles may be recombined, possibly responding to the aims of the Odense conference of different perspectives bringing forward "different and, sometimes, better solutions" (Odense Report, 2012:10). Stark writes that "the manifest, or proximate, result of this rivalry is a noisy clash, as the proponents of different conceptions of value contend with each other" (2009:27). However, he continues that the latent consequence of this dissonance is "that the diversity of value-frames generate new combinations of the firm's resources" (ibid). In the case of the RRI framework, genuine public engagement may generate new and fruitful combinations of Europe's resources, in this case its citizens, as a diversity of value-frames across a varied

population overlap. As such, public engagement activities can be understood as a form of temporary heterarchy and organised dissonance, in which productive recombinations may occur.

One could argue that the aims of RRI is exactly such fruitful recombinations, as public engagement is presented as a tool to foster "more socially relevant, desirable, and creative research and innovation" (EC, 2014a). The potential for a resourceful dissonance and ensuing productive recombination will here depend largely upon its heterarchical genuineness, that such activities are given actual influence in the shaping of research and innovation trajectories and that research and innovation does look different in response. Although Stark emphasises the need for a sense of collective 'rhythm and timing', or a discursive pragmatism, as temporary settlements to 'get the job done', it is imperative to deploy genuinely heterarchical processes to reap the benefits of such dissonance.

5 Concluding remarks

In his work, John Dewey places considerable emphasis on the distinction between the act of *problem-solving* and that of *inquiry* (1933). He writes that to start with a ready-made problem is artificial so far as thinking is concerned, as "in reality such a "problem" is simply an assigned *task*" (1933:201, emphasis in original). As a distinctive approach, inquiry looks instead into the "troubled, perplexed, trying situation, where the difficulty is, as it were, spread throughout the entire situation, infecting it as a whole" (1933:201). As David Stark writes, this distinction turns our attention from a *well-defined problem* to the more interesting case of a *perplexing situation* (2009:2).

In working with this thesis, I have attempted to follow these encouragements of Dewey and Stark. My ambition has not been one of solving a well-defined or specified *problem*, but one of inquiring into a particular perplexing *situation* – of a policy concept seemingly catapulting from a nebulous phrase to the centrepiece of workshops, high-level conferences, expert reports and declarations and, ultimately, made into a cross-cutting issue of the world's largest research and innovation funding programme. I have attempted to do so by inquiring into the situations conditioning its emergence, in the first place, and the valuation practices enabled in research and innovation, in response.

The ambition of this work has been to bring about new perspectives on the nascent policy concept and its traction in research and innovation policy discourse. Another ambition has been to contribute to the field of valuation studies, a field which has received increasing interest in recent years. In inquiring into the values enacted and valuation practices enabled by the policy concept, by way of looking at documents, my aim has also been to demonstrate how we may gain new insights into policy initiatives by employing a valuation perspective.

This is where I myself arrive at a limit – that is, the scope of this thesis. There are countless strategies for approaching the emergence of a policy concept, as well as for inquiring into what it effectively *does* or *adds* to the world (Asdal, 2012). Looking at documents and approaching situations and valuations represents one such strategy, and will necessarily only provide part of the story about how the policy concept could emerge and how it effectively *does* something. To bring about a fuller understanding, the issue must be grasped through

studies in other sites and processes, and by means of other materials. One such possible site is the research and innovation production sites themselves, and how the practical application of the RRI framework may challenge, evaluate, maintain or negotiate its organisation and routines in practice. In a valuation perspective, one could ask how the tools and metrics for 'good research' and 'good innovation' are reassembled somehow in such cases. Furthermore, this thesis has limited itself to the case of the European Union. The RRI discourse, however, reaches far beyond this level, as the framework has materialised in different versions, for example under the respective research councils of the UK, the Netherlands and Norway. Inquiring into these different versions in a comparative manner would make an interesting case for exploring the issue further.

Arie Rip notes that with the case of RRI, "our understanding will necessarily be partial, as we are in the midst of the process" (2014:1). Albeit partial, the perplexing and trying situation of assembling a policy concept makes it a particularly interesting object of study. The studying of how something is made into a 'matter of concern' offers "a unique window into the number of things that have to participate in the gathering of an object" (Latour, 2004:235). As time progresses, it remains to be seen if RRI will realise the high political expectations attached to it and if research and innovation agendas change in response, or if it remains diagnosed as 'a complex and ill-defined concept' (Ribeiro et al., 2017). As has been argued in this thesis, the ambiguities of the concept as different evaluative principles overlap evoke tensions. The realisation of RRI as "the on-going process of aligning research and innovation to the values, needs and expectations of society" (Rome Declaration, 2014) will on this basis depend largely on its ability to navigate an organised dissonance, potentially leading to resourceful and productive *recombinations* on how the value of research and innovation is to be evaluated.

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