# Chapter 12
# Stakeholders in Research and Innovation: Towards Responsible Governance

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**Abstract** The concept of Responsible Research and Innovation (RRI) revolves around stakeholders of research and innovation aiming for societal desirability of the innovation process. In practice, it is often not clear, however, why one instead of another stakeholder-(group) is invited and for which purpose (Repo and Matschoss 2019). In most of the RRI discourse, 'stakeholders' are used as a catchall phrase denoting societal actors without actually pointing to who they are, why their participation is important, what exactly they contribute and why they should be involved in the R & I processes. In the case of citizen engagement, a typical bias emerges around the inclusion of easily accessible groups of publics. In this chapter we look at stakeholder theory as it has been developed and used for strategic business purposes from the mid 80's and suggest how stakeholder theory may be combined with RRI, RI and QH approaches and applied to research and innovation. We argue that moral, epistemic and power diversity and balance is key to a stakeholder theory of RRI in order to facilitate a democratic debate amongst a wide group of stakeholders in a specific R & I endeavor in order to arrive at outcomes that are appropriate, legitimate, and desirable.

## 12.1 Introduction

The concept of Responsible Research and Innovation (RRI) revolves around stakeholders of research and innovation aiming for "societal desirability of the innovation process" (Von Schomberg 2013). Inclusivity, participation and engagement of a variety of stakeholders are key to RRI (Blok 2019, Brand and Blok 2019, Timmermans et al. 2020), which is also confirmed in empirical studies on RRI (Loureiro and Conceicao 2019). Stakeholders, it is argued, are any

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group or individual that can affect or be affected by the fulfillment of the goals defined by the research and innovation (R & I) process (Silva et al. 2019). When addressing stakeholder inclusion, Silva et al. (2019) classify stakeholders as internal or external groups to the innovation process, including both economic and non-economic actors. They thus suggest the inclusion of various external stakeholders, like individual researchers, research ethics committees and their members, research and innovation users, civil society organizations, public bodies as well as lay citizens in the R & I process. They also argue that employees, users, supply chain stakeholders and external research institutes make important contributions.

In practice, it is often not clear, however, why one instead of another stakeholder-(group) is invited and for which purpose (Repo and Matschoss 2019). In most of the RRI discourse, 'stakeholders' are used as a catchall phrase denoting societal actors without actually pointing to who they are, why their participation is important, what exactly they contribute and why they should be involved in the R & I processes. In the case of citizen engagement, a typical bias emerges around the inclusion of easily accessible groups of publics (Braun and Könninger 2018). We thus see the need to operationalize stakeholder engagement in R & I in order to avoid or make transparent these kinds of biases. Thus, this chapter focuses on the question of *responsible* stakeholder inclusion and brings examples as to potential avenues for operationalizing the normative ideals of inclusion and social legitimization in R & I.

First, we will look at stakeholder theory as it has been developed and used for strategic business purposes from the mid 80's as a point of departure, as well as its application and evolution in research and innovation (R & I). Then we will briefly reflect on the anticipation-inclusion-reflexivity-responsiveness (AIRR) principle from a stakeholder engagement point view, an often-used procedural conceptualization of stakeholder engagement in R & I processes (Braun et al. 2020; Owen et al. 2012). We will then reflect on political Corporate Social Responsibility (pCSR) conceptualizations of responsible governance in stakeholder engagement. Stemming from this conceptual discussion, we will report on two co-creation exercises that included a number of stakeholders in two institutional settings, both initiated through projects funded in the EU Horizon 2020 (H2020) framework. One of these co-creation processes, i.e. social labs (Timmermans et al. 2020), was driven by the Joint Research Center (JRC) of the European Commission and the second one is the Community Creates Mobility (CCM) initiative of the Austrian Railways. These two examples are to bring empirical perspectives on how different stakeholders are involved and engaged in R & I processes, as well as to reflect on how governance challenges are dealt with in these cases. Based on these practical examples of stakeholder inclusion, we will draw conclusions and extend the theoretical pCSR governance conceptualizations, targeted towards specific modes of corporate governance and responsible stakeholder inclusion (RSI), to R & I governance in general.

## 12.2    Corporate Stakeholder Theory

Stakeholder theory evolved in the 1980s in the context of corporations and the business sector. It is argued that the corporation is a quasi-contractual relationship of almost endless individuals and groups – without limitations of time or space and positive and negative impacts (including externalities) are part and parcel of how the company is and should be embedded in society (Freeman 1994). In Freeman's (1984) original definition, stakeholders were the suppliers, consumers, employees, the owners, the local community and the management. These were the groups that could contribute to the success of the corporation and that could legitimately enforce their interests and claims against the corporation. Other authors expanded the number of groups by adding governmental bodies, various political and social organizations and institutions, competitors, trade unions, representatives of the media, and past and future generations (Donaldson and Preston 1995, Clarkson 1995b). Mitchell and colleagues (1997) created instrumental stakeholder typologies based on a power-legitimacy-urgency model to be better applicable to corporate strategy in line with Freeman's original strategic intentions. Clarkson (1995a) argues that stakeholders are to be assessed based on the risks they bear as there is "no stake without risk".

Following Donaldson and Preston (1995), three kinds of stakeholder theories are differentiated. (1) Descriptive stakeholder theory suggests that a variety of different stakeholders represent different positions, interests and modes of value creation and such different vantage points as 'factual representations' of potential societal impacts should be incorporated into business operations. (2) Instrumental stakeholder theory proposes stakeholder-oriented answers to strategic business challenges, and suggests attendance to such challenges to better achieve corporate goals. (3) Normative stakeholder theory draws on ethical principles to propose stakeholder-oriented answers to strategic ethical challenges in governing the corporation. Normative theories focus on governance questions related to ethics and responsibility (Hendry 2001).

These three conceptualizations have been complemented by political Corporate Social Responsibility (pCSR) *politicizing* stakeholder theory along lines of corporate citizenship (Crane et al. 2004). Authors from the field of pCSR claim that the corporation should be a political system of 'stakeholder democracy' (Braun 2019) geared towards the public good (Scherer and Palazzo 2008). Such stakeholder theories, stemming also from corporative settings, are increasingly referred to in the context of R & I and related normative questions of responsibility (Blok 2019).

## 12.3    RRI and Its Stakeholders

RRI and responsible innovation (RI) have its origins in risk assessments of scientific innovations, especially in nanotechnology research. The concept was also applied to issues of research related to socio-technical integration and the ethical, social

implications of scientific innovation in general (Owen et al. 2012). RRI has been defined as "a transparent, interactive process by which societal actors and innovators become mutually responsive to each other with a view on the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products" (Von Schomberg 2013, p. 50).

In order to arrive at such acceptability, sustainability and societal desirability, RRI theorists suggest the inclusion of a variety of stakeholders in the R & I process, including actors from civil society. Blok et al. (2015) thereby suggest demarcating the engagement of economic (e.g., employees and suppliers) and non-economic (e.g., NGOs and research institutes) actors into the R & I endeavors. Von Schomberg (2013) proposes multi-stakeholder engagement, bringing together actors from industry, civil society, and research. Again, this perspective focuses on societal sectors and offers a differentiation of stakeholders on a macro level.

While the engagement of actors from civil society is a key aspect of RRI, this concept provides little guidance on the "how" and the "who". As Bauer and colleagues argue, "there is lack of clarity about what societal engagement under the terms of RRI precisely means" (Bauer et al. 2016). Scholars from fields such as Political Science or Science and Technology Studies (STS) have critically reflected on the participatory turn in R & I (Braun 2019) highlighting stage-managed exercises of invited publics facing barriers, such as limited time resources and asymmetric involvement (Felt and Fochler 2010). Others have criticized simplistic conceptions of publics that ignore less privileged groups from civil society, oppositions, and so-called mini-publics (Dryzek 2012, Michael 2009). Furthermore, it has been raised that the link between deliberative democracy and public engagement is too often taken for granted and that information as such will not increase public acceptance of science (Chilvers and Kearnes 2016). Institutional conditions are typically ignored when reflecting on roles and 'problems' of civil society (Wynne 2016). Thus, aims and rationales for engagement are oftentimes black-boxed while publics may, in the same move, legitimize the science-society relationship (Starkbaum 2018).

Coming back to stakeholder engagement more broadly, we see different attempts to open strategies for stakeholder selection. It is suggested that stakeholders in R & I may be identified, for instance, by categorizing them in relation to their level of interest, influence and relevance to the specific research and innovation project (Leventon et al. 2016). Another approach proposed by Reed et al. (2009) suggests technical competence and influence on outcomes as selection criteria. We take a different route. Our approach is to ground stakeholder inclusion and its normative base in the idea that research and innovation (R & I) are based on a "social contract" between researchers, innovators and society (Guston 2004, 2008; Te Kulve and Rip 2011, Bird and Ladyman 2012, Brown and Guston 2009). From this perspective, researchers, innovators and societal actors of all colors should be involved in co-producing the cognitive, the material, the social and the normative basis of the research and innovation process (Jasanoff 2004). This requires a strategy that stems not from an output or legitimacy orientation of inclusion (Mena and Palazzo 2012), but a co-creative approach that looks at the R & I process as a whole to be embedded in social meaning production.

In other words, stakeholders are to participate in determining both research and innovation agendas, take part in the research and innovation process, and be involved in the dissemination and use of R & I, covering the full R & I cycle.

Each stake bears also risks and that RRI is likewise grounded in risk assessment. R & I place stakeholders at risk (Clarkson 1995a) as they have either invested some form of capital (human, financial, knowledge) in the R & I process directly or indirectly through public monies, and are impacted by the outcome in a number of ways (directly through negative or positive impacts on stakeholders; indirectly through technology determining common sociotechnical futures). It is challenging to avoid these risks. Given the dominance of public funding of R & I and the levels of uncertainty in these processes (Van de Poel et al. 2017), all stakeholders are voluntary and involuntary stakeholders at the same time. Thus, scholars such as Brown and Guston (2009, 364) initiate a discussion on what sort of research is appropriate, legitimate and desirable (see also Raman and Mohr 2014). Stakeholders have different risks, claims, interests and values, therefore it is important to have some clarity on what these stakes and claims may be and how a level playing field of such stakeholders can be created.

## 12.4 Linking Stakeholder Inclusion Challenges of RRI and pCSR

There is an ongoing debate in pCSR, on the (necessary) conditions for stakeholder engagement in order to account for the normative goal of responsibility and diversity. On the conceptual level, Voegtlin and Scherer (2017) argue that corporate governance of responsible innovation should meet three types of responsibility: (a) the responsibility to do no harm, (b) the responsibility to do good, and (c) that of responsible governance. The third type of responsibility involves establishing institutions, structures, and procedures on multiple levels in the process in order to facilitate innovations to comply with the ethical and normative propositions of the first two types. They claim that governance is thus a meta-responsibility and key to achieving responsible innovation (Voegtlin and Scherer 2017). Specifically, responsible governance requires governance structures at various levels (e.g., global, societal, corporate) that facilitate an inclusive process of collective will formation on the goals and means and the societal acceptability of innovations (Owen et al. 2012, Voegtlin and Scherer 2017), thus focusing on both input and output legitimacy. Scherer & Voegtlin (2020) furthermore claim that governance should influence the innovation process so that the outcomes are socially acceptable (legitimacy), meet sustainable development goals (effectiveness), and use appropriate means (efficiency) so that the resulting innovations avoid harm and do good to society and the planet. While we witness overlaps in perspectives on stakeholder engagement in pCSR and RRI literature, we see the necessity to specify this for the context of the latter. From an RRI-stakeholder-perspective, the procedural responsible innovation

triad of anticipation, reflexivity, and responsiveness (Owen et al. 2012) may be related to three dimensions of stakeholder attributes: (a) the distribution of moral labor they denote (Blok 2019, Rip 2014); (b) the epistemic qualities and approaches they contribute to (Deblonde 2015; Jasanoff 2004; Wickson and Carew 2014); and (c) the power or social embeddedness they represent in the innovation process (Blok 2019; Eizagirre et al. 2017). If we conceptualize RRI as the inclusion of different actors to anticipate societal benefits of R & I, prevent negative consequences from occurring and bring about social goods based on stakeholder needs and wants, we need to create a stakeholder constellation in each innovation project that brings all three dimensions – the moral, the epistemic and the power/participatory – into the inclusion process through involving and engaging the stakeholders best suited for the purpose. The goal of RRI is to anticipate, reflect and respond to the 'moral', 'epistemic' and 'power' aspects of the social embodied in the different stakeholders invited to, involved in, and engaged with the innovation process (Braun 2019).

We started our discussion on stakeholder inclusion stemming from a business/ strategy approach (Freeman 1994) and followed up with discussions that occur in responsible innovation (Blok, Hoffmans, and Wubben 2015) in industry settings (Voegtlin and Scherer 2017, Scherer and Voegtlin 2020). Thus, it is important to make a demarcation here. As opposed to a business oriented stakeholder construct, where the goal of the theoretical construct is to assist managers in dealing with the different stakeholder groups and the responsibility that stems from epistemic and ethical responsibilities towards them (Hendry 2001), the aim of the stakeholder construct in RRI, as discussed above, is to assist the selection of diverse stakeholders representing the moral, the social epistemic and the power-political aspects of the social to better embed the innovation process in society through proper and diverse stakeholder inclusion. Groups representing moral claims in the research and innovation process would be, from an ideal-typical perspective, NGOs, CSOs and social enterprises. Epistemic claims would be mainly addressed by stakeholders with diverse types of theoretical or practical knowledge, expertise and experience including, but not limited to researchers and industry actors, social innovators and citizens. Finally, power discourses are foremost animated by funding agencies, policy or industry representatives familiar with the governance structures, management processes and policy discourses framing socio-technical visions. It is important to emphasize that all stakeholders may contribute to each of the three dimensions.

We assume that the goal of such moral, epistemic and power diversity is to have a democratic debate among the stakeholders on what R & I is appropriate, legitimate, and desirable. One way to do so is to open-up the R & I process to the deepest possible societal scrutiny (Raman and Mohr 2014). We may then conceive participatory innovation processes as a form of action-research platform (Argyris and Schön 1989) as it is the knowledge embodied in the moment-to-moment dialogic action of each participant. As such, it may be seen as the "communicative co-inquiry" into the world through collaborative relationships with each other and the "experiential presence" of persons through sharing their sensing, feeling, thinking and attending to arrive at socially desirable and socially legitimate new knowledge embodied in concepts, products or services (Reason and Torbert 2001).

While the emergence of RRI has led to the institutionalization of stakeholder engagement in R & I and in respective policy landscapes, we see only few contributions that develop a stakeholder theory for RRI, particularly for the democratic engagement of actors from civil society and other publics (cf. Blok 2019). These are too often assumed either as 'easily accessible citizens' or as institutionalized actors, such as CSOs. Both represent privileged segments of the civil society sector. Bajmócy and Pataki observe this 'absence' of citizens and characterize RRI as consensus oriented: "RRI invites stakeholders (and in rare cases citizens) to take part in a joint problem-solving exercise, in order to arrive to a shared understanding and a shared vision on possible future directions" (Bajmócy and Pataki 2019). Brand and Blok (2019) argue that there are tensions between the ideal of opening-up innovation processes to deliberative engagement and the current mode of competitive market operation. Popa, Blok, and Wesselink (2020) make the case for an agonistic approach to conflict in innovation. As an alternative or parallel to consensus oriented conciliatory or constructive approaches they argue that with an agonistic approach, conflicts can be brought to surface and mitigated. Such a strategy may help avoid immunization strategies that are meant to resolve the discussion in favor of one of the dominant stakeholders. Following this debate, we will, in the next section, move closer to the conceptions and practice of stakeholder engagement in EU R & I landscape. Our arguments so far have been that (a) stakeholder inclusion is necessary to live up to the "social contract" between researchers, innovators and society that legitimates R & I; (b) that inclusion should be co-creative that is a process followed through-out the innovation process from concept to product; (c) that a responsible governance approach is to be applied. Now we turn to a mode of R & I, based on a normative social ideal of inclusion, that of Quadruple Helix (QH) innovation (Carayannis and Campbell 2009, Carayannis et al. 2017) to offer a theoretical perspective as to how to embed the normative ideal into research praxis. We will bring procedural examples from our methodological experimentation with the social lab concept (Timmermans et al. 2020) to substantiate that a QH model applied in a methodical way may offer modes to operationalize the normative ideals.

## 12.5   Open Science, Open Innovation & the Quadruple Helix Model

In accordance with the strategy of the European Commission (EC) as represented in the "three Os" – Open Science, Open Innovation, Open to the World – several new research and innovation governance structures, participatory processes and coproduction formats are experimented with (European Commission 2017). Open Innovation is understood to be "a distributed innovation process based on purposively managed knowledge flows across organizational boundaries, using pecuniary and nonpecuniary mechanisms in line with the organization's business model" (Chesbrough and Bogers 2014, 17). This aims at moving away from a firm-centric

innovation process, claiming that innovation processes take place in webs of innovation, rather than in clear and singular value chains (Rip and Robinson 2013). The constantly changing webs of innovation are highly complex processes, structures and governance models, involving companies and other groups that are affected by or contribute to research, innovation, market uptake and diffusion such as NGOs, CSOs, regulatory agencies and consumer group representatives.

The core premise of creating multi-institutional collaborating innovation ecosystems is the hope of creating robust reciprocal linkages between government, universities, and industry, forming the crux of the well-established Triple Helix innovation model (Etzkowitz and Leydesdorff 2000). However, in recent years, the effectiveness of this model has been questioned and a need for more co-creational engagement was expected from innovation policy. In order to address these challenges, recent policy initiatives have identified the need for more open and democratic innovation processes involving key social stakeholders, in addition to those of the Triple Helix (European Commission 2017).

This led to the emergence of the Quadruple Helix (QH) innovation model (Carayannis and Campbell 2009): the inclusion of a 'fourth helix' – social innovation users/stakeholders (Arnkil et al. 2010) and members of the civil society, the media and arts sector (Carayannis and Campbell 2014). The QH model is increasingly present in different EC R & I policy documents and the H2020 funding landscape (particularly the stream *Science with and for Society* - SWAFS). Authors discussing the Quadruple Helix model of innovation emphasize (a) the involvement of citizens; (b) adding media-based and culture-based publics; (c) democratizing and opening up knowledge production; (d) creating non-linear innovation models; (e) using serendipitous and prototyping innovation modes; (f) shifting from economic to social- and ecologic driven innovation (Yun and Liu 2019, Carayannis et al. 2017, Arnkil et al. 2010).

The theoretical framework created within the RiConfigure project (Schroth et al. 2019), one of the empirical cases we report on, argues that four areas are especially relevant for QH practice, namely, (a) how (governance) structures are built, (b) how interaction between actors is fostered, (c) what type of value is created and (d) how mutual learning is nurtured. In accordance with this, CCM focused on building governance structure as a key prerequisite of such constellations to work in praxis. As Schroth et al. (2019) argue "In order to effectively build a structure for QH-collaboration, formal procedures for partner selection, reporting, and communication have to be developed, (…) [additionally] a common goal has to be identified and agreed upon." Operationalizing stakeholder inclusion through QH practice can be seen as a key element for managing collaborations across four sectors and for maintaining it over time. These include formal and organisational structures as well as setting-up a common vision and ensuring trust.

Bridging the theoretical link between QH innovation and RRI, we will look at two empirical case vignettes of stakeholder engagement in a QH context and reflect, in accordance with pCSR responsible governance claims, on the structures built in the QH process, via the social lab as method, to facilitate an inclusive process and enhance the societal acceptability of innovations.

## 12.6 Case Vignettes

In two H2020 SWAFS research projects (NewHoRRIzon [NH] and RiConfigure [RiCon]), we applied the method of social labs to co-create collaboration solutions in specific R & I areas with the ambition of stakeholder inclusion (Timmermans et al. 2020). In both projects the Quadruple Helix concept, that is the inclusion of four different types of actor groups in the innovation/experimentation process to broaden knowledge base and social legitimacy, was present. In the case of NH, the QH ambition was implicit, mainly operationalized in stakeholder selections guidance documents (cf. https://newhorrizon.eu/social-lab-manual/) and an explicit awareness of bringing all four types of actor groups on board in the social labs (cf. https://newhorrizon.eu/deliverables/), while in RiCon it was explicit as it was specifically looking at QH constellations or collaborations with such ambitions. In NH, nineteen social labs were created to reflect on and experiment with mainstreaming RRI through policy implementation betterment in the European Research Arena, while in RiConfigure, four social labs were established to reflect on the emerging praxis of Quadruple Helix innovation collaborations. It has been argued, in both contexts, that one possible way to operationalize stakeholder engagement and co-creation in solving complex social challenges is through participatory action research (PAR). In our version of the social labs, they provide settings for doing social experiments, based implicitly or explicitly on a QH stakeholder selection criteria, for stakeholders to collectively work together to initiate actions focused on jointly addressing identified societal challenges. It is not guided by predetermined project plans, lists of deliverables and without knowing how to proceed (Hassan 2014), but instead, to proactively experiment with possible strategies, approaches and solutions at the micro level in order to draw lessons for the systemic level of research practices. The method is characterized by (a) being a space for experimentation with actions to address societal challenges; (b) involving social experiments in real-life settings; (c) active participation of various types of stakeholders; (d) being inter- and multi- disciplinary involving a wide range of expertise and backgrounds; (e) experimentation on the micro level supports solutions and prototypes on a systemic level; (f) having an iterative, agile approach and involve learning cycles, allowing the evolution of prototypes and solutions over time.

We have selected the two case vignettes as they (1) offer perspectives to see QH constellations in praxis; (2) address challenges focused on participation and stakeholder engagement in mobility innovation; and (3) offer comparative perspective in terms of method and process similarity. Our empirical motivation is to show, based on the conceptual discussion above and the social lab process with a QH ambition, that responsible stakeholder inclusion is possible and operationalizable by applying a QH approach.

### 12.6.1  Case 1: Stakeholder Engagement in a JRC Mobility Project

The first case is that of the social lab established together with the Joint Research Center (JRC) of the European Commission. In this social lab, participants selected a specific research and innovation process, that of doing research on connected and autonomous vehicles. Within the bigger framework of the research objective, that of mainstreaming RRI in the European Research Arena, they choose to focus on stakeholder inclusion in the research and innovation process. The JRC is both experimenting with the automation process in its laboratories as well as investigating the wider socio-economic impacts of the emergence of autonomous mobility within the European Union. During the social lab process, a variety of stakeholders representing different disciplines, responsibilities and hierarchical levels of the JRC team including non JRC affiliated stakeholders identified the lack of stakeholder inclusion as impeding the socio-technical integration and the inclusion of the ethical, social implications of CAV innovation in society.

During the social lab workshops, it was widely acknowledged that science has to adapt to ongoing changes in society and that elements of RRI could support this process. Through group work and a voting process, and with helpful reference to the specific project of Connected and Automated Vehicles (CAVs) innovation selected, an experimental process emerged revolving around (a) stakeholder/citizen engagement, (b) stakeholder/citizen needs mapping and (c) testing alternative non-technology focused narratives. The experiment aimed to explore how an RRI inspired approach with the inclusion of a wide variety of stakeholders (including artistic and lay approaches in line with the original QH concept by Carayannis and Campbell (2009) could benefit stakeholder inclusive knowledge production and policy design for CAVs.

### 12.6.2  Case 2: Stakeholder Engagement Through a Mobility Initiative of the Austrian Railways

The second case is the social lab formed around the open innovation team of the Austrian Railways (ÖBB), a publicly owned company, that has both a public and economic mission in its DNA. The company has been experimenting with different forms of open innovation (OI) in the past and was aiming at a step-change to create a multi-institutional collaborative innovation ecosystem beyond rail-travel. In the social lab, participants selected the creation of a mobility innovation community. Additionally, within the bigger framework of the research objective, that is to observe the workings of quadruple helix innovation constellations, participants choose to focus on stakeholder inclusion including civil society in the mobility innovation process. During the social lab process a wide variety of stakeholders were selected based on QH principles, representing different responsibilities and

hierarchical levels of the Austrian Railways, as well as non-ÖBB affiliated groups and representatives of comparable stakeholder inclusive mobility endeavors. The social lab group worked towards establishing a stakeholder inclusive mobility innovation ecosystem to facilitate socio-technical integration and inclusion of ethical implications of mobility innovations into society.

During the social lab process and understanding the call for meeting the inclusion challenge, an open innovation ecosystem was started, named "Community creates Mobility (CCM)". Initiated and managed by the ÖBB OI Team, an experiment in the creation of a relatively loosely organized community initiative, based on and operationalized by the QH ambition, emerged, aimed to challenge the status-quo of mobility innovation by sharing their learnings and jointly defining common set of goals in a Mobility Manifesto (cf. https://www.zusammenbewegen.at/). The Social Lab provided reflections and input from research on non-linear innovation and inclusion of the civil society. The CCM addressed the absence of civil society actors and specifically asked actors outside the traditional settings to speak at the events and to use the QH Model as a tool to shed light on the consumer or citizen perspective that is often not visible in innovation settings.

## 12.7   Discussion

In both cases the main social challenge addressed was creating a stakeholder inclusive process to attend to a shared responsibility in R & I doing no harm, doing good, and facilitating collective will formation on the goals, means and societal acceptability of R & I. This was operationalized by a specific attention to the QH model in (a) selecting stakeholders, (b) applying the social lab process as a methodological framework to create a level playing field for all actors in the QH process; (c) and creating a process within the social labs that was attentive to the four areas relevant for QH practice: governance structures built, democratic and open interaction between actors which maintains the social value created and mutual learning nurtured. In the case of the JRC, a research framework was created that used quantitative and qualitative methods to enhance the societal acceptability of the research at hand. This involved quantitative research on assessing the opinion of a representative sample of European citizens as well as a series of workshops and focus groups asking for reflection by different stakeholders on the research findings and innovations delivered in the JRC. As Scherer & Voegtlin (2020) emphasize, a responsible governance model should focus on stakeholder inclusive processes that provide (i) social legitimacy to facilitate wide inclusion, (ii) sustainable effectiveness to frame goals in terms of avoiding harm and potentially doing good, and (iii) stakeholder efficiency to mitigate the sole leadership and overriding power of one of the potentially dominant stakeholders. Following the theory distilled from QH innovation, we take social legitimacy as a concentrated effort of selecting stakeholders to bring all three R & I dimensions, the moral, the epistemic and the power/participatory into the process. This was achieved in the case of the JRC by specifically selecting

stakeholders from all four helices and fostering interaction between them via focus groups. During the social lab process reflection and mutual learning was facilitated on the inputs from the specific phases of the research by a wide variety of actors, including staff members who are typically engaged in artistic work within research projects. The interviews and narratives collected during the research project aimed at building trust and aligning expectations, to "speak a common language" and to include voices reflecting different sustainability views and impact vantage points of stakeholders willing to participate. Openness in terms of sharing knowledge and reflecting on data about issues of sustainability and social impacts is also beneficial for strengthening social effectiveness of the inclusion process.

After the first phase of building up a community of like-minded people and institutions in the ÖBB case, the OI Team approached members of the CCM to be part of the management board. These were the representatives of the community who also manage the community. This role was shared amongst various types of actors. Parallel to building sustainable structures for future collaboration, the CCM designed an open and participatory goal setting process enshrined in a co-created document, the Mobility Manifesto. This document was created in two workshops and invited all members of the community to collect main topics the community should address and concretize the direction the community should go towards. Between these workshops, an open online document was made available to gather and revise input. Mutual learning and participatory events were organized on a regular base. CCM used the QH Model as tool to identify speakers and to give people from the civil society a better voice in these events. Stakeholder efficiency in this view would boil down to creating appropriate legal/ governance frameworks that foster trust and define responsibilities and (shared) goals. This seems to be particularly relevant in a collaboration dependent on a single actor providing resources, as was the case in our social labs. Legal and governance frameworks (within and beyond the research endeavor or QH process) were particularly important once unforeseen events have threatened the collaboration, such as individuals or partners leaving the collaboration, withdrawal of support by external forces, changes in governance boards, or local security issues (specifics are confidential information). Such a framework allows for a joint and level playing field for developing a common vision and a set of shared goals, complemented and guided by wider aims such as national R & I strategies or the UN SDGs.

Reflecting on the inclusive process in our two cases, we see that within the framework of their own process – research in the case of the JRC and innovation in the case of ÖBB – practices of social legitimacy and sustainable effectiveness were put in place via paying attention to the QH framework, however in different forms and diverse stakeholder engagement levels. The JRC social lab experiment addressed a wide number of stakeholders to arrive at social legitimacy, however it also applied traditional top-down research processes to include sustainable effectiveness via engaging with the diverse opinions of different stakeholder publics that may be impacted by the development of connected and autonomous mobility solutions. This said, the QH model provided a framework for stakeholder selection, for the engagement and involvement of a variety of diverse (mainly internal) stakeholders

in the governance structures of the collaborative research efforts between departments, for fostering open interaction between stakeholders during the focus group process and for focusing on the potential social value created in the R & I process related to CAVs. Mutual learning was applied in the social lab process.

The ÖBB CCM also applied the QH model throughout the operationalization of the stakeholder inclusion process by reaching out to a wide number of stakeholders, however with the limitation that participation was mainly offered to those interested in the creation of a business focused ecosystem. In terms of sustainable effectiveness, in both cases, alternative narratives (case JRC) and sustainability minded NGOs and start-ups (case ÖBB) were addressed and social impact and sustainability principles were in the forefront of discussions. While the mixed method applied by the JRC may seem more traditional (and also better fitting a traditionally conservative research outfit), it did provide strategic learning opportunities for the research actors involved and reflection potential for stakeholders on both social impacts and engagement methods. It also showed that responsible stakeholder inclusion operationalized by applying QH principles and the social lab method is effective in maintaining a research ambition that aims at addressing societal concerns and better embedding CAV research in societal expectations. In the ÖBB case the participatory process, both in the form of the community events and the social lab reflection process, assisted in directing the process towards a more inclusive and trust enhancing mode of collaboration, again, based on and operationalized by the QH process.

However, when the mitigation of the leadership and overriding power of the potentially dominant stakeholder (JRC and ÖBB) was concerned, the two cases show different patterns and somewhat diverse outcomes. In the case of the social lab involving the JRC and its partners in mobility innovation, no instrument was put in place to mitigate the dominance of the JRC as dominant partner in the stakeholder inclusive process. No apparatus to foster trust of the stakeholders involved was conceptualized, nor were a common vision and set of shared goals defined together with the engaged stakeholders. This shows that when applying the QH process tensions may arise between the operationalization of responsible stakeholder inclusion and more traditional modes of governance that focus on efficiency, research excellence or the sovereignty of scientific inquiry. In the case of the ÖBB, a special emphasis was put on creating such structure and attending to the challenge of establishing some form of shared governance, first involving representatives from all four helix stakeholders and later deciding that a specific legal instrument, that of a formal association with appropriate board structure, should be initiated. Common goals were also defined in a stakeholder inclusive process via the CCM manifesto, something that was lacking in the case of the JRC process. It is worth noting, however, that the common goal definition was developed only on a generic vision level, which did not allow for the diversion from the business or economic mission orientation of the innovation process. Therefore, the operationalization of the responsible governance attempt did not yet create a level-playing-field engagement of actors from civil society who may have been interested in other, equally important, non-business focused potential missions or goals. This was witnessed as some of the civil society actors lost interest and withdrew from the co-creation process (Table 12.1).

**Table 12.1** Aspects of 'shared responsibility'

|  | JRC/CAV | ÖBB/CCM |
|---|---|---|
| Inclusive selection of stakeholder (social legitimacy) | Broad | Broad |
| Mode of engagement (sustainable effectiveness) | Mixed (qualitative and quantitative, participatory) | Participatory |
| Sustained inclusion of stakeholders (sustainable effectiveness) | Low | Moderate |
| Goals setting and mission definition (stakeholder efficiency) | Initiator dominated | Initiator dominated |

Our findings confirm the importance and the operationalizability of appropriate governance mechanisms as meta-responsibility in responsible innovation or RRI processes as heralded in pCSR literature (Voegtlin and Scherer 2017). Operationalizing responsible stakeholder inclusion as responsible governance via QH is particularly important as RRI and stakeholder engagement endeavors often lack responsibility towards citizens and their representatives by marginalizing their roles and impacts on R & I processes and outputs (Repo and Matschoss 2019). Differences in research and innovation processes notwithstanding, principles of responsible governance in stakeholder inclusion should apply. It is therefore possible to extend pCSR conceptualizations of responsible governance and its argument related to the meta-responsibility beyond corporate governance and suggest that its principles may be applied to governance processes facilitating common will formation across all stakeholders involved in the process. This may, as our case vignettes showed, be operationalized by attending to QH principles and processes as well as applying an agile and reflective method, such as social labs. Only through operationalizing responsible governance and stakeholder inclusion can it be guaranteed that stakeholders participate in a responsible and inclusive process: *determining* research and innovation agendas, *being included and engaged* in the research and innovation process, and *being involved* in the dissemination/use to cover the full cycle. It is clear that while broad stakeholder inclusion and participatory social impact assessment is very important in avoiding harm and potentially doing good, the key to the operationalization of inclusive stakeholder orientation is, as the concept of QH suggests, building structures that guarantee shared mission and goal determination as well as mitigating the impact of a potentially dominant stakeholder. In both our cases however, while there was a broad inclusion of the stakeholders bringing moral, epistemic and political power to the co-creation process, and bottom-up perspectives were considered, stakeholders could not have a strong position in re-defining or even influencing the research agenda or the mission of the R & I efforts. In the case of the JRC, the mission was sustained and technology-focused research on CAVs, with input from diverse stakeholder on acceptance, needs and wants, was continued. The planned outcome of the experiment is an internal report and an academic publication; both important in their own right, however both of them use stakeholders as source of academic input (research subjects) as opposed to stakeholder relevant co-created content. In the case of ÖBB, the mission

always remained business, start-up and technology focused and therefore solution-ist (Dewandre 2018) in its epistemic orientation. Co-creation stopped short of being transformative in the innovation mission conceived and aimed for. This suggests that further research is required on how the QH model needs to be further developed to offer appropriate guarantees that co-creation with and by stakeholders is fully compatible with responsible inclusion. Our research has shown that QH is a promising mode of operationalizing stakeholder inclusion in a responsible way. However, the QH process needs to be complemented with other modes of governance and collaborative approaches to arrive at socially acceptable outputs for all stakeholders involved.

## 12.8   Conclusion

In this chapter we look at stakeholder theory as it has been developed and used for strategic business purposes from the mid 80's and suggest how stakeholder theory may be combined with RRI, RI and QH approaches and applied to research and innovation. We argue that moral, epistemic and power diversity and balance is key to a stakeholder theory of RRI in order to facilitate a democratic debate amongst a wide group of stakeholders in a specific R & I endeavor in order to arrive at outcomes that are appropriate, legitimate, and desirable. We emphasized, using pCSR principles of shared responsibility in R & I, that doing no harm/doing good as well as facilitating collective will formation on goals, means and the societal acceptability of research and innovation social legitimacy, sustainable effectiveness, and stakeholder efficiency is required. However: this is theory. We wanted to see how a model, that of QH, may be applied to operationalize shared responsibility in R & I or responsible stakeholder inclusion. Looking at cases that involved stakeholder inclusive, albeit different, processes when applying the QH model and the social lab method it emerged that the key to sustainable stakeholder engagement is to focus on stakeholder efficiency and creating governance structures that are able to mitigate the overriding powers of one of the stakeholders; creating a level playing field for all stakeholders to engage in jointly and democratically defined missions; and determining the goals and aims of the inclusion process. Naturally, as suggested at the end of the discussion, more research is required to discuss and determine how this can be done most efficiently. The QH innovation model and the social lab method suggest avenues and modes for doing this, however, both come short of suggesting a clear pathway for creating democratic stakeholder inclusion and engagement in R & I.

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