Chapter 6
Responsible Innovation in Developing Countries: An Enlarged Agenda

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Abstract The Responsible Research and Innovation framework emerged from the reflection on a socially desirable form of development of emerging technologies in Europe and the United States. In this chapter, I discuss how to further elaborate the framework in order to effectively engage in a dialogue with science, technology and innovation (STI) policy in the developing world, particularly in Latin America. In order to take on this task, I describe first the discussion about uncritical processes of STI policy transfer. Then I analyze the dominant framework of science, technology and innovation policies in the region. Finally, I propose topics that I think should be included in the RRI agenda; themes that will allow the framework to be more responsive to issues related to other geographical contexts. The proposed topics include: (a) expansion of its focus beyond emerging technologies, (b) inclusion of resistance to technologies and contentious politics, (c) global perspective on the production of innovations, (d) building of theoretical links with inclusive innovation frameworks and (d) the development of sensitivity towards intercultural dialogue.

6.1 Introduction

Throughout the 2000s, a moderate paradigm change in the theoretical frameworks that underpin Science, Technology and Innovation (STI) policy was recognizable. The hegemony of National Innovation Systems and evolutionary economics was questioned and new ideas intended to complement them with concepts originated in other fields of the social sciences. New perspectives nuance the centrality of competitiveness and economic growth as the key objectives of STI policies. It is argued that these generic economic objectives do not necessarily lead to the social benefits that "trickle-down" perspectives promise. Accordingly, the new generation of STI

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policy intends to address social objectives in a more immediate way, although without denying the importance of economic growth or competitiveness. Elsewhere I have called this change a "post-competitive turn" (Vasen 2016a).

The development of the aforementioned new theoretical frameworks express a disenchantment with traditional approaches; those of which have not met the expectations of policy makers and analysts in terms of the social benefits that science and technology was expected to provide for society at large. This is particularly controversial in Latin America and other regions within the developing world, where traditional innovation policies are still hegemonic. Science and technology are still being considered mainly tools to increase greater socioeconomic development and quality of life and the analysis of their risks and negative externalities is usually not considered along with their potential benefits.

Frameworks such as the orientation towards 'grand challenges' (Kallerud et al. 2013), 'responsible research and innovation' (RRI)[1] (Owen et al. 2013) or 'inclusive innovation' (Bortagaray and Gras 2014) can be regarded as part of the 'post-competitive' turn. Out of these three, only inclusive innovation has been taken up and discussed intensively by Latin American scholars. This may not be a surprise, since this perspective focuses on the issues of inequality and poverty that are a main concern in the developing world. In contrast, "responsible innovation" or "grand challenges" are hardly mentioned in the STI policy discourse in Latin America. Do these frameworks address issues that are irrelevant to the local context? Are there ideological preconceptions that prevent a proper discussion on the frameworks? In this paper, I analyze specifically the discourse on RRI. I argue that the concerns that motivate the framework are indeed relevant to the Latin American context and are not visible in mainstream discourse. However, the tools that the proponents of RRI suggest should be used to deal with these concerns are expressed in terms that are very alien to local STI governance and political cultures.

In the next section, I discuss the conflicts linked to uncritical processes of STI policy transfer. Then I describe the origin of the multiple perspectives within the RRI framework. I intend to identify what they have in common and I relate these ideas to the discourse on STI policy in Latin America. Finally, I discuss why the main tenet of the RRI discourse is relevant to Latin America, but the tools and cases proposed do not fit with the main local concerns. I propose then five issues that should be included in the agenda of a RRI framework that can effectively make a contribution to local STI policy studies. Moreover, "a view from the periphery" might also be useful to enrich the European perspective on RRI with new perspectives and ideas.

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[1] Although the concept advanced by most scholars focuses on innovation, the EU perspective also discusses responsible scientific research. This has been crucial for the current widespread use of the acronym "RRI" instead of "RI". In this paper, although I use the RRI acronym, I concentrate on innovation rather than on scientific research.

6.2 The Problem of Importing Theoretical Frameworks in STI Policy

Regarding the problem of importing ideas from other geographical contexts, the history of STI policy in Latin America has been marked by the uncritical transfer to the region of theoretical frameworks originated in developed countries. This practice has been criticized since the 1960s. At that time, Latin American authors had been highlighting the fact that the level of development of local science and technology systems and the peripheral position of the region in global academic communities required a specific treatment. This standpoint originated as a response to supply-driven science policies based on the linear model that international organizations proposed for the region during the postwar period (Oteiza 1992; Finnemore 1993; Feld 2015). Latin American thinkers noted that the emphasis on capacity building as a prerequisite to progress on the path of technological and social development neglected research agendas linked to issues with greater local social impact (Herrera 1972; Varsavsky 1969; Vasen 2016b).

This line of thought has been embraced by the majority of the local academics involved in science policy studies. Arocena and Sutz (2000) noted that the concept of National Innovation Systems -that had been created as an analytical concept to describe how the most dynamic national configurations on innovation had developed- was proposed in Latin America as a prescription, as a kind of "model" that emerging countries should emulate in order to achieve the long-awaited development. The example of the "Asian tigers", particularly South Korea, was repeated *ad nauseam* as a proof of the viability of this path, without considering the many differences between the Latin American and Asian contexts. According to Dagnino and Thomas (2001) these processes are not restricted to a simple translation of policy frameworks in which a signifier is translated into a different language but attempts to preserve the underlying meaning. What actually is taking place is what the authors call a *transduction* process in which a signifier is inserted into a new context and this creates new meanings (functions, dysfunctions, unwanted effects, etc). This situation, which Dagnino and Thomas described for the case of Latin American STI policy has been described in broader terms by Delvenne and Thoreau (2012) for all non-OECD countries.

6.3 What Is Responsible (Research and) Innovation?

Since the 1980s, a conceptual framework based on evolutionary economics and the idea of innovation began to take shape (Elzinga and Jamison 1995). Its main objective was to strengthen "innovation systems" that group together all the different stakeholders who are part of the processes that lead to the creation of new technologies. It is assumed that the existence of strong and dynamic systems of innovation contribute to central economic objectives, such as growth and competitiveness. The

generation of innovations that yield economic benefits becomes the privileged means through which science and technology improve a countries' economy and the quality of life of its inhabitants (Lundvall 1992; Nelson 1993).

The "responsible innovation" framework is not clearly represented by this scheme. Its central focus is not on economic competitiveness but in the governance of emerging technologies, emphasizing the inclusion and participation of a variety of actors (Owen et al. 2013; Guston 2014). The framework originates from the concept of "responsible development" in the context of the National Nanotechnology Initiative in the United States in the early 2000s. (Roco et al. 2011). This approach is heir to previous research done on the potential unintended consequences of scientific research and technological development. These issues, which initially were addressed by the philosophy of science, bioethics and technology assessment, received a new impetus in the early 1990s with the ELSI component (Ethical, Legal and Social Implications) of the Human Genome Project. In 1994, it was proposed to change the acronym ELSI with ELSA, replacing the idea of ethical, legal and social "implications" with "aspects". The objective was to abandon a linear view regarding the impacts. The change was aimed at including the discussion of particular issues which had potentially more diffuse implications and required a greater degree of public participation. The idea of "aspects" could not be easily restricted to questions of risk, safety and health, which could be framed and analyzed only with expert knowledge (Thoreau 2013; Zwart et al. 2014).

Shortly after the research in the field of ELSI / ELSA consolidated in the 2000s, the concept of Responsible Research and Innovation (RRI) arose. It was proposed as a more comprehensive concept, intended to encompass work on ELSA but also to give it a wider dimension and integrate it with broader areas of science policy. To understand the genealogy of this approach, it is also useful to refer back to the debate on biotechnology, particularly on genetically modified organisms (GMOs). A potentially very critical view regarding emerging technologies emerged in the European context that created discomfort in the industrial elites. Years later, it was feared that nanotechnology could be subject to the same critique. Rip (2006) employed the term "nanophobia-phobia" (a phobia within the scientific and industrial community about the emergence of a nanophobia within the public) to refer to these concerns. Later, the concept of RRI broadened its scope beyond the specific field of nanotechnology and today occupies a central place in the European Union's STI funding programme, *Horizon 2020*, under which is one of the cross-cutting concepts of the component "Science with and for Society", whose total budget for 2014 and 2015 was 91 million euros (European Union 2014a; Galiay 2014).

The responsible innovation framework is best characterized by the multiple elements attached to it rather than by a single definition. According to Zwart et al. (2014), this is a consequence of the top-down manner in which the concept –the signifier "RRI"- was proposed by the policy elite before any meaning was fixed. However, it is possible to distinguish some characteristic features that appear in the writing of most authors who use the term "RRI" which connotes that there is a more or less defined framework. Stilgoe et al. (2013) point out that what characterizes RRI is the intention to create spaces for discussion on aspects of innovations that are

matters of public interest or concern. Thus, with the participation of all affected stakeholders (government, academia, industry, civil society), it is expected that the innovations produced reflect more appropriately the values and interests of a wider set of actors and not only of those who promote the technology. These authors argue that responsible innovation has four integrated dimensions (anticipation, reflexivity, inclusion and responsiveness) that should guide processes of institutional reflection and assessment of scientific and technological initiatives.

Moreover, the European Union, which has been one of the main promoters of the framework has not offered an official definition of Responsible Research and Innovation, but refers to a characterization offered at one Competitiveness Council meeting, in which it was described as "a process for better aligning research and innovation with the values, needs and expectations of society. It implies close cooperation between all stakeholders in various strands comprising: science education, definition of research agendas, access to research results and the application of new knowledge in full compliance with gender and ethics considerations" (European Union 2014b).[2]

Thirdly, the research group led by Jeroen van den Hoven (2013) based at Delft Technical University has also advanced a definition with a somewhat different focus. The vision of these authors arises in the context of the discussion about technology and values. Based on the notion that technology is not neutral, they argue that it is possible to influence the development of emerging technologies in order to incorporate values that are considered desirable. Thus, it is expected that new technologies can solve moral dilemmas by creating technical designs that expand the possibilities of action faced by actors trying to solve ethical problems. This proposal is based on the idea of Value-Sensitive Design, a perspective that emerged at Stanford during the 1970s. Originally dealing with information technology, it was later extended to other emerging technologies. It should be noted that the Dutch research council (NWO) has created a specific funding program for responsible innovation inspired by these ideas. Another feature of this approach is its focus on technology and not science, so it is rather a vision of Responsible Innovation and not of Responsible Research and Innovation.

Critical perspectives on the RRI approach have also emerged recently. They see a pro-industry bias in the concept and argue that by institutionalizing and promoting public participation in a top-down manner RRI proponents could limit the potential for criticism; a possibility previously enabled by participatory mechanisms developed since the 1990s (Thoreau 2013). The upstream total stakeholder participation that RRI proposes would essentially prevent the emergence of a radical opposition and resistance movement and not necessarily lead to a democratic opening. In this sense, it is argued that RRI would be an ally of traditional technological development, allowing its proponents to "stop and think a minute" but without truly putting into question the technological pathways and overall benefits (Rip 2014). Finally, it has also been noted that this framework may increase the bureaucratization of

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[2] This definition is based in the six point agenda that appeared in previous EU documents: engagement, gender equality, science education, open access, ethics and governance.

scientific research and innovation through RRI-compliance assessments, which may become required points of passage; although they would be prerequisites they would not necessarily foster reflection of the actors involved.

The starting point of RRI is a much friendlier vision of market dynamics and innovation that more radical previous reflections have linked to public participation in technology assessment. In this sense, responsible innovation is much more reformist than a revolutionary proposal. Its fundamental difference from other more conventional approaches is its claim that the dissemination and social appropriation of emerging technologies is not a phenomenon to be analyzed in purely economic terms (as can be seen in works like Bozeman et al. 2008). The importance it gives to consensus building among all sectors of society is also remarkable. The RRI framework in all its versions has both an analytical ("the adoption of a technology must be understood from a multidimensional perspective") and a normative component ("the participation of more stakeholders in early stages of development should be facilitated") that advocates against economic reductionism and the monopoly of expert knowledge.

6.4   Responsible Innovation and Socio-economic Development in Developing Countries

As previously noted, the agenda of STI policy in developing countries is strongly linked to the paradigm of the economics of innovation and the pursuit of competitiveness. While this is also true in the developed world, in the Latin American scene these frames are virtually hegemonic and do not leave much space for more reflective or alternative paths. The prevalence of a still strongly enlightened vision on the potential of technology (Macnaghten and Guivant 2011) can be thought of as a reason for this.

The central question that should be asked then is, "How useful or relevant is the framework of responsible innovation to the situation of developing countries, particularly in Latin America?" In this sense, I think it is important to distinguish what we might call the "core ideas" of the RRI perspective from the tools and enforcement mechanisms that have been developed in order to put the ideas into practice. As noted by Delvenne et al. (2011), the tools, derived mostly from the European tradition of public participation in science and technology and technology assessment, historically have not been echoed in the Latin American scene. However, this does not mean that the issues that are the root of the RRI approach are unrelated or irrelevant in these regions. Although public participation mechanisms in science and technology did not develop in the European way, numerous examples of critical reaction against technological developments can be identified in Latin America, particularly those related to environmental issues. This critique was conducted in most cases not institutionally but primarily as a phenomenon of resistance and mobilization. This situation indicates that conflicts over the "alignment of research and innovation with the values, needs and expectations of society" also occur in

developing countries. The mechanisms employed however cannot be captured with the tools available in frameworks such as "responsible innovation".

At this point, there are two conceptual alternatives available. The first would involve noting the inadequacy of the concept of RRI to characterize conflicts linked to the social acceptability of technologies in Latin America and criticize the 'Eurocentric' content of the notion, in a post-colonialist fashion. On the other hand, a second option would recognize the importance of establishing a dialogue between the conceptual frameworks developed in Europe and the Latin American agenda, and intend to contribute to the construction of notions that may simultaneously have global reach and address the specific local contexts. This second option presupposes the distinction between a shared ideological core and specific mechanisms and applications that are dependent on the context in which they are applied. I assume then that the concept of RRI involves concerns that are shared by stakeholders globally and are potentially applicable to all regions. However, the way the concept has been deployed in Europe does not match the main topics in the Latin American agenda in STI policy. Even if there are shared problems, the concepts and notions mobilized are mostly foreign to the local context. I do not want to suggest that this is a misconception of the developers of the RRI framework, as it was explicitly constructed for the European context. The main task is then to emphasize which topics are particularly relevant to the discussion of anticipation and social acceptability of emerging technologies in developing countries and to include them in the RRI agenda.

6.5   A 'Responsible' Agenda for Innovation in Developing Countries

One of the main precautions to be taken when discussing STI policies in Latin American is that, unlike in the context of the developed world, both science and technology are addressed primarily as tools to achieve a higher level of socioeconomic development. In this sense, there is a dominant view that STI are a means towards further development. The critical perspective that involves considering science and technology not only as tools for improving the quality of life but as threats and risk carriers (Beck 1992) is highlighted by some social actors but is absent in STI policy discourse. Unlike other approaches towards the risks of emerging technologies, responsible innovation is more optimistic about the possibility of controlling these risks and integrating their assessment into the innovation process (Zwart et al. 2014). However, even if RRI represents a more pro-innovation perspective, the idea of controlling the risks of technology as a whole is only hardly acknowledged by Latin American STI policies as a priority. All attempts to promote policies that engage with the risks and unintended consequences of technology must then challenge what I call the "luxury argument": the idea that all discussion of negative aspects of technology is an intellectual luxury for developing countries. The discussion of risks in an anticipatory and integrated manner, as outlined in the approach of

responsible innovation, could be then referred to as a luxury that cannot be afforded by developing countries. In this view, resources should be invested in the advancement of science and technology and only then, if necessary, the question of risks should be addressed. Discussing risks beforehand could slow down a countries' economic development and be detrimental in the long run. However, this perspective involves ignoring the consequences of not treating the risks of technology with a precautionary approach, as shown by many environmental disasters or forms of intensive exploitation of natural resources.

To confront this "luxury argument", I therefore believe that it is necessary to pose a *general principle* to address the issue of the risk of technological development in developing countries[3] stating that "*the question of social acceptability of new technology should always be analyzed in conjunction with the question of socioeconomic development.*" This is neither a genius idea nor is it a novelty, but keeping this idea in mind can pave the way when raising the issue of the risks of technology and social acceptability to a set of policy-makers who see STI policy only under the lens of innovation and competitiveness, and who characterize all other reflection as superfluous. This is particularly the case when resources are scarce and they subscribe to a trickle-down approach and state that competitiveness-oriented policies will eventually shed satisfactory results for all.

In the next sections, I will present five discussion points linked to the dynamics of conflicts related to the social acceptance of technologies and the "alignment" between research and innovation and societal expectations, needs and values. My intention is to introduce an issue agenda for a concept of responsible innovation more appropriate within the context of developing countries. This does not mean that the framework of RRI is fundamentally wrong. It is just a reminder that in order to meet its goal of aligning technological developments with social expectations in a different geographical context, new aspects have to be highlighted and new tools need to be developed.

6.5.1 Expand the Scope of Responsible Innovation Beyond Emerging Technologies

Although the focus of the RRI framework has been on emerging technologies, the broader problem being addressed is that of social acceptability and the alignment of social expectations with technological development. In this sense, I argue here that a vision of responsible innovation that takes into account that the particularities of the developing world should not be limited to new and disruptive technologies. While it is true that emerging technologies pose new challenges that require the

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[3] This principle is naturally not exclusive for developing countries. It just becomes more important in that context since the issue of socioeconomic development has a much more important place on their political agenda.

creation of spaces for reflection, acceptability challenges are still an issue with more mature technologies. "Emerging technologies" usually refers to high-tech developments such as nanotechnology, robotics and biotechnology.

In contrast, in the developing world there are many cases where social acceptability issues related to technology are not necessarily linked with high-tech and emerging technologies. In the case of Latin America, there are conflicts linked to new technologies such as biotechnology as in the case of GM maize in Mexico and Colombia (Fitting 2014) or soy in Argentina (Arancibia 2013) or new technologies regarding the extraction of natural resources such as open pit mining. But among the most contentious cases are also situations related to older technologies such as Belo Monte hydroelectric dams in Brazil (Hall and Branford 2012) or the installation of pulp plants in Argentina and Uruguay (Vara 2007; Baya-Lafitte 2016). All these cases involve questions regarding the social acceptance of technologies and the alignment of innovation with social expectations. Responsible Innovation as a framework should not necessarily be restricted to the cases in which emerging technologies are involved and tools have to be developed to deal with issues of acceptability of mature technologies.

6.5.2   Contentious Politics as Part of the Process of Social Acceptability of Technologies

Literature related to the concept of responsible innovation, ELSI/ELSA or technology assessment, deals mostly with cases of public participation in science and technology within the context of developed countries. The methodologies implemented, such as consensus conferences, citizen juries or scenario workshops, presuppose a context in which dialogue in formal contexts is still possible and stakeholders engage in a rational debate.

There is however a more acute dimension of controversies linked to the acceptance of technologies in which the conflict has escalated to levels at which the application of these methodologies is not possible. In these circumstances, social participation is expressed not institutionally but routed through radical resistance (Pestre 2003; Bauer 1995). In these cases the social actors who oppose a particular technology adopt the disruptive techniques of contentious politics (demonstrations, blockades, boycotts) in order to add more power to their claim.Clearly it cannot be said that these forms of protest are specific to the developing world, as we can find many cases also in the United States, for example, controversies around fracking in the Midwest or the anti-nuclear movement (see Nelkin 1984 for one of the first analyzes on the subject). In the developing world however, the large differences in power between the promoters of technology and those who resist it, added to a diminished presence of the state, distrust in institutions and lower levels of education creates a context in which radical resistance is seen by protest groups as a more viable way to gain public visibility and influence political decisions.

Multiple cases that show this trend can be found in Latin America. In the previous section I mentioned the protest movement against the installation of a pulp-mill plant on the border between Argentina and Uruguay. In that situation, many factors came together: the rejection of potential water, air and visual pollution that the plant would produce, the discussion of whether the Finnish company, *Botnia*, was bringing outdated technology to the region no longer accepted in Europe and the diplomatic conflict generated by its location on an international boundary (Vara 2007). In this regard, many considered this protest as a case of NIMBY conflict because the discussion was mainly about localization and not about the technology itself. The bridge connecting Argentina and Uruguay at that point was closed for almost four years by the protest. The Argentine government took environmentalists' claim as a national cause and even brought the case to the International Court of Justice in The Hague.

Not in all cases such a strong commitment from the government can be found. In the resistance to mega open-pit mining projects in the Andes, the state appears as a partner of the mining companies rather than a supporter of local inhabitants. Local organizations partner with opposition politicians and other international environmental organizations through transnational advocacy networks (Keck and Sikkink 1998). In most cases, protesters have set up roadblocks and triggered repressive action by the authorities (Origlia 2015). In the Patagonian town of Esquel a referendum took place in 2003 where people voiced their opposition against mega-mining projects. In these cases it was the protest and mobilization of the people who generated the withdrawal of projects. It is hardly possible that in a climate of open conflict institutional mechanisms for technology assessment could have been useful to generate a proposal satisfactory for all stakeholders.

In conclusion, I would like to emphasize that if the objective of the responsible innovation framework is to facilitate the social acceptance of technologies, it cannot be restricted to institutional mechanisms that can only work within certain contexts. It is necessary to think how to address conflict situations in which social participation appears only in the most original form of resistance. It may be argued that the framework of responsible innovation should not develop tools to deal with these cases, since what these situations show is what happens when a preventive approach like responsible innovation is not followed through on. The solution would be then to implement the preventive measures recommended in the framework. My position is that, given the characteristics of the governance of STI in the region, the escalation of conflicts and the use of disruptive techniques of social protest is unavoidable in many cases. I am not maintaining the view that the intention of preventing the escalation of conflict through enlarged institutionalized public participation should be abandoned. But since power differences and lack of trust in institutions make resistance inevitable in many cases, it is necessary to find tools that enable responsible action in situations in which radical political action cannot be avoided.

6.5.3 A Global View of Innovation Value-Chains

In today's world, it is increasingly common that the technology development process takes place in multiple locations. While R&D, design and prototyping are often concentrated near the companies' headquarters in developed countries, manufacturing and other polluting and energy-intensive industrial production processes are often carried out –outsourced- in countries in the developing world.

Developing countries are often the source of the raw materials needed for the production of innovations, such as coltan in Sub-Saharan Africa for electronics or lithium in Bolivia and northwestern Argentina for batteries. In addition, these countries may also be recipients of technological waste, i.e. products at the end of their life cycle that are sent to developing countries as donations but are actually unusable products.

When reflecting on what it means to develop an innovation responsibly, it is necessary to include not only the undesirable impacts on its potential users but also the vision of all those who will be affected globally by the process of developing this technology and will participate in the new value chain. *Fairphone*, a mobile phone that comes with minerals obtained outside conflict zones and by paying decent wages to workers is an interesting example that addresses this dimension (Wernink and Strahl 2015).

These situations can be described as negative consequences of the globalization of the economy. To address these conducts, organizations such as the OECD (2011) have issued guidelines urging multinational companies to behave responsibly in the various countries in which they operate. A company's reputation may be adversely affected by these actions, which can damage their own Corporate Social Responsibility strategy. However, neither potential failure to comply with the guidelines nor potential reputational damage can provide a framework in which an irresponsible attitude in this regard can be adequately punished. Civil society can also play an important role making the irresponsible and criminal practices of companies visible.

While this point is not directly linked to the original focus of responsible innovation in emerging technologies, I think it is a central issue for a discussion agenda concerning the responsible development of technologies in a globalized world. The tools for risk analysis and public participation that RRI proposes should include the views of all those who will be involved in the global technological system created by this new technology and the positive and negative consequences they may face. This also includes the populations that will be affected by the globally distributed processes of resource extraction and manufacturing and not only consumers. Internalizing the greater number of externalities, both positive and negative, can be considered a responsible course of action.

6.5.4 Strengthen the Theoretical Link Between Responsible and Inclusive Innovation

In recent times, we have witnessed a growing interest in linking science, technology and innovation policy more directly with the problems of inequality and social inclusion. This trend is verified both by international organizations like the World Bank or the OECD (Paunov 2013; Dahlman et al. 2014) and academic researchers (Cozzens and Sutz 2012; Casas et al. 2014; Thomas 2012; Knorringa et al. 2012). Developing countries are the main beneficiaries of these policies because it is there where the most urgent needs of social inclusion are found.

The approaches currently available have different nuances and not all are necessarily aligned with the ideas of responsible innovation. While in general the need for specific STI policies to address the challenges of inequality and poverty are acknowledged, the approaches taken by international organizations focus on the need to include the "base of the pyramid" as consumers, and regard inclusive innovations as a means for expanding markets to a previously unreachable population (see for example Prahalad and Mashelkar 2010). In contrast, most academic visions regard beneficiaries not only as passive consumers but as citizens and innovators who can transform available technologies to suit their own needs and interests.

This brief comparison between existing frameworks on the subject reveals that it would be a mistake to think that inclusive innovation is necessarily responsible. Frameworks such as the "base of the pyramid" do not address the processes of including actors that is the central tenet of responsible innovation.[4] Moreover, neither the inverse statement is true. Not all responsible innovation is necessarily inclusive in the sense of "inclusive innovation". The literature on responsible innovation is primarily concerned about the inclusion of all stakeholders in the design of emerging technologies. It could be the case of a technology developed along with the participation of all stakeholders but whose objective is not linked to the problem of social inclusion, in the sense that it is understood in the literature on inclusive innovation.

In short, what is important is to create a dialogue between the two theoretical reflections -inclusive and responsible innovation. It could be possible then to move forward in the development of a more integrated framework in order to ensure that all inclusive innovation is also responsible and every responsible innovation is inclusive or at least does not contribute to social segregation.

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[4] As Pansera (2014) noted, the main objective of this framework is to include the poor in the market economy. It puts no emphasis on social justice or transformation or other broader dimensions that could be related to responsible innovation.

6.5.5 The Importance of Establishing Mechanisms for Intercultural Dialogue

Finally, one last point to which I want to draw attention is related to the origin of the values that the framework of responsible innovation tends to promote.[5] Even if responsible innovation frameworks aim to include all potential actors in the innovation process, the challenge is even greater in situations of intercultural dialogue with indigenous peoples and other traditional knowledge holders. It is true that the problem of cultural acceptance is not specific to only cases of the developing world. Cultural differences regarding the appropriation of technology occur also within Western cultures, as shown for example by Jasanoff (2005) in her study about perceptions of risk in biotechnology. However, the potential incommensurability when Non-Western cultures are involved is even greater. It could even be considered that modern technology, closely related to the project of Baconian-Galilean modern science, is a Western project in itself.

To avoid criticism of responsible innovation as a Eurocentric or colonial framework, it is necessary to incorporate sensitivity within RRI towards the issue of traditional knowledge. The cases of biopiracy in which the intellectual property of indigenous groups was not recognized could be an example to consider and not to follow (Shiva 1997). However, this does not imply that any use of traditional knowledge automatically qualifies as responsible. The 'science-wars' in South Africa regarding AIDS therapy shows that 'traditional knowledge' is a contested and conflictive notion when used to address current issues (Green 2012).

On a broader level, traditional knowledge should not be limited to specific applications but also considered in regard to the different conceptions of human welfare. Bolivia and Ecuador have adopted the idea of *sumak kawsay* or good living from aboriginal people, which conveys an idea of human development very different from the standard in the Western world (Radcliffe 2012). In short, it is important that a concept of responsible innovation incorporates criteria and tools for addressing problems of the social acceptance of technologies in intercultural contexts that conform to notions of justice, diversity and democracy (Olivé 2010). This will give the responsible innovation framework a broader scope and a greater capacity for understanding the dynamics associated with technology in the developing world. Moreover, sensitivity to these issues is also currently strongly needed in the Western world where societies have become more and more multicultural.

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[5] It is worth noting that some definitions of RRI include an explicit mention to European values as an intrinsic part of RRI (von Schomberg 2013).

6.6   Conclusion

In this paper, my aim was to discuss responsible innovation within a broader geographical context than usual studies. In this sense, I questioned whether the concept is relevant in order to analyze cases outside the region where it originated and whether it can be useful as a framework for public policy in those settings. I argued that the overall objective that inspires responsible innovation (the alignment research and innovation with the values, expectations and needs of society) is laudable and is not necessarily restricted to the European level. However, the tools that the framework RRI usually discusses are mostly linked to the European context and the tradition of technology assessment and public participation that has not been successfully developed in other regions of the world. In turn, the overwhelming majority of empirical studies linked to the RRI framework are focused on Europe or North America.

In the fifth section, I pointed out five issues that should be considered in order to make the RRI framework more suitable within the context of developing countries, particularly Latin America. The issues mentioned have greater relevance in the context of developing countries. However, this does not mean they are only applicable to them. They can also serve to put more emphasis on issues that may have become blind spots in the European context, and a foreigner's perspective can help to visualize them. Problems of the acceptance of mature technologies, the challenge of intercultural dialogue and the relationship between technology and social inclusion can occur in all geographical contexts.

Finally, this text does not seek to "sell" a concept or impose a buzzword in regions that have not shown much interest in it. My aim is to discuss what Latin American science and innovation policy studies can learn from developments taking place in other regions, as well as what Europeans can learn from an outsider's critique of the concepts they have created. In this sense, and in the case of Latin America, the framework of responsible innovation can be useful to incorporate into local science policy, still hegemonically dominated by the approach of innovation used for competitiveness, a broader view point that emphasizes a more critical approach to technological development and enhances the participation of more stakeholders. Achieving this could be an important step towards the creation of a more multidimensional science and technology policy; one that analyzes the contribution of innovation in terms that exceed economic outputs and that are closer to meeting the needs and expectations of society as a whole.

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