Responsible Innovation with/for Plural European Societies

Interview with René von Schomberg

René von Schomberg (1959) is a scholar in Science and Technology Studies and a philosopher working for the European Commission on research and innovation policy. He holds PhDs from the University of Twente, in the Netherlands (Science the Technology Studies) and the J.W. Goethe University in Frankfurt am Main (Philosophy). He was a European Union Fellow at the George Mason University (Virginia USA) in 2007 and he has been part of the European Commission since 1998, where he is now the leader of a team. He is also guest professor at the Technische Universität Darmstadt in Germany, where he is currently chairing seminars on scientific controversies in social contexts.

René von Schomberg was at the origin of the current concept of Responsible Research and Innovation (from now on RRI). He is author and (co)editor of 14 books, most recently: *International Handbook on Responsible Innovation. A Global Resource (co-edited with Jonathan Hankins)*, 2019; *Towards Responsible Research and Innovation in the Information and Communication Technologies, and Security Technologies Fields*, 2011; *Understanding Public Debate on Nanotechnologies*, 2010; *Implementing the Precautionary Principle. Perspectives and Prospects* (co-edited with Elisabeth Fisher), 2006, and *Discourse and Democracy. Essays on Habermas' Between Facts and Norms* (co-edited with Kenneth Baynes, 2002).

The interview published in this contribution is the result of the confrontation between the two authors occurred in November and December 2020.

Could you please illustrate the definition of Responsible Research and Innovation (RRI)? Additionally, could you share the genesis of this framework, i.e. how it was developed from the disciplinary perspective?

Responsible Research and Innovation has become an increasingly important phrase within policy narratives, especially in Europe, where it became a cross-cutting issue under the EU Framework Programme for Research and Innovation «Horizon Europe». Subsequently, it became an operational objective of the strategic plan for «Horizon Europe», the new EU Framework Programme for Research and Innovation (2021-2027). In EU member states, there are also various initiatives supporting RRI, notably under schemes of national research councils (the United Kingdom, Norway, and the Netherlands, among the others). The concept also resonated internationally, notably in the United States, and in China it became part of the national five - year plan for Science, Technology and Innovation. However, there is a variety of approaches as for how it should be implemented.

This naturally entails as a consequence that scholars provide a variety of perspectives and different assessments of what needs to be addressed by responsible innovations. However, all scholars generally share the notion that RRI requires a form of governance that will direct or re-direct innovation towards societally desirable outcomes. This initial definition that I provided in 2013 captures the commonalities of the field:

«Responsible Research and Innovation is a transparent, interactive process by which societal actors and innovators become mutually responsive to each other with a view to the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products (in order to allow a proper embedding of scientific and technological advances in our society)»[1].

This definition was not proposed as an end-result but as a starting point for an ever-growing field of research and innovation actions. The definition was put forward, first of all, to highlight that dominant public policies only negatively select science and technology-related options, through means of the management of their risk, quality, and efficacy. According to this ideology, all innovation will contribute to common prosperity, regardless of its nature. The notion of responsible innovation makes a radical break with such ideology. Furthermore, this ideology tells us that innovations cannot be managed or given a particular direction.

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[1]   R. von Schomberg, *A Vision of Responsible Innovation*, in R. Owen - M. Heintz - J. Bessant (eds.), *Responsible Innovation. Managing the Responsible Emergence of Science and Innovation in Society*, London, John Wiley, 2013, pp. 51-74, here p. 63.

Also on this front, the notion of responsible innovation breaks with this ideology and puts the power for a societally desirable change trough innovations into the hands of stakeholders. However, these stakeholder have to become, or be incentivized or even enforced to become, mutually responsive to each other in terms of social commitments to such change. The current «green deal» can be seen as (maybe the soft version of) such a social commitment and makes directional innovation possible. This also implies the institutionalization of a form of collective co-responsibility, going beyond the traditional evaluative forms of ethics, which have concentrated on the negative constraints of new technologies rather than engage with a constructive form of technology development.

Considering the broad perspective on RRI, and its multiple interpretations, could you please introduce the key notions of this framework? What are the conceptual foundations able to underpin the RRI, especially in European societies?

A recent body of work has been dedicated to the further conceptualization of notions underpinning RRI, as (among others) amply illustrated in the diverse contributions to the «Journal of Responsible Innovation», launched in 2013[2]. As indicated in the previous definition, RRI is drawn from a conception of an ethics of co-responsibility, which is articulated by the demand to be «mutually responsive» or obtain commitments to societally desirable goals from stakeholders within the innovation process. However, this perspective is not unanimous in the field. Some have argued for an ethics of care, others ground the notion of responsibility in a social understanding of «freedom».

A further body of work has been devoted to addressing the governance of innovation processes. A commonly occurring theme is the importance of stakeholder involvement and the participation of a broad range of actors. For example, this is articulated by notions such as democratic engagement with the innovation process, better integration of assessment mechanisms relevant for innovation, or even experimentation by societies. In this respect, an important field of investigation aims to specify and clarify some general reflections on socio-economic gover-

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[2] The «Journal of Responsible Innovation» can be viewed online at https://www.tandfonline.com/action/showAxaArticles?journalCode=tjri20, 20.11.2020. Moreover, see R. von Schomberg - J. Hankins (eds.), *International Handbook on Responsible Innovation*, Cheltenham - Northampton, Edward Elgar, 2019; R. von Schomberg (ed.), *Towards Responsible Research and Innovation in the Information and Communication Technologies and Security Technologies Fields*, Brussel, European Commission, 2011.

nance, concerning the relatively overlooked and yet vitally important analysis of the socio-economic governance of organizations and their relationship to society.

Finally, many authors have emphasized the importance of reflexivity in the innovation process by either calling for reflexivity of the innovation process as such or within the specific boundaries between scientific disciplines and society. In this respect, it also possible to introduce an element of reflexivity within ethics by calling for an «ethics-of ethics»[3]. In short, foremost we can recognize these three main conceptual paths.

From a historical perspective, is it possible to identify some deficits that have compromised the development of the RRI framework in Europe? In particular, I am thinking about the multiple influences and pressures exerted by actors and sectors belonging to society, market, politics, and university.

I have provided an overview of six deficits in the global research and innovations system that constitute obstacles for innovations delivering on societally desirable objectives[4]. The first deficit concerns the exclusive focus on risk and safety issues concerning new technologies under governmental regulations. Although the progress in policy frameworks and mechanisms for risk management and governance may look impressive, it actually came along with an unchanged scope of the responsibility of democratic states for emerging technologies. The so-called «market hurdles» for product authorizations define state responsibilities in terms of safety, quality, or efficacy of products. The second deficit concerns the market deficits in delivering on societally desirable innovations. Innovations often overwhelm people, and virtually no new transformative technological innovations have been predicted in advance. Even at the early stage of technology development, such as in the case of nanotechnology, the first marketed products were not of the kind that experts initially predicted.

The third deficit concerns aligning innovation with broadly shared public values and expectations. Under the European Framework Programme

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[3]   V. Özdemir, *Towards an Ethics-of-ethics for Responsible Innovation*, in R. von Schomberg - J. Hankins (eds.), *International Handbook on Responsible Innovation*, pp. 70-82.

[4]   For an in-depth view, see R. von Schomberg, *Why Responsible Innovation*, in R. von Schomberg - J. Hankins (eds.), *International Handbook on Responsible Innovation*, pp. 12-32.

[5]   Lund Declaration at the Conference *New Worlds - New Solutions. Research and Innovation as a Basis for Developing Europe in a Global Context*, Lund, Sweden, 7-8 July 2009.

for Research and Innovation «Horizon 2020», a number of «grand societal challenges» have been defined, which followed the call enshrined in the Lund Declaration for a Europe that «must focus on the grand societal challenges of our time»[5]. The fourth deficit regards a focus on the responsible development of technology and technological potentials rather than on responsible innovation. The institutional and societal learning processes brought on by the introduction of new technologies since World War II have culminated in specific large-scale initiatives to promote the «responsible development» of new technologies under public policy. Nanoscience and nanotechnologies constituted the first historic case in which a technology, in its infancy, is being addressed on such a large scale on both sides of the Atlantic.

The fifth deficit concerns a lack of open research and open scholarship as a necessary but not sufficient condition for responsible innovation. Currently, research and innovation are based on a too closed and too competitive research and innovation system, leading among other things to a productivity crisis in research and innovation due to the fact that the ever-increasing investments in research and innovation are not matched with societally desirable outcomes. For example, over the last twenty years, we have not seen the marketing of urgently needed new generation-antibiotics or remedies for the diseases affecting most people on Earth such as malaria. In this respect, COVID-19 was a gift. We realized immediately that only a radically open science, in which researchers collaborate, rather than compete internationally, along with public investments and less restrictions on property rights, could help us to get a vaccine in a short time, However, this rationale should not be an exception but a norm for all publically funded research on the quest for public goods such as vaccines.

Finally, the sixth deficit concerns the lack of foresight and anticipative governance for the alternative shaping of innovation in sectors. Although open research and scholarship provide for responsiveness towards societal demands and broadens the scope for actually addressing societally desirable options, it does not yet provide the sufficient conditions to steer research and innovations or to complete a mission-oriented research towards these goals[6]. I expressed the call for the establishment of

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[6]   R. von Schomberg, *Prospects for Technology Assessment in a Framework of Responsible Research and Innovation*, in M. Dusseldorp - R. Beecroft (eds.), *Technikfolgen abschätzen lehren. Bildungspotenziale transdisziplinärer Methoden*, Wiesbaden, Springer VS, 2012, pp. 39-61.

professional bodies and of governance mechanisms that would look into the type of outcomes that we want to draw out of innovation research.

How can these deficits be addressed today? Is it possible to develop a common strategy towards them? In this respect, I urge you to focus on the fifth deficit, the lack of open research systems and open scholarship, as I think it can play a key role in tackling the other deficits.

Regarding this issue, Michael Nielsen advocated open science as «the idea that scientific knowledge of all kinds should be openly shared as early as is practical in the discovery process»[7]. Thus, open scholarship is predominantly the result of a bottom-up process driven by a growing number of researchers, who increasingly employ social media and a variety of digital means for their research to initiate globally coordinated research projects and share results at an early stage in the research process.

Open scholarship strongly contrasts with mainstream science, which has become too competitive in nature and often mandated by major industries. From this point of view, it is not surprising that research data that are published or produced in the context of clinical trials are not reliable. The reproducibility crisis comes together with a 'productivity' crisis equally linked to an increasingly competitive closed science. Research efforts have increased exponentially during decades, whereas research productivity has dropped dramatically. For instance, some scholars found out that since the1930s research effort has risen by a factor of 23 – with an average growth rate of 4.3% per year, but research productivity has fallen by a factor of 41 – with an average growth rate of -5.1% per year[8].

Considering this situation, it is clear that the current reputation and evaluation system has to adapt to the new dynamics of open scholarship and acknowledge, and incentivize engagement with open research activities. The rationale has to shift from publishing as fast as possible to sharing knowledge as early as possible. Researchers have growing expectations that their work, including intermediate products such as research data, will be better rewarded or considered in their career de-

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7   M. Nielsen, *Reinventing Discovery. The New Era of Networked Science*, Princeton NJ, Princeton University Press, 2014.

8   N. Bloom - J. Charles - J.V. Reenen - M. Web, *Are Ideas Getting Harder to Find?*, in «American Economic Review», 110, 2020, 4, pp. 1104-1144.

velopment. In the light of an ever more data-intensive science whereby scientific progress is dependent on effective data sharing for the completion of scientific missions, the primary focus on publishing articles seems antiquated. Excellent science is also rarely a matter of individual intellectual superiority rewarded by competitive funding systems, but increasingly more a matter of excellent collaboration among a great number of scientists. For instance, the article in which empirical evidence was revealed for the existence of gravitational waves conjectured 100 years ago by Einstein was written by 1000 authors.

The European Union articulated a call to direct research and innovation towards the above-mentioned grand societal challenges of our times (such as climate change, food security, ageing populations). In your opinion, how is it possible to direct the crucial innovation sectors towards societal innovation? What kind of governance can encourage a re-orientation of key research and innovation actors towards a broad social responsibility?

The macro-economic justification of investment in research and innovation emphasizes that innovation is the «only answer» to tackle societal challenges. According to the European Commission, «returning to growth and higher levels of employment, combating climate change and moving towards a low carbon society»[9]. This approach implicitly assumes that access to and availability of finance for research and innovation will automatically lead to the creation of jobs and generate economic growth, thereby taking on the societal challenges along the way. The more innovation there is, the better. The faster it becomes available, the better. In this macro-economic model, innovation is assumed to be less steered but inherently good as it produces prosperity and jobs while meeting societal challenges addressed through market demand.

I intend to contrast this macro-economic justification with a more responsive, adaptive, and integrated management of the innovation process. A multidisciplinary approach to the involvement of stakeholders and other interested parties should lead to an inclusive innovation process whereby technical innovators become responsive to societal needs and societal actors become co-responsible for the innovation process by

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[9]   European Commission, *From Challenges to Opportunities. Towards a Common Strategic Framework for EU Research and Innovation Funding*, Green Paper, 48, Brussels, 2011, p. 3.

providing a constructive input in terms of defining societally desirable products. In this regard, the product and process dimensions are naturally interrelated. An instrument for directing research and innovation to societally desirable outcomes is the implementation of mission-oriented research. In such missions, stakeholders and citizens collaborate on open research and innovation agendas with a social commitment to a societally desirable outcome. The key words here are co-creation and co-design of research and innovation trajectories.

How is it possible to establish and elaborate the RRI framework within European societies and business sectors that are characterized by social inequalities, unfair labor market, and social violence? Moreover, how could RRI have constructive and positive impacts on these issues?

Here, the challenge is clearly to address market-deficits. We need not only public investments but also public engagement with research and innovation objectives. As mentioned above, COVID-19 was a gift for open science and I hope that it will have a lasting impact on research and innovation policy beyond emerging public health issues. In a certain way, we did not yet handle COVID-19 radically enough with open science/and RRI[10]. In Europe, we ensured public investments in research, fostered open collaboration among researchers, and public acquisitions of vaccines in order to make them public goods, which means accessible and affordable for all. Yet, they remained public 'national' goods, and cooperation among industrial partners was still limited. A clear, transparent review and comparison of the data underlying the clinical trials of the various vaccines under development were not carried out and the employment of intellectual property rights may still have been too restrictive. It remains to be seen whether we will make it a true planetary public good, to make it available and affordable for all countries on Earth. Ultimately, RRI should foster outcomes in the form of national, and preferably planetary, public goods, and they will not become available if we let global markets rule innovation (for example, this can be observed with regard to artificial intelligence, which unfortunately seems to be determined by the competition between a handful of globally operating multinationals, as it happens in the case of pharmaceuticals).

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[10]   R. von Schomberg - V. Özdemir, *Full Throttle: COVID-19 Open Science to Build Planetary Public Goods*, in «OMICS. A Journal of Integrative Biology», 24, 2020, 9, pp. 1-3.

Could religious institutions play a role as a stakeholder within the RRI? In this respect, I refer to the growing multicultural and multireligious characters of the EU, and I consider their incremental impacts in different sectors of the European market and society.

RRI is about value-driven innovation. I believe that the guiding elements should be values which are shared by a large and, whenever possible, global community. Hence, the work on the «sustainable development goals» are legitimate. The implementation of any innovation may lead to conflicts among various values of a single community or to different ways of implementation among various communities. It is important to articulate these values and I believe religious institutions can contribute to such a discussion on values. These are not theoretical discussions, as they have to guide or motivate the implementation of innovations at the local (or community) level.

Focusing on the crucial aspect of different worldviews, what are the impacts of religions, undestood as historical traditions holding a set of cultural values, on EU's policies concerning research and innovation? Have there been paths related to clash of values, such as the ones that concerned religions and technological developments with regard to bioethical issues?

It is very clear that religious values have put a constraint on particular technological developments, and rightly so: for example, they contributed to the fact that we do not allow interventions in the genetic make-up of human embryos, that we forbid human cloning etc. At the same time, I believe that the values underlying these constraints can also be articulated in a secular way. Nonetheless, religious traditions do provide a wealth of values, which should be mobilized for an articulation in the discussions on societally desirable innovation outcomes. Also at this point, the discussion within religious communities should go further than what we do not want to allow (which implies only an ethics of constraints), but also include a discussion on which direction we should give innovation. Only then we can foster a value-driven innovation.

What proposal could be outlined to include religious actors in the RRI? Are there or how is it possible to plan some governance mechanisms that are able to involve religious leaders in the early stages of the innovation processes?

The key to RRI is the mutual responsiveness among stakeholders: they are the 'powers' behind the shaping and implementation of innovations. Religious actors or even religious communities can operate in the same way as any other stakeholder does. However, we have to acknowledge that to ensure a proper governance as well as equitable access and participation of all stakeholders, public authorities have to take the lead. The lack of proper governance is therefore still a deficit. Only public authorities can provide the means to enable any relevant stakeholder to become part of the process. The mission-oriented research schemes to which I have referred represent one particular way of enabling this participation early on. Obviously, religious actors can also take initiatives themselves and engage with the subject matter, for example, in direct contact with industrial organizazions or contribute to discussions on codes for conduct or other debates on regulatory oversight of particular technological fields.