Multiple futures for society, research, and innovation in the European Union: Jumping ahead to 2038

Stephanie Daimer, Attila Havas, Kerstin Cuhls, Merve Yorulmaz, Petar Vrgovic and Erich Griessler

Extended abstract

There is a growing consensus in the literature that it is crucial to better align research, technological development and innovation (RTDI) activities with societal needs. The relationships between societal and professional actors in RTDI activities are complex, given their diverse backgrounds and aspirations. Further, these interactions are influenced by a broad set of other factors. How scientific results and innovation are perceived by the society, and how societal aspects guide RTDI activities are crucial properties of an innovation system. These features, together with other factors, influence the behaviour of RTDI actors, and thus the performance of the system. Hence, the *interactions between societal and professional actors* (ISPA) have major economic, societal, and environmental repercussions. To foster these interactions, the EU launched a number of initiatives in the last two decades. Often, the main purpose was to anticipate the impacts of technologies on human beings and the planet and promote the societal acceptance of new technologies. This technology-centred approach has gradually been complemented by novel ones stressing that the needs and expectations of society should be major factors guiding RTDI activities. The most important examples of this major turn include initiatives related to the *Responsible Research and Innovation* (RRI) approach (von Schomberg 2012) and the *Mission-Oriented Policies* (Mazzucato 2018), introduced by way of five missions into the Horizon Europe programme.

The programme line of *Science with and for Society (SwafS)* is not continued in Horizon Europe and RRI is not pursued as a horizontal research issue, either. Yet, the sustainability and engagement agendas of the new European Commission's Green Deal policies, together with the mission-orientation of Horizon Europe, could open novel avenues for societally engaged RTDI activities. These developments strongly suggest that the ways, in which societal aspects would be considered in RTDI activities in the EU is far from being predictable. It can evolve by taking radically different directions, indeed. These possible futures, however, are not considered explicitly and systematically in the literature. Further, the various factors that are likely to shape the interactions between societal and professional actors are not analysed, either.

As a first attempt to fill these gaps, we consider *different futures for ISPA in the EU by devising four scenarios*, focussing on the broader ideological and political framework

conditions of ISPA. We have opted for building scenarios because this method yields novel insights into the factors that influence the nature and practices of ISPA. We postulate that the broad political framework conditions for ISPA would determine to a substantial extent what type of ISPA can possibly emerge. Our scenarios go far deeper than looking at science, technology, and innovation (STI) policies: they consider possible fundamental changes in political cultures and prevalent ideological stances that are endorsed through national and EU elections, as well as major opportunities, threats, and challenges for democracy in the EU countries.

Our analysis rests on *three conceptual pillars*. First, the systems approach to innovation, which in turn is derived from evolutionary economics of innovation (Fagerberg et al. 2005; Fagerberg et al. 2013; Hall and Rosenberg 2010; Nelson 1995). The second pillar are the notions of ISPA and RRI (von Schomberg 2012). ISPA denotes all sorts of possible linkages and *interactions between societal and professional RTDI actors* (ISPA) in the innovation system. Professional RTDI actors include researchers (working for public, private, or private non-profit research organisations), those staff of innovative firms, who can significantly shape innovation processes, as well as STI policy-makers and funders. RTDI actors are also citizens – members of the society – as natural persons. Yet, their way of thinking, aspirations, ambitions and overall approach to RTDI activities, and especially their capabilities and opportunities to steer these activities, are markedly different compared to those of societal actors (citizens). These differences are crucial for our analysis.

ISPA can be characterised by taking into account the main *aims* of particular interactions (ranging e.g. from popularisation of science and technology to planning and conducting and/or evaluate RTDI projects in collaboration), their *types and forms* (e.g. one-way communications, genuine dialogues, collaborations), as well as their *nature* (be regular or ad hoc; formal or informal; open or closed [in terms of participation]; systemic or sporadic; and transparent or opaque). Finally, ISPA can be genuine and substantive vs. tokenistic, even deceptive; inclusive and responsive vs. condescending and patronising; might develop vs. neglect citizens' capacities; and rely or not on co-creation of knowledge with citizens.

The third pillar is the idea that the future is not given already 'out there', hence it can be shaped by today's actions (Acheson et al. 2002). By exploring different (possible) futures, various actors – business people, researchers, policy-makers, citizens – can systematically consider the implications of different future states of affairs, and thus take more informed actions today to either increase the likelihood of a desirable future, or avoid – at least divert, or slow down – undesirable trends.

Our scenarios were devised following a multi-method process – called ScenarioSprint approach – relying on a thorough literature review, an analysis of environmental factors, observable current trends and upcoming developments, as well as a scenario workshop. They were developed under the umbrella of the SwafS-funded project NewHoRRIzon. These are *environmental scenarios* describing future worlds we might live in, with relevance for future ISPA. They depict the overall developments of political systems, the economy, the society, as well as RTDI practices, all affecting ISPA in the EU.

Having considered 16 major factors that would shape the future of ISPA, workshop participants have concluded that the most influential factors are the prevailing *ideological stances and political practices,* in brief, the future of democracy in the European Union member states. In this light, the discussion about the future of responsible RRI at an instrumental level, e.g., about developing and introducing the appropriate tools, methods and policies to promote inclusive and transparent ISPA, or devising and applying the adequate evaluation instruments to measure its benefits is certainly crucial, but of secondary significance compared to the framework conditions, especially the dominant ideology and the concomitant political system.

With this approach we contribute to the RRI literature in two ways: we consider possible, fundamentally different futures of ISPA, as opposed to analysing current or recent practices and policies, on the one hand, and put the emphasis on the framework conditions, as opposed to focussing on RRI or RI principles and instruments *per se*, on the other.

Taking ideological stances and political practices to be the most influential factor(s) that shape the future of ISPA provides the 'switches', where scenarios take fundamentally different pathways. Our analysis has been motivated by the current observations that political debates have become ideologically extreme in recent years, including post-truth debates, where fundamental democratic principles and institutions are called into question or even ignored. Moreover, these have far-reaching implications for RTDI activities (Nature 2020a, 2020b).

We have identified four radically different types of political systems: participatory, libertarian, authoritarian/ populist, and technocratic. In the *Kingdom of RRI* citizens participate directly in decision-making processes; *Fortress Europe* depicts a liberal-with-tendency-to-libertarian system; *Failed Democracy* is a populist-with-tendency-to-autocratic regime; while *Benevolent Green Eurocrats* describes a strong, technocratically coordinated state. At a first glance, the idea of RRI as an anticipatory, reflexive, deliberative and inclusive approach to ISPA is completely ignored, manipulated or very selectively applied in the latter three scenarios.

These scenarios depict somewhat extreme versions of distinct political regimes, relying on the dominant ideological stance, and hence they imply different ISPA framings. While we painted black-and-white, somewhat simplified pictures, real life is never like that; it is always 'colourful'. Hence, there is some room for *safeguarding meaningful ISPA* even in the harshest framework conditions. The actions needed, as well as the likelihood of success would depend on several factors: the determination and type of 'change agents', e.g., citizens, researchers or business people, their agency, skills, motivations, and willingness to learn and apply new practices and 'unlearn' less useful ones.

More generally, the systemic approach we have taken implies that the type of actors, the framework conditions among which they create, exploit and disseminate knowledge, their interactions, as well as the institutions – that is, 'the rules of the game' –, that govern their interactions, and the flow of knowledge and resources are all of crucial importance. Therefore, the place of society in different political systems, on the one hand, and in the different innovation systems, on the other, makes a difference. Yet, all the (groups of) actors

have some leeway to shape ISPA in these different framework conditions. ISPA are determined to a significant extent by the nature of government-society relationships: it would be implausible to expect societally aligned RTDI activities without political decision-makers, whose main intention is to serve the well-being of society. However, the degree of autonomy available to professional RTDI or societal actors (although it might vary in the different scenarios), allows them to interact creatively and effectively in different ways.

Our work needs to be extended in three directions. First, at the ScenarioSprint workshop neither all stakeholder groups, nor all different types of EU regions were represented. Hence, to enrich the discussion on the policy and other practical implications of these four scenarios, *a series of new workshops* needs to be organised, attended by citizens, policy-makers, business people, and a more diverse group of experts. These workshops might verify the validity of our scenarios, but could as well identify other aspects that are also pertinent for the future of ISPA. These would lead to revised or additional scenarios.

Second, to conduct these series of workshops, most likely *methodological innovations* would also be needed, despite the novelty and proven benefits of the ScenarioSprint method. We need to experiment with techniques and approaches that would allow involving a significantly larger number of stakeholders in order to reflect the diversity in the EU, also capable of tackling cultural differences and language barriers – but in an efficient, affordable way, that is, keeping the necessary resources at an acceptable level.

Third, further work – both 'classic' academic research and participatory workshops with stakeholders – is also needed to address several issues not covered in our scenarios. That would include addressing the *complexity of the topic*: meaningful ISPA being 'nested' in framework conditions and those being dependent on the overall developments of the political systems, conditioned by economic performance and certain global developments. Another important extension would be focussing explicitly on *the* 'fit' between specific ISPA instruments, on the one hand, and their framework conditions, on the other, to *derive tailored policy implications*.

References

Acheson, Helena et al. 2002. "Thinking, debating and shaping the future: Foresight for Europe." Final report prepared by a High Level Expert Group for the European Commission, Brussels: European Commission, Directorate-General for Research, EUR 20439

Fagerberg, Jan., Ben R. Martin, and Esben S. Andersen, eds. 2013. *Innovation Studies: Evolution and Future Challenges.* Oxford: Oxford University Press.

Fagerberg, Jan, David C. Mowery, and Richard R. Nelson, eds. 2005. *The Oxford Handbook of Innovation.* Oxford: Oxford University Press.

Hall, Bronwyn H., and Nathan Rosenberg, eds. 2010. *Economics of Innovation*. Amsterdam: North-Holland.

Mazzucato, Marianna. 2018. Mission-oriented innovation policies: Challenges and opportunities. *Industrial and Corporate Change* 27 (5): 803–815.

Nature. 2020a. Science and politics are inseparable. *Nature* 586: 169–170.

Nature. 2020b. A four-year timeline of Trump's impact on science. *Nature* doi: 10.1038/d41586-020-02814-3.

Nelson, Richard R. 1995. Recent Evolutionary Theorizing about Economic Change. *Journal of Economic Literature* 33 (1): 48–90.

von Schomberg, René. 2012. Prospects for Technology Assessment in a framework of responsible research and innovation. In *Technikfolgen abschätzen lehren: Bildungspotenziale Transdisziplinärer,* edited by Marc Dusseldorp and Richard Beecroft, 39–61. Wiesbaden: VS Verlag.