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Working Paper

Innovation policies, digital platforms and governance: what lessons from public european and american prizes?

Isabelle Liotard

CEPN Université Sorbonne Paris Nord

Valérie Revest

iaelyon School of Management, Université Jean Moulin Lyon3

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INNOVATION POLICIES, DIGITAL PLATFORMS AND GOVERNANCE: WHAT LESSONS FROM PUBLIC EUROPEAN AND AMERICAN PRIZES?

Isabelle Liotard* and Valérie Revest[◇]

Abstract

In recent years, one has observed the emergence of new public policy tools for innovation: prizes platforms. The objective of this article is to better understand the contributions of prizes as an instrument of innovation policy. More precisely we study the extent to which prizes allows political actors to implement a more open political process to stimulate and support innovation. Through a qualitative study we examine the functioning of two public prizes platforms: in the United States (Challenge.Gov) and in Europe (the European Commission prizes). If the use of prizes remains limited compared to traditional innovation policy tools, our conclusions confirm the implementation of - partially - open innovation processes by public actors, through prizes. To better understand the current challenges, we propose in the discussion to refer to the concept of tentative governance, reflecting the need to take into account the dimensions of both inclusiveness and uncertainty.

Key words: Innovation, Policy, Prizes, Contests, Openness, Inclusivity, Governance

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*CEPN Université Sorbonne Paris Nord, isabelle.Liotard@univ-paris13.fr

[◇] iaelyon School of Management, Université Jean Moulin Lyon3. valerie.revest-arliaud@univ-lyon3.fr

INTRODUCTION

Since the mid-2000s, a new public policy instrument for innovation has come to the forefront: prizes (or contests) backed by digital platforms¹. The mobilization of this public policy tool is part of the broader movement to digitalize the public sector, initiated in the early 2000s in the United States, and known as e-government and open-government (Meijer and Bekkers, 2015). Many public, regional and national administrations - especially in Western countries - have progressively adopted this scheme as an instrument to encourage and guide innovation. While there is a large body of work on private competitive innovation platforms, such as Innocentive (Lakhani and Panetta, 2007; Liotard and Revest, 2015), how public authorities develop and use this device remains largely underexplored. The objective of this article is to better understand the contributions of prizes platforms as an instrument of innovation policy. To this end, we propose an original comparison of the functioning of two public platforms: American Challenge.gov in the U.S. and the European platform via the DGRTD (DG Research and Innovation) website. The first has already been the subject of academic literature, while the second remains almost unstudied. Our approach is in line with the work of Mergel (2015, 2018) on challenge.gov. She analyzes public contests as vectors of open innovation (OI) mechanisms, similar to the private sector (Chesbrough, 2003, 2006). Based on the existing literature, a review of documents and official websites, and interviews - conducted in the European case-, we raise the following questions: To what extent do public innovation prizes embody an open innovation movement? Do American and European policy actors adopt the same perspective?

Our results show, first, that although American and European public representatives mobilize competitions from an open innovation perspective process, the degree of openness and

¹ In this article the terms "contest" and "prize" will be used interchangeably.

inclusiveness varies from one platform to another. Moreover, if the concept of OI is a relevant dimension for analyzing the functioning of these platforms, it is insufficient to interpret other properties intrinsic to the competition mechanism. This observation leads us, from a theoretical point of view, to enrich the concept of public open innovation with recent research on the governance of public innovation policies, particularly through the "tentative governance" approach developed by Kulhmann et al. (2018, 2019). This form of innovation policy governance reflects the growing need to rely on inclusive, flexible and experimental governance processes in a context strongly marked by uncertainty.

Our article proceeds as follows. The first section sets out the theoretical foundations of our approach. After introducing the notions of digital platforms and public innovation policies, we return to the concept of public OI based on the existing literature. The second section proposes an analysis of the functioning of American and European prizes platforms that sheds light on their main properties. The third section is dedicated to an extension of the concept of public OI, thanks to recent work on the governance of public innovation policies. The last section concludes.

1. THEORETICAL FOUNDATIONS: DIGITAL PLATFORMS AS TOOLS FOR PUBLIC INNOVATION POLICIES

Driven by the advent of the Internet at the turn of the millennium, digital platforms, accessible online, enable the establishment of relationships (intermediation) between actors via a website or an application (Gawer, 2014). They have benefited from a large academic literature for several years. From an economic viewpoint, they undertake the characteristics of a two-sided market (Rochet and Tirole, 2006). In the engineering domain, the platform is considered a modular technological architecture involving a stable and shared set of components (Baldwin and Clark, 2000).

1.1 Digital platform, public innovation policy and contests

In recent decades, digital platforms have been increasingly used to stimulate the production of new knowledge and innovations (Lakhani and Panetta, 2007). Moreover, they offer the possibility for companies to post research and innovation questions and potentially receive answers from the outside; this approach implies that the company mobilizes research outsourcing networks, allowing it to benefit from a global audience, far from the classic practices of internal research or collaborations with a known and restricted circle of partners. Considered innovation intermediaries, these platforms have been successful for approximately 20 years, and some of them have been the subject of applied studies, such as the private platform Innocentive (Lakhani and Panetta, 2007, Liotard and Revest, 2015). This type of device is closely linked to the desire of companies to nurture an innovation strategy driven by open innovation, a process leading companies to exploit internal and external knowledge and to combine them in the best possible way to accelerate innovation and, thus, market new products (Chesbrough, 2006; Von Hippel, 2005). *Outside-in movement* enables the company to capture knowledge coming from its external environment, mainly through the development of *crowdsourcing*, relying on the direct exploitation of the innovation and creative potential of communities of Internet users belonging to a globalized crowd (Guittard and Schenk, 2011).

Digital platforms and open innovation appear to be intimately linked; this dynamic has not escaped the attention of the public sector, which has very recently taken up the subject, following the successful experiences of the private sector. The challenge.gov platform in the U.S. (Mergel 2018), Nesta in the UK or the European Commission's initiative via H2020 (Makela, 2017, Weber et al, 2019) testify to the willingness of governments to turn to open innovation tools to adapt them to the needs of public actors and their users. The challenge is then to stimulate innovation to respond

to increasingly complex challenges, resist increased pressure on financial resources, and satisfy increased demand from citizens for new, flexible and quality services (Mergel et al, 2019).

Among the tools used, innovation contests are a cornerstone of the open innovation process and part of the development history of major industrialized countries (Adler, 2011). Since the end of the 1980s, we have seen the expansion of these contests, which are now based on the architecture of platforms and on *crowdsourcing*. These prizes offer Internet users the opportunity to compete against each other in contests in which the winner will receive an award, typically monetary. Competitions most often take the form of incentives offered by a sponsor, who may be private, public, philanthropic or mixed (Scotchmer, 2006). Their objective is to launch new research or an innovation (based on a specific question) and to stimulate it with an award known in advance. They are at the heart of the platforms studied in this research². The vast majority of inducement prizes are technological in scope, even though in recent years there has been a surge of interest in challenges that include a societal dimension (e.g., in Europe, "Early warning for epidemics", and "Affordable high tech for humanitarian aid"; and in the United States, competitions launched as part of the COVID-19 pandemic). Carried by polymorphic rules, the elements of the contest design can differ and thus adapt to the sponsor's needs (Liotard and Revest, 2018; Kay, 2012, Brennan, and al, 2012; Lakhani and Tong, 2012; Master, 2008).

1.2 Public OI and crowdsourcing

Currently, there are multiple forms taken by public OI, and several countries have been pioneers in this area, including the United States, Australia, and Singapore (Lee et al, 2012; Mergel and De Souza, 2013, Mergel, 2015, 2018, Loukis et al, 2017, De Vries et al, 2016). The growing

² There are also recognition prizes that reward ex post the efforts made (e.g., Nobel Prize, etc.).

interest in developing a public OI may be explained by a combination of two factors. On the one hand, the private sector's experience with OI and *crowdsourcing* practices are inspiring for governments. Calling on a crowd for problem-solving or idea input, with or without collaboration (Estellés-Arolas, E., et al 2012), is a practice that can be deployed in the public domain as needed. On the other hand, the willingness of the public sector to implement citizen-oriented devices (*citizen sourcing*) has been a strong indicator in recent years (Nam 2012). Citizens can contribute to certain actions, coproduce a service jointly with the public actor and engage actively or passively in the device (Androutsopoulou et al, 2017). In this sense, he or she can play the role of "users and choosers" or "makers and shapers" in decisions (Lukensmeyer and Torres, 2008). Calling on the collective intelligence of citizens (users) corresponds to a *crowdsourcing* mechanism that not only allows the public decision-maker to improve its services and relations with citizens but also facilitates the implementation of public policy.

Public OI in this context can be seen as a means of deploying new mechanisms allowing for "*citizen-centered governance*", of which *active citizen sourcing* is the hallmark (Linders, 2012, Mergel, 2015). Knowledge sharing then becomes essential for public actors, who must set up new spaces to allow creativity and collaboration (Godenhjelm et al 2018).

Research in public management, in particular, sheds light on the devices established by government agencies to invite citizens to participate (Bekkers and Tummers, 2018). Mergel (2015) highlights the practices of *crowdsourcing*, peer production and even coproduction to feed public OI, each practice being positioned at different and concentric levels, inducing a gradation in citizen involvement. Peer production, inspired by initiatives in the software world (Benkler et al.2006), allows for decentralized and collaborative work and contributes to a more pronounced involvement of the crowd. Coproduction appears to be the most accomplished stage in the sense that the

members of a crowd are full partners and build fully with the public actor (Mergel 2020). Based on 23 U.S. government initiatives, Mergel (2015) distinguishes the use of these methods over time, with *crowdsourcing* appearing during an ideation phase (upstream), while peer production (votes and comments by peers) and coproduction (between the public agent and the citizen) occur in more downstream phases. The place of citizens is marked in the upstream phases of this process (collection and selection of ideas) and less strong in the implementation phase. These stages highlight the different forms of collaboration between public actors and stakeholders, especially citizens. This approach is refined in Mergel and De Souza (2013), Mergel et al (2014) and Mergel (2018), who focus on the challenge.gov platform as a public OI device, a vector of motivation and commitment not only for public institutions but also for the citizen, while reminding us that the transposition of OI to the public sector is not without difficulties and that obstacles (cultural, technological, etc.) can make its implementation difficult.

However, to gain a more detailed understanding of the process at work, it is useful to draw on another level of analysis to distinguish the different forms that citizen (or stakeholder) involvement can take in the production cycle of a public service (in general or of an innovation system in particular) (Sicilia et al., 2016 ; Lorey et al, 2019). At the same time, it increases the understanding of the notion of "*inclusiveness*". These forms are identified under the term coproduction (Bovaird and Lofler, 2012) and include coinitation, codesign, coimplementation, codelivery and coevaluation. Coinitation allows for the identification of needs, expected outcomes, and users (Sorensen and Torfing, 2018), enabling stakeholder cooperation with public officials to identify problems and needs. Codesign helps improve processes to achieve desired outcomes (Loeffler and Bovaird, 2019; Nabatchi et al. 2017). Codelivery occurs when outside organizations produce services in collaboration with the state (Brandsen and Honingh, 2016; Brandsen and Pestoff, 2006)

(IT service providers, user testing by users). Finally, coevaluation focuses on the monitoring and evaluation of public services. Traditionally, outcome evaluation activities are carried out by public officials or external consultants; however, in coproduction, the state and ordinary citizens cooperate to assess the quality of services, the problems encountered and/or areas for improvement. Coevaluation is usually retrospective in nature; it looks backward and assesses activities that have already taken place. However, the results of coevaluation exercises can be used prospectively to redesign or improve services (Nabatchi et al.; 2017). Thus, this deeper level of analysis highlights the variety of forms taken by inclusivity within public OI.

2. PRIZES CASE STUDIES: CHALLENGE.GOV AND THE EUROPEAN COMMISSION

Two ³public prizes platforms have caught our attention, and are the subject of this empirical study: American and European. Challenge.gov was implemented in 2010 by the Obama administration in the United States⁴ and allows us to look back on the system for 10 years. A major tool of the government's desire for a public policy geared toward open innovation (GAO, 2017), the platform offers public agencies the possibility of placing their own prizes online⁵. NASA, HHS (Health and Human Services), DOD (Department of Defense), and DOE (Department of Energy) are particularly active, having initiated several dozen competitions. The results from Mergel and De Souza (2013), Mergel et al. (2014) and (2018) show that federal agencies tend to invest in simple forms of problem-solving, such as public awareness and education campaigns. Conversely, some agencies such as NASA mobilize competitions to capture useful solutions to complex problems

³ We retain the term "platform" for both devices because of their intermediation characteristic, even if their respective technical configuration differs in certain aspects.

⁴ A Strategy for American Innovation: driving towards sustainable growth and quality jobs, 2009.

⁵ 700 competitions have been posted by 80 public and semipublic agencies (source December 2021). To date, approximately US\$31 million in prizes have been awarded and nearly 42,000 participants have responded (www.digitalgov.gov).

that require expertise from specialists. According to the authors, U.S. federal agencies currently rarely use public contests to create new products/services.

The European experience is more recent. Under the auspices of Horizon 2020 (2014-2020), the European Research and Innovation program, the first prizes were launched as early as 2015 in various fields, including technological and societal (Makela, 2017). This initiative emerged following other schemes set up at the national level by some European countries, such as the UK's NESTA program. The European contests are launched by the various directorates of DG RTD⁶.

We analyze to what extent and how these two systems can be considered as policy instruments for public open innovation. Moreover, as the European system has never been studied, it is worthwhile to compare it with the American platform.

2.1 Methodology and data collection

Our research took place over several years, focusing first on the American platform starting in 2016 and then more recently (starting in 2019) on European initiatives. This approach reflects the way in which actors have attempted to orient innovation public policy toward OI. This is an exploratory research that relies on a qualitative approach based on two case studies to better understand the challenges posed by the implementation of new policy instruments (Grillitsch et al., 2019; Flyvbjerg, 2006; Yin, 2013; Miles et al., 2014).

To explore these cases, we use a variety of sources and methods. In the case of challenge.gov, we draw on already existing literature, building on the work of Mergel (2018). In addition, we use other materials, including economic and political reports (notably Reports from the Office of Science and Technology 2015, 2019; Obama's report 2009; Kalil, 2012, Kay, 2012) sites

⁶ https://ec.europa.eu/info/departments/research-and-innovation_fr#leadership for the organization chart

specialized in innovation competitions (Nesta in the UK) and, notably, those of federal agencies (www.xprize.com, www.energy.gov/eere/sunshot/, <http://cepgrandfinals.com/>), the challenge.gov site (www.challenge.gov), and government sites (www.digitalgov.gov, www.whitehouse.gov). The age of the Challenge.gov platform, created in 2010, allows us to examine awards with a wide variety of characteristics (theme, duration, amount of the award, etc.).

With respect to Europe, we analyze the innovation awards launched by the EC between 2015 and 2020. A systematic study of the available materials was conducted to specify the operation of the European portal (See Liotard and Revest, 2021). These materials come from several sources, including documentary and digital sources largely from the European Commission's website (especially that of DG RTD⁷) and external sources. In addition, we conducted 8 interviews between March 2019 and April 2020 with program managers/teams within DG RTD and DG Connect and three interviews with candidates (Cf Appendix 1). These interviews were semi structured and lasted between 45 and 90 minutes. After an initial selection of people to interview, we identified other stakeholders using the "snowball sampling" process (May 2011). While we followed an interview guide, the questions remained relatively open-ended. The majority of the interviews were recorded and transcribed by the authors.

2.2 Analysis

Operating procedures

Challenge.gov and H2020 appear to be digital intermediaries between, on the one hand, the "seekers" (American agencies or European DGs) who initiate the prizes and, on the other hand, the "solvers", who belong to various categories depending on the expectations of the public sponsor.

⁷ https://ec.europa.eu/info/index_en

In this sense, platforms are indeed two-sided intermediaries (Rochet and Tirole 2006). They rely on a digital platform (acting more as a portal than as an interactive platform); both challenge.gov and the European website share the same vision of the construction of a contest: making the contest visible, by ensuring the link to the dedicated sites, and by setting up rules on identical items. However, the analysis of the functioning of the two platforms reveals differences that we can summarize as follows. i) The Challenge.gov platform is characterized by a strong presence of so-called societal competitions compared to the European portal. ii) While the American agencies are free to choose the topics of the prizes, the European organization reveals a rather hierarchical functioning insofar as the different DGs must be submitted through the approval of the European Commissioner who selects the submitted themes. "There was an initial screening, and it was the commissioner who decided which prize would be awarded" [interview 8].

iii) In Europe, the prizes are structured according to the H2020 program. Once they have been set up and launched by different directorates, they cannot be changed in terms of duration, rules, evaluation criteria, etc. One exception is the "Early warning for epidemics prize", which was underway during the COVID-19 health crisis and has been extended. Challenge.gov appears to be more flexible in this regard, where opportunities to change the rules along the way are possible for some prizes ⁸. "...it is almost impossible to redefine the prize during the course of the prize. If we see there is a problem, we're stuck." [interview 6]

Collaborations and stakeholders in light of the public OI criteria

The analysis of the functioning of the two infrastructures also reveals a significant component of the contest mechanism, the participation of stakeholders.

⁸ See Murray et al. 2012.

Here we distinguish between the two platforms.

The American case

The experience of challenge.gov tends to demonstrate the significant role played by a variety of stakeholders in the whole process, whether in the design, implementation, selection and even evaluation phases of the competition (learning about the experience to prepare for future contests). Stakeholders can be private citizens, associations, foundations, universities, other public agencies, companies, and venture capitalists, among others. They can participate in external expert committees that help to define the prize topics, the assessment process (as selection juries), and in technical assistance. In this sense, challenge.gov responds to the recommendations of the American government to support open innovation, notably through the GAO report (2017). Collaborating with a wide range of actors to support open innovation becomes essential to meet various needs (e.g., collecting information, developing new products and ideas, building a community, attracting public attention, improving the agency's capabilities).

Stakeholders can first play an ex ante role regarding competition criteria. For example, the Environmental Protection Agency (EPA) held a series of workshops from 2012 to 2015 with federal agencies, local governments, universities, private companies, and organizations to better understand the needs of government and user groups on air pollution sensors and to create a more cohesive community of users and developers. (GAO 2017). Second, collaborations with outside entities can occur during the implementation of the contest, whether in logistical or financial terms, as illustrated by the Rebuilding by Design (RBD) competition launched by HUD (Department of Housing and Urban Development) in 2013 after Hurricane Sandy. Finally, stakeholders can become involved ex post once the competition is over. They become involved in the evaluation of the awards in terms of impact (employment, start-up creation) (Liotard and Revest, 2018). To

measure the impact of the awards made in the SunShot Catalyst competitions, the DOE has developed a long-term scheme to monitor the status of companies created after the competition (GAO, 2017).

The European case

From this point of view, the European experience appears less advanced, but also more recent, in the sense that stakeholders (professionals, academic experts, even associations) are involved only in the very early phase, and in the phase of selection of proposals via the jury. To date, the implementation of the contests and their management remain in the hands of the EC, and no partnership with private entities has been identified. Stakeholders are consulted for advice during the preparation of the prize topic, often through an exploratory study lasting approximately six months. The contest managers mobilize their own networks and experts from the scientific, professional and political worlds, depending on the prize topic. These experts provide their advice on the subject of the prize and can make recommendations on the outline of the prize, the target audience, or the evaluation criteria to be used.

Preparatory workshops are also organized to benefit from the interaction of the participants and serve to validate both the topics and the rules of the contests. The managers then build the architecture of the rules for the prize concerned: *"I did two validation workshops... The first one was to validate the idea and I invited experts, then I did a second workshop as soon as I had a draft of the rules of contest and of the award criteria, then we validated the evaluation criteria"* [interview 8].

No interaction is foreseen between the EC and the networks activated after the preparatory phase. One of the reasons given for this is to allow them to apply to the contest and thus avoid potential

conflicts of interest. *"If they participate in the final definition, they exclude themselves from participating in the competition."* [interview 6]

The other aspect of the stakeholders' intervention lies in their expertise at the time of the juries. Indeed, for challenge.gov, the submitted solutions must be evaluated by a jury of experts. In many prizes, assessments are conducted in two stages: first, an individual evaluation by each expert, and then a collective evaluation after which a ranking of solutions is proposed based on the number of points obtained. The blockchain for social goods prize launched in 2018 experimented with a more open system by organizing a day's workshop during which the candidates presented their solution to an audience made up of members of civil society (developers, activists, etc.). The experts of the jury (installed in an adjoining room) were able to listen to the opinions and comments of the public regarding the solutions presented, benefiting from this indirect help in the final evaluation. *"We kept them in a room right next door with a web stream of what was going on in the main room, and so each member of the jury, expert in a certain area, had the opportunity to follow the presentation of these projects, follow the questions asked by the crowd"* [interview 10]. However, over the period, the European platforms seem to have improved by becoming more efficient, more multidisciplinary and inclusive when launching prizes. The EIC (European Innovation Council) competitions from 2017 appear to be open to a wider audience (international, associative, NGOs, individuals, etc.). In addition, recent awards appear to be more hybrid and target innovations in the humanitarian field, thus promoting interactions between advanced knowledge in technology and the particularities of the humanitarian world. This is the case for the Early Warning for Epidemics Prize launched in 2018. The objective of the prize was to develop an alert system to predict, monitor and ultimately prevent epidemics of one or more vector-borne diseases. In addition to the

technological aspect, collaboration with communities is essential to ensure that this prototype is relevant to the real needs of populations.

Results

- *Inclusiveness and "co" devices*

In light of the literature on coproduction, the two contests platforms appear to be oriented toward public OI, capable of allowing collaborative interactions between citizens and the public actor. On the one hand, *crowdsourcing* is a predominant figure since the prizes are open to a public of solvers who, depending on the competitions, may be more or less varied. The objective here is to call upon the expertise, knowledge and creativity of a community to stimulate/accelerate innovation. On the other hand, the "co" mechanisms are also present and are able to include multiple stakeholders in the process. *"This is the open innovation approach (...): ideas, concepts, research themes, are not very strictly defined by the Commission, as unfortunately we are used to doing"* [interview 10].

Co-initiation is a common element to both platforms. In this case, the initiators of the prizes rely on the expertise of a scientific community, companies, and associations to define the subjects, objectives, and expected results of the competition. Co-evaluation is also common in contests since the final jury calls on external experts to judge the adequacy of a proposed solution to the expectations of the prize. The evaluation can take the form of an individual assessment by the members of the jury, followed by a collective assessment, according to the marks attributed. Concerning other patterns of coproduction, the practices in the U.S. and European situations seem to be more in contrast. The process of co-evaluation is more substantial in the U.S. insofar as some devices allow citizens and other stakeholders to evaluate the prize, to assess the positive elements or to correct some of them, and thus to enable learning to be enriched and to improve future

mechanisms. This is also the case for the co-implementation process: while American competitions can be entrusted in whole or in part to external actors/providers (university, private company, etc.), this is not the case in Europe, where only the European Commission manages the system.

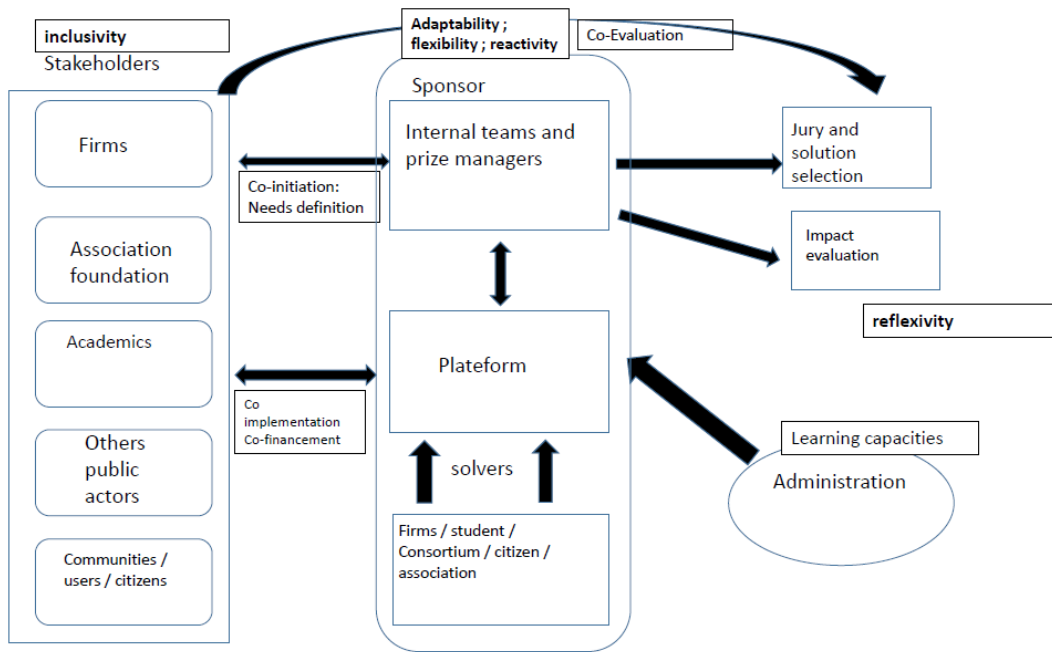
- *Distinct properties of innovation platforms*

The examination of the functioning of the platforms has highlighted other properties that go beyond those of the IO mechanism, including reflexivity, adaptability, and responsiveness. These dimensions are currently more noticeable on the American platform than on the European platform. Generally, reflexivity refers to the ability to observe one's commitments and activities to become aware of the limits of one's knowledge and subjectivity (Stilgoe et al., 2013). It manifests itself via the ability to adapt and change both the rules and the procedures in progress. In the context of our study, reflexivity can be displayed through the willingness to change the parameters of a competition while it is taking place and after having noticed certain limitations or inefficiencies. In the United States, the rules of some contests have thus evolved, even marginally, during the course of the competition because of a reassessment of the situation. Reflexivity can also be understood through the implementation of procedures (U.S.) that enable the study of the impact of competitions once they have concluded (e.g., NASA and HHS), leading the sponsoring agency to improve the modalities of future prizes based on feedback from past competitions (The role of inducement prizes; August 2020)⁹. At the same time, we observed forms of reactivity on both platforms. Sponsors have been led to launch prizes very quickly in response to urgent issues, as illustrated by the challenge.gov platform during the COVID pandemic in 2020. Indeed, the support provided by digital platforms increases the speed and efficiency of public actors; these platforms can quickly

⁹ The ability to transform certain rules and procedures seems to be facilitated in the case of so-called iterative and multiround competitions.

be connected to the world crowd, propose technological, societal or mixed competitions and adapt/design the rules of the prizes according to needs. Figure 1 summarizes these mechanisms.

Figure 1: Platform and Stakeholder Engagement



3. DISCUSSION: WHAT MODE OF GOVERNANCE FOR INNOVATION POLICIES FROM AN OI PERSPECTIVE?

While the analysis of American and European innovation platforms confirms the existence of public OI mechanisms, some questions remain. How and under what conditions can public decision-makers deploy inclusiveness and knowledge coproduction? In this section, we propose to address the topic of the governance mode of innovation policies by focusing on the "tentative

governance"¹⁰ paradigm recently mobilized by Kuhlmann et al. (2018, 2019) in line with the work on Responsible Research and Innovation. This paradigm appears particularly relevant because, beyond the issues of stakeholder inclusion, it states that governance rules must be reflexive, adaptive and reactive, properties highlighted in the previous empirical study of the two platforms (Cf Kuhlman et al., 2019). The objective of this discussion is to propose tentative governance as a governance modality to extend and operationalize the concept of public OI in the context of innovation policies. While our proposal emerges from the study of prizes platforms, its scope is broader and is intended to contribute to the overall transformation of innovation policies (Schot and Steinmueller, 2018).

3.1 Innovation and the Responsible Research and Innovation (RRI) program

Research in economics and management of innovation converges toward the recognition of collective, cumulative and highly uncertain innovative processes at the origin of the great technological and organizational innovations of our societies (Lazonick and Mazzucato, 2013). Radical uncertainty at the heart of innovative processes concerns several aspects: the success of the innovation itself, the target market(s), investment costs, and the future profitability of innovations, among others. In addition, in recent years, another dimension of innovation processes has been invited into the debate: the societal dimension through the Responsible Research and Innovation (RRI) program. The latter has been defined by Von Schomberg as "a transparent and interactive process by which social actors, researchers and innovators collaborate for the ethical acceptability, sustainability and *societal desirability* of innovation - thus allowing the insertion of scientific and technical advances in society" (Barré, 2011, p. 406). A formalization of this approach appeared in the *Responsible Research and Innovation Tools* (RIR Tools) program financed by the European

¹⁰ See previously Deleamarle (2014).

Commission's 7th Framework Program. Increasingly, public actors are trying to integrate, beyond the standard properties of innovative processes, a new dimension of research and innovation called "for and with society". According to this perspective, policy processes need to be anticipatory, reflexive, deliberative and responsive, leading to more openness and to greater stakeholder involvement (Stilgoe et al., 2013, Gay et al., 2019). It should be noted that the RRI program put forward by the European Commission has, however, attracted a large number of critics denouncing an essentially strategic and superficial policy (Rip, 2016).

3.2 Tentative Governance and Public OI

Inspired in part by the RRI program, several paradigms of innovation policy governance have emerged in recent decades, including the "tentative governance" approach¹¹. First, this concept fits with the current policy governance research that moves away from a top-down model and refers more to the dynamic interactions of actors and to a preferably horizontal approach. Second, the concept of provisional governance recently redefined by Kulhmann et al. (2019) includes both considerations in terms of accountability, inspired directly by the RRI stream, and in terms of the properties of innovative processes, including extreme uncertainty and the ability to reshape governance rules very quickly. The shifting and uncertain context that characterizes the emergence of new technologies calls, alongside the need for inclusivity, for more adaptive and experimental approaches to public policy governance (Lyall et al., 2019; Sorensen and Williams, 2002, Roca et al., 2017). Moreover, while uncertainties have always been inherent to research and innovation processes, they have reportedly increased in recent decades when confronted with highly complex issues, such as the debate around GMO research. Faced with violent reactions, or even opposition,

¹¹ See, for example, the concepts of collaborative governance (Emerson, Nabatchi, Balogh, 2012), and platform governance (Janowski and Estevez, 2018).

a growing number of political and scientific decision-makers are calling for a radical transformation of forms of governance to anticipate risks at a very early stage and to integrate the perception of diversified actors (Kulhman and Rip., 2019). From this perspective, tentative governance is seen as incorporating "provisional, flexible, revisable, dynamic and open approaches that include experimentation, learning, reflexivity, and reversibility" (Kuhlmann et al. 2018, p. 1091). The main characteristics and properties of tentative governance are summarized in Table 1.

Table 1: The main characteristics and properties of tentative governance

Characteristics	The actors and their roles	<u>The State</u> - Meta-governance role: coordinating agent, providing resources, building trust - Creating spaces for interaction, legitimizing new actors <u>Other actors</u> - Private and public actors, foundations/charitable organizations - They create capabilities - They are accountable - They are responsible for
	Forms of innovation	- Technological and social innovations - Change in innovative sociotechnical configurations
	Financing	- Public and private
	Actions	- Construction of new capabilities - Public investments targeted to certain challenges - Definition of "open-ended" objectives - Create space for experimentation - Financial resources for new players
Properties	Internal processes	- Provisional, flexible, dynamic, open approaches - Experimentation, learning, reflexivity, reversibility
	Coordination mechanisms	- Concertation: dominant mode of concertation associated with the assembly (different from orchestration) - Stakeholder inclusiveness

Source: inspired by Kulhmann, S., Rip, A. (2014, 2018).

In summary, five specific features can be highlighted to characterize this form of governance of innovation policies:

- Key players should be included, supported by a consortium of public/private actors and charitable foundations.
- Social innovation must be at the core of the process, including contemporary debates on its broad directions (Van der Have and Rubalcaba, 2016).
- Intermediary organizations and spaces for stakeholder interaction should be created to enable and enhance collaborative action.
- Governance rules must be flexible and adaptive.
- Meta-rules are rather characterized by a lack of directionality to facilitate adaptive governance behavior. However, standard and exploratory forms of governance must coexist¹². The aim is to find a balance between flexibility and stability.

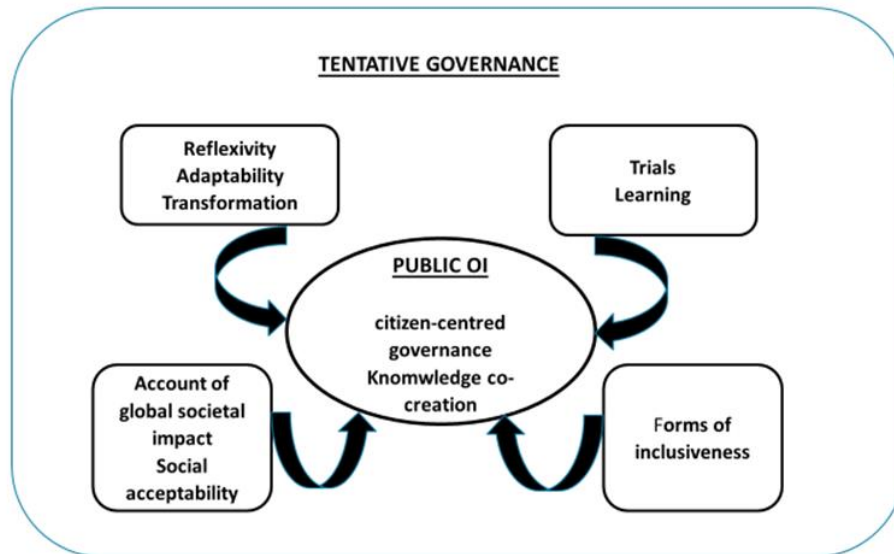
While the tentative governance paradigm and the public OI paradigm seem intrinsically linked, through the desire to implement policies focused on better stakeholder integration, approaches in terms of RRI and tentative governance enrich the concept of OI in the particular context of innovation policies. These approaches reveal the crucial character of anticipating and integrating the impact of new technologies and innovations on society. This also raises the question of innovation orientation and social acceptability, which goes beyond the issue of knowledge coproduction (Baba and Raufflet, 2015). In other words, involving various actors in the coconstruction of knowledge and the emergence of new public services/devices is not strictly similar to thinking about the social acceptability of some innovations. On the one hand, citizens

¹² Linders developed an approach in terms of reflexive governance very similar to the proposal of Kuhlmann et al. (2018), the key difference being that reflexive governance is considered a normative approach, whereas the direction of research and innovation is given by public actors (directionality).

who participate in "co" mechanisms do not necessarily represent the whole of society in its diversity and complexity. On the other hand, the integration of stakeholders can induce biases; individuals or groups of individuals may act for their own interest or out of ideology (Lyall et al., 2019), raising the question of the intervention of public actors as a last resort.

A particularly stimulating dimension of approaches in terms of RRI and tentative governance is the focus on the mechanisms at work—how to experiment, to question, to adapt, and to transform the methods and procedures of governance of innovation policies. This perspective—process analysis—deepens and extends the concept of public OI. Ultimately, it is not only a matter of designing coconstruction mechanisms, such as coinitation, codesign, which are defined *ex ante* for the duration of the entire political action but also of demonstrating reflexivity, anticipation, and adaptability throughout the entire process. The issues of experimentation and learning are thus at the heart of this mode of governance. The following figure shows the extent to which the concept of tentative governance can flesh out that of public OI for innovation policies.

Figure 2: OI and tentative governance



CONCLUSION

The objective of this study is to demonstrate that the use of digital platforms is part of the OI government strategy, initiated in the late 2000s. Public actors - international, national, regional - in a large number of countries are committed to the necessary transformation of public action, oriented toward increased involvement of civil society, thanks to the potentialities offered by Web 2.0 and digital platforms.

With regard to innovation policies, we have used two case studies to show that (i) public actors deploy OI mechanisms through devices such as innovation prizes and their implementation opens up the possibility of real stakeholder inclusiveness; and (ii) stakeholder intervention through coproduction tools, however, brings out varied configurations depending on the American or

European approach, appearing to be more notable for challenge.gov. However, recent developments in European programs offer greater inclusiveness. The examination of competitive platforms also revealed very stimulating properties for policy tools: reflexivity, adaptability and responsiveness.

If the concept of public OI precisely describes the different forms of coproduction of new knowledge, it does not allow us to grasp the concrete processes favoring the connection and involvement of stakeholders. Moreover, it does not integrate the distinctive features of innovative activities. To acknowledge the qualities of contests as instruments of public policy, we propose extending the concept of public OI with that of tentative governance. The regulation of innovation policies through the prism of this mode of governance illustrates, in an uncertain and changing context, the decisive character of reflective, adaptive and reactive procedures. If the joint mobilization of the concepts of OI and tentative governance offers a relevant conceptual framework for the analysis of the properties of innovation platforms, this contribution, in our view, can be extended beyond the instrument represented by contests.

Indeed, competitive platforms can be seen as a laboratory for experimentation revealing new configurations of public innovation policies. The functionalities of contest platforms may help inspire the metamorphosis of traditional innovation support instruments, such as public procurements and policies to support collaboration (Edler et al., 2017). Another possible direction of innovation policy renewal takes the form of concrete combinations between platforms and other public policy tools, allowing both for the positive externalities of more traditional policies to be reaped, as well as the benefits from interactions between traditional tools and platforms. These combinations of policy instruments could be explored, for example, in the context of the major societal challenges we are currently facing (Hekkert et al., 2020).

References

- Adler, J. H. (2011). Eyes on a climate prize: Rewarding energy innovation to achieve climate stabilization. *Harv. Envtl. L. Rev.*, 35, 1.
- Baba S., Raufflet E. (2015). “ L’acceptabilité sociale: une notion en consolidation ”. *Management international/International Management/Gestión Internacional*, 19(3), p. 98-114.
- Baldwin, C.Y., Clark, K.B. (2000). *Design Rules: The Power of Modularity*, vol. 1. MIT Press, Cambridge, MA.
- Barre, R. (2011), “ Des concepts à la pratique de l'innovation responsable : à propos d'un séminaire franco-britannique ”, *Natures Sciences Sociétés*, 2011/4 (Vol. 19), p. 405-409.
- Bekkers, V., Tummers, L. (2018). “ Innovation in the public sector: Towards an open and collaborative approach ”. *International Review of Administrative Sciences*, 84(2), p. 209-213.
- Benkler, Y., Nissenbaum, H. (2006). “ Commons-based Peer Production and Virtue ”. *The Journal of Political Philosophy*. 14(4), p. 394–419.
- Bovaird T., Lofler E. (2012). “ From engagement to co-production : The contribution fo users and communities to outcomes and public value ”, *Voluntas : International Journal of Voluntary and Nonprofit Organizations*, 23(4), p. 1119-1138.
- Brandsen T., Honingh M. (2016). “ Distinguishing different types of co-production: a conceptual analysis based on the classical definitions ”. *Public Administration Review*, 76(3), p. 427-435.
- Brandsen T., Pestoff V. (2006). “ Co-production, the third sector and the delivery of public services: an introduction ”. *Public Management Review*, 8(4), p. 493-501.
- Brennan, T., Macauley, M., Whitefoot, K. (2012). “ Prizes, patents and technology procurement: a proposed analytical framework ”. In: Discussion Paper, *Resources for the Future*, (www.rff.org, May, 11-21).
- Chesbrough, H. (2003). “ The era of open innovation? ” *MIT Sloan Management Review*, 44(3), p. 34-42.
- Chesbrough, H. (2006). “ Open Innovation: A New Paradigm for Understanding Industrial Innovation ”, in Chesbrough, H., Vanhaverbeke, W., West, J. (eds), *Open Innovation, Researching a New Paradigm*, Oxford University Press.
- De Vries H, Bekkers V., Tummers L. (2016). “ Innovation in the public sector : A systematic review and future research agenda ”. *Public Administration*, 94(1), p. 146-166.
- Delemarle, A., Larédo, P. (2014). “ Governing radical change through the emergence of a governance arrangement ”. In *The Governance of Socio-Technical Systems*. Edward Elgar Publishing.

- Edler, J., Fagerberg, J. (2017). “ Innovation policy: what, why, and how ”. *Oxford Review of Economic Policy*, 33(1), p. 2-23.
- Emerson, K., Nabatchi, T., Balogh, S. (2012). “ An integrative framework for collaborative governance ”. *Journal of public administration research and theory*, 22(1), p. 1-29.
- Estellés-Arolas, E., González-Ladrón-De-Guevara, F. (2012). “ Towards an integrated crowdsourcing definition ”. *Journal of Information science*, 38(2), p. 189-200.
- Flyvbjerg, B. (2006). “ Five Misunderstandings About Case-Study Research ”. *Qualitative Inquiry*, 12(2), p. 219-245.
- GAO, 2017. Open Innovation: Executive Branch Developed Resources to Support Implementation, but Guidance Could Better Reflect Leading Practices. Report to Congressional Committees, GAO-17-507.
- Gawer, A. (2014). “ Bridging differing perspectives on technological platforms: Toward an integrative framework ”. *Research Policy*, 43(7), p. 1239-1249.
- Gay C., Liotard L., Revest V. (2019). “ Les concours d’innovation en ligne : un instrument pertinent pour la recherche et l’innovation responsable ”, *Innovations - Revue d’Economie et de Management de l’Innovation*, n°59, p. 129-150.
- Godenhjelm, S., Johanson J.E. (2018). “ Les effets de l’inclusion des parties prenantes sur l’innovation dans les projets du secteur public ”, *Revue Internationale des Sciences Administratives* , p. 47- 67.
- Grillitsch, M., Hansen, T., Coenen, L., Miörner, J., Moodysson, J. (2019). “ Innovation policy for system-wide transformation: The case of strategic innovation programmes (SIPs) in Sweden ”. *Research Policy*. 48(4), p. 1048-1061.
- Hekkert, M. P., Janssen, M. J., Wesseling, J. H., Negro, S. O. (2020). “ Mission-oriented innovation systems ”. *Environmental Innovation and Societal Transitions*, 34, p. 76-79.
- Janowski, T., Estevez, E., Baguma, R. (2018). “ Platform governance for sustainable development: Reshaping citizen-administration relationships in the digital age ”. *Government Information Quarterly*, 35(4), p. S1-S16.
- Kalil, T. (2012). *Grand Challenges. Office of Science and Technology Policy Executive*, Office of the President.
- Kay, L. (2012). “ Opportunities and challenges in the use of innovation prizes as a government policy instrument ”. *Minerva*, 50(2), p. 191-196.
- Kuhlmann, S., Rip, A. (2018). “ Next-generation innovation policy and grand challenges ”. *Science and Public Policy*, 45(4), p. 448-454.

- Kuhlmann, S., Stegmaier, P., Konrad, K. (2019). “ The tentative governance of emerging science and technology- A conceptual introduction ”. *Research Policy*, p. 1091-1097.
- Kuhlmann, S., Rip, A. (2014). “ The challenge of addressing Grand Challenges ”. Report to the European Research and Innovation Area Board.
- Lakhani, K. R., Panetta, J. A. (2007). “ The principles of distributed innovation ”. *Innovations: technology, governance, globalization*, 2(3), p. 97-112.
- Lakhani, K., Tong, R. (2012). “ Public - Private Partnerships for Organizing and Executing Prize-Based Competitions ”, WP n° 2012-13, Berkman Center for Internet & Society at Harvard University. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2083755
- Lazonick, W., Mazzucato, M. (2013). “ The risk-reward nexus in the innovation-inequality relationship: who takes the risks? Who gets the rewards? ”. *Industrial and Corporate Change*, 22(4), p. 1093-1128.
- Lee, S. M., Olson, D. L., Trimi, S. (2012). “ Co-innovation: convergenomics, collaboration, and co-creation for organizational values ”. *Management decision*, 50(5), p. 817-831.
- Linders, D. (2012). “ From e-government to we-government: Defining a typology for citizen coproduction in the age of social media ”. *Government Information Quarterly*, 29(4), p. 446-454.
- Liotard I., Revest, V. (2015). “ Le renouveau des concours aux Etats-Unis, dispositifs publics de stimulation à l’innovation complémentaires aux brevets ”, *Revue d’Economie Industrielle*, 253, p. 91-122.
- Liotard, I., Revest, V. (2018). “ Contests as innovation policy instruments: lessons from the US federal agencies’ experience ”, *Technological Forecasting and Social Change*, 127, p. 57-69.
- Liotard, I., Revest, V. (2021), « Open Innovation and prizes : is the European Commission really committed ? », avec I. Liotard, GROWINPRO Working Paper, 46/2021 April.
- Loeffler, E., Bovaird T. (2019). “ Co-commissioning of public services and outcomes in the UK: bringing coproduction into the strategic commissioning cycle ”. *Public Money & Management*, 39(4), p. 241-252.
- Lorey, T., Dosquet, F., Errami, Y., Chantelot, S. (2019). “ Dynamique de co-cr  ation des politiques publiques dans des contextes institutionnels complexes : le cas des Chemins de Compostelle en France et en Espagne ”. *Management international / International Management / Gest  on Internacional*, 23(3), p. 89-105.
- Loukis, E., Charalabidis, Y., Androutsopoulou, A. (2017). “ Promoting open innovation in the public sector through social media monitoring ”. *Government Information Quarterly*, 34(1), p. 99-109.
- Lukensmeyer, C. J., Torres, L. H. (2008). “Citizensourcing: Citizen participation in a networked nation”. *Civic engagement in a network society*, p. 207-233.

- Lyall, C., Tait, J. (2019). “ Beyond the limits to governance: new rules of engagement for the tentative governance of the life sciences ”. *Research Policy*, 48(5), p. 1128-1137.
- Makela, A. (2017). “ Fostering innovation and growth in the digital age: the case for challenge prizes in Europe ”. CEPOB College of European Policy Brief. 13, December.
- Master, W. (2008), *Accelerating innovation with prize rewards: a history and typology of prize contexts, with motivation for a new contest design*, Purdue University, WP.
- May, T. (2011). *Social research*. McGraw-Hill Education (UK).
- Meijer, A., Bekkers V. (2015). “ A metatheory of e-government: Creating some order in a fragmented research field ”. *Government Information Quarterly* 32(3), p. 237-245.
- Mergel, I. (2020). “ La co-creation de valeur publique par les directions du numérique : une comparaison internationale ”. *Action Publique, Recherche et Pratique*, 6, p. 6-16.
- Mergel, I. (2015). “ Opening government: Designing open innovation processes to collaborate with external problem solvers ”. *Social Science Computer Review*, 33(5), p. 599-612.
- Mergel, I. (2018). “ Open innovation in the public sector: drivers and barriers for the adoption of Challenge. Gov ”. *Public Management Review*, 20(5), p. 726-745.
- Mergel, I., Edelmann, N., Haug, N. (2019). “ Defining digital transformation: Results from expert interviews ”. *Government Information Quarterly*, 36(4), 101385, p. 1-16.
- Mergel, I., Desouza, K. C. (2013). “ Implementing open innovation in the public sector: The case of Challenge. Gov ”. *Public Administration Review*, 73(6), p. 882-890.
- Mergel, I., Bretschneider, S. I., Louis, C., Smith, J. (2014). “ The challenges of Challenge. gov: Adopting private sector business innovations in the Federal Government ”. In 47th Hawaii International Conference on System Sciences, January, IEEE, p. 2073-2082.
- Miles, M. B., Huberman, A., M., Saldana, J. (2014). *Qualitative data analysis: a methods sourcebook*, 3.
- Murray, F., Stern, S., Campbell, G., MacCormack, A. (2012). “ Grand innovation prizes: a theoretical, normative and empirical evaluation ”. *Research Policy*, 41, p. 1779–1792.
- Nabatchi T., Sancino A. et Sicilia M. (2017). “ Varieties of participation in public services: the who, when, and what of co-production ”. *Public Administration Review*, 77(5), p. 766-776.
- Nam, T. (2012). “ Suggesting frameworks of citizen-sourcing via Government 2.0. ” *Government Information Quarterly*, 29(1), p. 12-20.
- Obama's report (2009). *A Strategy for American Innovation: driving toward sustainable growth and quality jobs*.

- Rip, A. (2016). “ The clothes of the emperor. An essay on RRI in and around Brussels ”. *Journal of Responsible Innovation*, 3(3), p. 290-304.
- Rochet, J. C., Tirole, J. (2006). “ Two-sided markets: a progress report ”. *The RAND journal of economics*, 37(3), p. 645-667.
- Scotchmer, S. (2006). *Innovation and incentives*. Cambridge MA, The MIT Press.
- Schot, J., Steinmueller, W. E. (2018). “ Three frames for innovation policy: R&D, systems of innovation and transformative change ”. *Research Policy*, 47(9), p. 1554-1567.
- Sørensen E., Torfing J. (2018). “ Co-initiation of collaborative innovation in urban spaces ”. *Urban Affairs Review*, 54(2), p. 388-418.
- Sorensen, K.H., Williams, R. (2002). *Shaping Technology, Guiding Policy*. Elgar, Cheltenham.
- Stilgoe, J., Owen, R., Macnaghten, P. (2013), “ Developing a framework for responsible innovation ”, *Research Policy*, 42, p. 1568–1580.
- Weber, M., Lamprecht, K., Biegelbauer, P. (2019). “ The Shaping a new understanding of the impact of Horizon Europe: the roles of the European Commission and Member States ”. *fteval Journal for Research and Technology Policy Evaluation*, 47, p. 146-154.
- Yin, R. (2013). “ Validity and generalization in future case study evaluations ”. *Evaluation*, 19(3), p. 321-332.

APPENDIX

List of interviews

Interviewee	Affiliation	Duration	Date
1	European Commission	30 min, 60 min	03/07/2019, 05/20/2019
2	European Commission	30 min	10/03/2019
3	Start-up: competitor	40 min	11/23/2020
4	Start-up: winner	70 min	11/15/2019
5	Start-up: competitor	50 min	01/29/2020
6	European Commission	64 min	04/07/2020
7	European Commission	59 min	04/10/2020
8	European Commission	74 min	04/21/2020
9	European Commission	60 min	04/24/2020
10	European Commission	90 min	05/07/2020

NB: These were conducted using a combination of email, in-person meetings and virtual meetings via Skype or GoToMeeting.