3. Transformative Metrics for Responsible and Transformative Innovation: Putting People at the Centre. Exploring Windows for Change in a State Initiative on Gender and Innovation Monitoring within the European Merge of Governance Frames

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3.1. Introduction: Why Are Metrics so Relevant in Responsibility Promotion?

Metrics and indicators have a curious influence on our daily lives. Researchers, especially in some countries, are impelled to look for the impact factor of a publication according to current career structures. Public authorities and scientific and business institutions are trying to adjust the metrics to what is demanded by Brussels or other international authorities to access funds or to position themselves in some prestigious ranking. They are not unique motivators for action although they are sometimes set as incentives. If we talk about the nature of governance in the times we are living, metrics are part of the landscape, sometimes deemed as the trees that do not let us see the forest.

Metrics are also usually positioned as sources of transparency and equanimity, i.e., bearers of the objectivity that lack other types of data collected in a less systematic, periodic, or comparable way. Nonetheless, this has not always been the case. This is because they are part of what we know as 'new models of governance' grounded in European public policies at the end of the 90s through the implementation of the open method of coordination. This method was applied in scientific and innovation policies as well as in areas of explicit normative scope such as gender equality policies, generating a great profusion of indicators in both areas. Moreover, this governance framework fitted into previous frameworks, especially within multilevel governance, which years before had defined the relevance of having European or State institutions. Yet such frameworks concerned about those institutions closer to citizens, for instance, the regions or local governments (vertical level) and groups outside the political or business sphere and other groups of stakeholders or civic actors (horizontal level).[2]

It seems, however, that these forms of governance have not resolved and/or have fostered forms of inequality and distancing from citizenship, which new currents of governance focused on responsibility intend to redirect. Attention

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2. Ian Bache, Ian Bartle, and Matthew Flinders, 'Multi-level governance,' in *Handbook on theories of governance*, eds. Christopher Ansell and Jacob Torfing (Cheltenham: Edward Elgar Publishing, 2016), 486–98.

to the Responsible Research and Innovation (RRI) literature points out three fundamental axes mostly: the orientation of science towards the major social challenges, the focus on co-creation and increase of citizen participation, and the reduction of the unexpected consequences of innovation.[3] [4] These respond to challenges such as climate change or social aspects such as the possible increase of political polarisation and power imbalances derived from the use of tech-based social networks.

In this scenario of juxtaposed governance frames, metrics play not only a relevant but a foundational role in the new policies of responsibility. For example, metrics were crucial in making corporate social responsibility (CSR) a way to encourage (without imposing) standards that facilitate knowing what 'responsibility' implies, allowing to compare companies and observe their progress. This, in turn, allowed visualising corporate responsibility statements that are often highly cosmetic. Building metrics was also one of the first initiatives for gender equality policies adopted following both the open method of coordination and gender mainstreaming governance frames that tend to soft measures promoted through benchmarking, avoiding other such legislation.[5] [6] Lastly, metrics have been used as an effective way to foster awareness about inequality showing its existence in our societies numerically. In summation, metrics are key to current normative or value-driven policies as well as to science and innovation policies considering the governance frames in place.

Nonetheless, metrics have limitations and unexpected effects. For this reason, the analysis of metrics yields interesting results on the visions, values, and

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3. Richard Owen, et al., 'A framework for responsible innovation,' in *Responsible innovation: managing the responsible emergence of science and innovation in society*, eds Richard Owen, Jhon Bessant, and Maggy Heintz (Chichester: John Wiley & Sons, 2013), 27–50.

4. Richard Owen, Phil Macnaghten, and Jack Stilgoe, 'Responsible Research and Innovation: From Science in Society to Science for Society, with Society,' *Science and Public Policy* 39, no. 6 (December 2012): 751–60. https://doi.org/10.1093/scipol/scs093

5. Susana Borrás and Kerstin Jacobsson, 'The open method of co-ordination and new governance patterns in the EU,' *Journal of European Public Policy* 11, no. 2 (May 2004): 185–208. https://doi.org/10.1080/1350176042000194395

6. Isabel Bruno, Sophie Jacquot, and Lou Mandin, 'Europeanization through its instrumentation: Benchmarking, mainstreaming and the open method of co-ordination... toolbox or Pandora's box?' *Journal of European Public Policy* 13, no. 4 (August 2006): 519–36. https://doi.org/10.1080/13501760600693895

priorities that underlie policies. In this sense, my interest in this chapter is to address a specific dimension of policies: the construction of metrics in a responsible manner. In doing so, this work employs a responsible metrics approach to explore a case in development, namely: a pioneering initiative of innovation indicators with a gender perspective in Spain. It is an official experience that could lead to opening doors to change in innovation frames and monitoring.

3.2. The Responsible Research and Innovation (rri) Approach

Scientific and technological development generates benefits and risks, certainties, and uncertainties that must be managed. Usually addressed by risk management, some RRI perspectives intend to transcend such 'control' approaches arguing that these latter are limited because they are based on present evidence, and do not necessarily promote forward-looking reflection.[7] These viewpoints are relevant for the times we are living characterised by an increasing emphasis on profits linked to our capacity to impact and even damage future generations perhaps irreversibly.[8]

RRI perspectives anchored in specific ethical obligations, e.g., the EU principles of equality,[9] help us to study the 'right impacts' and 'socially desirable' contributions of science and innovation. In the European framework, RRI attempts to bring science and innovation closer to society via traditional and non-academic and non-industrial actors, using concepts such as co-creation, open science, and public engagement to improve the accessibility of science and encouraging non-scientific groups to participate in its development. Similarly, close visions like 'transformative innovation' insist on new approaches in the governance of sociotechnical transitions emphasising systemic endeavours.

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7. Owen, et al., 'Framework for responsible innovation;' Owen, Macnaghten, and Stilgoe, 'Responsible Research and Innovation.'

8. Hans Jonas, *El principio de responsabilidad: Ensayo de una ética para la civilización tecnológica* (Barcelona: Herder, 1995).

9. Rene Von Schomberg, 'A vision of responsible research and innovation,' in *Responsible innovation: managing the responsible emergence of science and innovation in society*, eds. Richard Owen, Jhon Bessant, and Maggy Heintz (Chichester: John Wiley & Sons, 2013), 51–74.

Sustainability, for example, requires changing the regime and necessarily going beyond the initiatives of the organisations merely.[10]

In the current European framework, two RRI frames co-exist and interrelate. On one hand, a dimensions approach comprising aspects such as reflexivity, anticipation, responsiveness, inclusiveness, and openness, as guiding principles for all actors and activities of the innovation system.[11] On the other hand, the approach launched by the European Commission defines specific areas of intervention: governance, public engagement, ethics, science education, open access, and gender equality.[12] Even though the European Commission does not enact a consensual definition of what RRI entails or not, based on the cited key areas, they promote diverse initiatives to build RRI indicators. Some of the main ones are the RRI Expert Group, which finished its work in 2015, and the MORRI project, which concluded in 2018, conceived to support the Directorate-General for Research and Innovation (DG-RTD). Further work is needed as the first development of metrics was led by experts. Wider public consultation and further involvement of stakeholders affected by specific innovations or future, for instance, women and other diversity-oriented associations, citizen science groups, or NGOs.

The foregoing are recent attempts, thus their impact on governance and change-promotion of more responsibility in science and innovation systems is unknown. Yet, this might change thanks to more work on RRI metrics, e.g., the SUPER_MORRI project (ending in 2023) and other projects supported by European funds. Whatsoever, metrics construction ought to be aligned with some of the needs that responsible and transformative metrics proposals introduce in

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10. Joan Schot and W. Edward Steinmueller, 'Three frames for innovation policy: R&D, systems of innovation and transformative change,' *Research Policy* 47, no. 9 (August 2018): 1554–67. https://doi.org/10.1016/j.respol.2018.08.011; Adrian Smith, Andy Stirling, and Frans Berkhout, 'The governance of sustainable socio-technical transitions,' *Research policy* 34, no. 10 (December 2005): 1491–1510. https://doi.org/10.1016/j.respol.2005.07.005

11. Jack Stilgoe, Richard Owen, and Phil Macnaghten, 'Developing a framework for responsible innovation,' *Research Policy* 42, no. 9 (November 2013): 1568–80. https://doi.org/10.1016/j.respol.2013.05.008.

12. European Commission. *Responsible Research and Innovation: Europe's Ability to Respond to Societal Challenges* (Brussels: European Union, 2014).

the diverse phases of development, from their conception to their final use 'in the wild,' that is, in the real world.[13]

3.3. Responsible and Transformative Metrics

Responsible metrics is not a research discipline but a concept that envisages the responsible shift in research and innovation policies in the realm of measurement and monitoring. The Leiden Manifesto[14] and The DORA Declaration[15]are at the origins of this new wave in an old debate. The following lines summarise a literature review gathering references from expert recommendations (eleven reports and papers) as well as from debates held in the SUPER_MORRI project.

A crucial concern is how data is increasingly used in science governance, substituting judgement. RRI has emerged thinking about unintended, unexpected, or damaging consequences of science and technology so, following this path, metrics literature reacts to bad consequences in the use of the indicators. Two examples of this are: the power given to the firms that have launched metrics (e.g., the owners of Web of Science and Scopus) and the use of metrics conceived for journals in individual researchers' career evaluations such as the quartiles of the journals. Its use negatively impacts researchers that work in fields or countries that have no Q1 journals, discouraging research in entire areas of knowledge.

Still, most of the literature pinpoints that the main problem is not indicators, but the policymaking and governance processes that distort its purposes and final uses which are frequently different from their initial conception. It has been remarked that indicators, instead of being used for informed decision-making, have been deployed to reduce the issues taken into consideration in the S&T policies.[16] The essential problem can be summarised as follows: 'These

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13. Michel Callon, Pierre Lascoumes, and Yannick Barthe, *Acting in an uncertain world: An essay on technical democracy*, trans. Graham Burchell (Cambridge: The MIT Press, 2011); Ismael Rafols, 'S&T indicators in the wild: Contextualization and participation for responsible metrics,' *Research Evaluation* 28, no. 1 (January 2019): 7–22. https://doi.org/10.1093/reseval/rvy030

14. Diana Hicks, et al., 'Bibliometrics: The Leiden Manifesto for research metrics,' *Nature* 520 (April 2015): 429–31. https://doi.org/10.1038/520429a

15. 'The Declaration on Research Assessment,' American Society for Cell Biology, accessed May 18, 2022. https://sfdora.org/about-dora/

16. Barré, 2018.

artefacts [metrics] have no meaning by themselves, but receive their meaning from attributions in institutional practises.'[17] These practises have consequences in the outputs, in society, and directly on researchers and innovators. In the Metric Tide policy report, which is a milestone of the responsible metrics approach in the UK, the author claimed that 'metrics hold real power: they are constitutive of values, identities, and livelihoods. How to exercise that power to positive ends is the focus of [that] report.'[18] In a responsible exercise of power, bad consequences are at stake, but the core issue is the democratisation and public engagement in policies. This encompasses incorporating plural visions and acknowledging that current governance frames bring their values with their practises and instruments, specifically with monitoring.

In this train of thought, there are proposals to pursue responsible metrics that are quite practical and explicit in including more information about the indicators, their conception frames, possible issues informed by previous experiences in indicator use, and intrinsic limitations such as robustness within specific samples. A key recommendation is making explicit proxies and translations used in building indicators. The steps missing behind need an explanation that should accompany metrics.[19] For instance, when it comes to measuring 'research quality' diverse proxies are used such as the quality of the journals. Yet, for other actors, the idea of 'research quality' is more linked to the final impact on society. In this vein, we should be cautious with translations of social aspects to numbers.[20] Also, there are strong demands for contextualisation considering the diverse contexts where data come from and the inclusion of the ultimate justification and purposes of monitoring; it is not the same justification of

17. Loet Leydesdorff, Paul Wouters, and Lutz Bornmann, 'Professional and citizen bibliometrics: Complementarities and ambivalences in the development and use of indicators—a state-of-the-art report,' *Scientometrics* 109 (December 2016): 2129. https://doi.org/10.1007/s11192-016-2150-8

18. James Wilsdon, *The metric tide: Independent review of the role of metrics in research assessment and management* (London: SAGE Publications, 2015), 3.

19. Jochen Gläser and Grit Laudel, 'The social construction of bibliometric evaluations,' in *The Changing Governance of the Sciences,* eds. Richard Whitley and Jochen Gläser (Dordrecht: Springer, 2007), 101–23.

20. Andrea Saltelli and Monica Di Fiore, 'From sociology of quantification to ethics of quantification,' *Humanities and Social Sciences Communications* 7, no. 1 (August 2020): 69. https://doi.org/10.1057/s41599-020-00557-0

efficiency rather than of a research mission such as curiosity or social well-being.[21] Epistemologically, it is not possible to separate knowledge formation from decision-making, but experts usually do so when indicators, or other research outputs, are translated from 'laboratories' to macro cosmos in different stages.[22] In the light of the presented above, responsibility for metrics goes beyond experts that work proposing them. There needs to be a comprehensive approach to governance processes of science and innovation and the actors that take part in these processes.

Framed in the previous viewpoints, the following case shows an initiative led by the Spanish government that is close, in some respects, to a responsible metrics approach. I will discuss some reflections from practise and raise new questions. Overall, I will argue that the main connection between the initiative and a responsible shift in metrics is the participatory approach, including social actors as well as the usual innovation system actors to develop the monitoring initiative. Also, I will bring up its ultimate justification since it is oriented to societal impact, namely, knowing more about women's situation and the gender perspective in innovation.

3.4. Innovation Monitoring with A Gender Perspective: A Spanish Pioneer Initiative

In September 2019, The Women and Science Observatory, which is attached to the Ministry of Science and Innovation, launched an Innovation Commission. Its purpose was to fill the gap regarding innovation where little gender data is available, despite the efforts of monitoring initiatives in science with a gender perspective like the European Commission´s report 'She figures.' To fill the gap, the first task was to produce a report with an exploration of data needed and available. The global objective was to further develop periodic data series, thus establishing a monitoring initiative on gender and innovation similar to the existing one in science since 2007.[23] The Commission included different types of actors such as

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21. Rafols, 'S&T indicators.'

22. Ibid.; Callon, Lascoumes, and Barthe, *An uncertain world*.

23. Unidad de Mujeres y Ciencia, *Académicas en cifras 2007* (Madrid: Ministerio de Educación y Ciencia, 2007).

two associations related to innovation and technology transfer, five equality and women entrepreneur associations, a university association, two university institutes, and twelve public bodies from different ministries. Examples of these latter were: the National Institute of Statistics, the National Telecommunications Observatory, the Centre for Technological and Industrial Development (CDTI), which manages the main innovation funds in the country, the Spanish Foundation for Science and Technology (FECYT), and the Directorate General for Labour.

The group was consulted to define relevant aspects to be monitored, for instance, gender and innovation in small and medium enterprises (SMEs), gendered innovative entrepreneurship, employment rates and their relationship with public funds for innovation and gender, social and public innovation, and innovation in feminised and masculinised sectors, among others. Research and data collection was allotted to scientists. Diverse meetings were held to present preliminary results and to redefine these aspects. The output was the report published by *Observatorio Mujeres, Ciencia e Innovación*[24] with results of interest for a more responsible innovation system:

- The monitoring effort showed profound gender gaps in indicators related to entrepreneurship, interactions and knowledge transfer, access to public resources, and women's participation in decision making. To illustrate this, indicators showed the low rate of women present in firms funded with large amounts of public resources for innovation, the highest female participation being 23% from 2014 to 2018. An exception was support personnel: more than 70% of technical transfer support staff were women in 2018. The gender gap is much higher than in science where most of the institutions are public bodies.

- Findings pointed out that women are not participating in technological innovation like men. Likewise, they evidenced that data about non-technological innovation is not available as though other types of innovation were not relevant. Public innovation or data coming from

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24. Observatorio Mujeres, Ciencia e Innovación, *Mujeres e Innovación 2020* (Madrid: Ministerio de Ciencia e Innovación de España, 2020).

other institutions than firms was not collected either. Other institutional environments count largely more on women than the business sector, so it was not possible to trace women's contribution to innovation since current data just focused on technological firms.

- The report worked mostly with primary data collected specifically for the initiative because there is no existing data on the human factor in the innovation surveys, such as the surveys launched by OECD, EUROSTAT, or the Spanish National Institute of Statistics.

Both the bad results in terms of gender balance and the scarcity of information led the Innovation Commission to start a process to include gendered data in the Spanish innovation survey that allow further gender monitoring. Rates of men and women in diverse organisational positions, working conditions, and non-technological innovation registers were some of the ideas in debate in the commission. From the viewpoint of the authors of the report, including myself, it is crucial to pay attention to the relying frames of innovation and the purposes of monitoring considering that the current focus leaves out possible women's contributions.

3.5. Discussion and Further Research

Based on the discussion above regarding responsible metrics, there exists a need for defining the role of metrics in the general governance frame of the policymaking bearing in mind why, how, and who participates in the phases of conception, data collection, use, and interpretation of the information. Defining a governance life cycle of metrics, it is needed to talk about responsible metrics, and also to specify the policy process that these will produce.

The case addressed here illustrates a first attempt in innovation metrics with a gender perspective, where actors that go beyond the Triple Helix, i.e., public administration main bodies, universities, and firms,[25] have participated. Concerned societal actors such as women associations, had participated also

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25. Henry Etzkowitz and Loet Leydesdorff, 'The dynamics of innovation: From National Systems and "Mode 2" to a Triple Helix of university–industry–government relations,' *Research policy* 29, no. 2 (February 2000): 109–23. https://doi.org/10.1016/S0048-7333(99)00055-4

in defining relevant aspects to be measured. The justification for monitoring was to observe the gendered side of innovation, namely, a societal impact. The result of this experience is a very different picture from the usual innovation monitoring, where persons are not present, but firms' environment or public and private investments are.

Observatorio Mujeres, Ciencia e Innovación continues working on possible gendered questions to be included in the Spanish innovation survey. Their objective will be to palliate the lack of information. Nevertheless, the next steps are unknown so many questions arise about how to open windows for change in innovation monitoring and how new metrics are finally embedded in the governance of innovation policy in Spain.

To discuss the case, it is relevant to tackle the creation of a space to reflect with increased participation, i.e., a Quadruple Helix, revealing how the frames associated with innovation monitoring are not neutral. In this sense, the striking results can have a deeper impact beyond gender, promoting a profound reflection on how innovation is conceived in the monitoring frameworks. The case presented shows that, in its monitoring at the international, European, and national levels, the innovation concept is reduced to technology produced in the market. This limits responsible approaches to innovation both in Europe and other parts of the world where other types of innovation produced by other actors, such as social or public innovation, can be very relevant.[26] Also, the case shows that public engagement is needed to produce monitoring frames. Including some different actors with a specific social goal changes completely the frame, demanding crucial aspects not previously included: innovators' traits, capabilities, working conditions, social environment, or other data related to the human factor. The absence of human factor in the official innovation monitoring leads to thinking that the underlying vision about innovators and entrepreneurs is the 'Schumpeterian' one (i.e., deriving from Schumpeter's vi-

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26. Vincent Blok and Pieter Lemmens, 'The emerging concept of responsible innovation. Three reasons why it is questionable and calls for a radical transformation of the concept of innovation,' in *Responsible Innovation 2,* eds. Bert-Jaap Koops, et al. (Cham: Springer, 2015), 19–35; Mario Pansera and Richard Owen, 'Innovation for de-growth: A case study of counter-hegemonic practices from Kerala, India,' *Journal of Cleaner Production* 197, no. 2 (October 2018): 1872–83. https://doi.org/10.1016/j.jclepro.2016.06.197

sion): they are 'naturally' forged, not depending on socioeconomic or cultural conditions, so the information about them is not relevant.[27] Gender results and the big gap detected show that it is not the case and if gender matters, other socioeconomic aspects related to the human factor do too.

There is increasing evidence about the aspects above in entrepreneurship and inventors research pinpointing the need for high-level connections and funds to succeed that come mostly from family status.[28] We are not just hiding women and other actors' possible innovations. If we do not track where possible innovators are, i.e., the people, what we are doing is blindly deciding where innovation is, firms in this case. Transcending the innovative Schumpeterian vision, we might look at innovators as conditioned by their environment and their socio-cultural traits. Therefore, these individuals undertake an innovation in different ways, considering that some groups face inequality in their innovative activities as gender research on innovation has shown it.[29] All in all, a better understanding of who innovates and in which contexts could be very relevant to promoting better innovation policies in our view.

Still, the foregoing does not just relate to the frames but also to the purposes of innovation policies themselves, and therefore, to the purposes of innovation monitoring. Current innovation monitoring has been useful to observe country efforts to support technological development in firms. Other purposes that do not rely upon linear assumptions of the well-distributed benefits of technology for society will appear if we ask for different actors than Triple Helix, as we have seen in this case analysed here. RRI policy started as a top-down process that remains mostly at the European or national level. Still, the innovation policy

27. Observatorio Mujeres, Ciencia e Innovación, *Mujeres e Innovación 2020.*

28. Candida Brush, et al., 'A gendered look at entrepreneurship ecosystems,' *Small Business Economics*, 53 (August 2019): 393–408. https://doi.org/10.1007/s11187-018-9992-9

29. Gry Alsos, Elisabet Ljunggren, and Ulla Hytti, 'Gender and innovation: State of the art and a research agenda,' *International Journal of gender and Entrepreneurship* 5, no. 3 (October 2013): 236–56. http://dx.doi.org/10.1108/IJGE-06-2013-0049; Lene Foss, Kristin Woll, and Mikko Moilanen, 'Creativity and implementations of new ideas: Do organisational structure, work environment and gender matter?' *International Journal of Gender and Entrepreneurship* 5, no. 3 (September 2013): 298–322. http://dx.doi.org/10.1108/IJGE-09-2012-0049; Barry Bozeman and Monica Gaughan, 'How do men and women differ in research collaborations? An analysis of the collaborative motives and strategies of academic researchers,' *Research Policy*, 40, no. 10 (December 2011): 1393–1402. https://doi.org/10.1016/j.respol.2011.07.002

envisages a multi-level approach that is already merged with the open method of coordination.

In this vein, accountability processes are produced within communities with actors that acknowledge each other.[30] This entails that such processes take place in specific territorial spaces like regions that are highly conditioned from other governance instruments coming from a top-down approach such as smart specialisation strategies; this is an influential instrument to receive European funds in the regions requiring its specific innovation indicators. Consequently, it introduces another question about monitoring purposes: 'For the sake of whom are working indicators at different levels?' If we ask specifically about responsible innovation monitoring, we should consider that transparency in fund distribution is not enough as a purpose, even if it is a very relevant one for public administrations.

Previous work has shown that co-creation initiatives in RRI with diverse stakeholders lead to different indicators from those developed at the European level[31] as well as those gender equality-oriented, suggesting both the need for the country to adapt to the measurements and the diverse actors' needs of different types of indicators. Diverse actors can have different responsibilities to promote a specific aspect and it can suppose diverse monitoring for each actor as planned, for instance, in the open science policy.[32] Likewise, the corporate social responsibility frame exists- as well as their monitoring initiatives- and its networks co-habit with innovative ones, especially in local or regional spheres. Yet, the use of complex or composed indicators could not be useful at the mezzo or micro-level (universities, groups, or projects), this sort of indicators

30. Rune Dahl Fitjar, Paul Benneworth, and Bjørn Terje Asheim, 'Towards regional responsible research and innovation? Integrating RRI and RIS3 in European innovation policy,' *Science and Public Policy* 46, no. 5 (October 2019): 772–83. https://doi.org/10.1093/scipol/scz029

31. Paula Otero-Hermida and Mónica García-Melón, 'Gender Equality Indicators for Research and Innovation from a Responsible Perspective: The Case of Spain,' *Sustainability* 10, no. 9 (August 2018): 2980. https://doi.org/10.3390/su10092980. ; Mónica García-Melón, et al., 'Indicators for monitoring responsible research and innovation in Spain; the case of Science Education,' paper presented at *25th International Conference on Multiple Criteria Decision Making, Istanbul, June 2019*. Digital.CSIC: http://hdl.handle.net/10261/212898

32. European Commission. *Progress on Open Science: towards a shared Research Knowledge System* (Publications Office of the European Union: Brussels, 2020).

being more useful at the macro level.[33] This is for avoiding misunderstandings, ensuring robustness, and favouring that non-expert actors might interpret the results.

Further research should shed light on the limits and potential of responsible metrics approaches within the previous merge of governance frames that conditions their life cycle and the policy-making process set to produce metrics and frames. Responsibility policies that have populated first the business world (CSR) and now science and innovation (RRI) have been juxtaposed in previous governance models in a way that may limit their principles, leading to contradictions. Specifically, new responsibility frames have adapted to soft-law initiatives that were promoted at the time by the open method of coordination, which proposes a framework and indicators but does not promote regulation. This latter often is understood not so much as a public good fruit of public debate but as an imposition to organisations and states that are difficult to apply in a highly globalised context.

This has been delicate in contexts such as the Green Deal where, for example, the prohibition of single-use plastics has been a long debate. Also, it has been contested via equality policies where new governance approaches related to the open method of coordination, i.e., gender mainstreaming, included limited perspectives that can hamper women's advance.[34] Equally, the multi-level frame has been criticised for generating policy networks that include more actors but not the parliamentary legitimate ones, becoming a path for building technical control over democracy.[35]

Paying attention to those aspects can be fundamental to promoting processes that count on diverse actors in plural and legitimate ways. Considering the case presented and the literature reviewed here, policy working groups

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33. Ludo Waltman, 'Responsible metrics: One size doesn't fit all,' *In STI 2018 Conference Proceedings, Leiden, the Netherlands, 526–31, September 12–14, 2018*. Leiden: Centre for Science and Technology Studies.

34. Judith Squires, *The new politics of gender equality* (Basingstoke: Palgrave Macmillan, 2007).

35. Paul Stephenson, 'Twenty years of multi-level governance: "Where does it come from? What is it? Where is it going?"' *Journal of European Public Policy* 20, no. 6 (May 2013): 817–37. https://doi.org/10.1080/13501763.2013.781818; Jacqui True, and Michael Mintrom, 'Transnational networks and policy diffusion: The case of gender mainstreaming,' *International Studies Quarterly* 45, no. 1 (March 2001): 27–57. http://dx.doi.org/10.1111/0020-8833.00181

including experts, industry, and administration are not enough for bring-ing perspectives in the 'responsible shift' that is demanded to the innovation policies. New responsible policies may need co-creation for the governance processes and instruments such as metrics, but this will occur within the previ-ous governance settings, which implies their limitations beyond metrics focus. To explore these aspects, we have found useful participatory decision-making research techniques in previous RRI metrics developments.[36] By the same token, probably we need specific approaches to the policy processes derived from co-creation. Collaborative and inclusive governance research frames count years of experience in observing empirically new governance settings that establish cross-boundary relations among diverse actors in different sectors.[37]

We are following this path to continue researching about Spanish gen-der and innovation case in which social engagement has occurred seeking to contribute to key questions about policy processes towards transformative monitoring, namely: Where are the windows for change in innovation gover-nance and monitoring based on more responsibility? How are they working? This approach could also fit the exploration of other windows, further research and discussion will shed light. Finally, considering the gender results observed, focusing on the people, i.e., those persons that innovate and innovation ben-eficiaries, and their contexts, can be a good chance to start transformative and responsible metrics initiatives.

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36. García-Melón, et al., 'Mmonitoring responsible research;' Otero-Hermida and García-Melón, 'Gender Equality Indicators.'

37. Chris Ansell and Alison Gash, 'Collaborative governance in theory and practice,' *Journal of Public Ad-ministration Research and Theory* 18, no. 4 (October 2008): 543–71. https://doi.org/10.3390/su10092980; John D. Donahue and Richard J. Zeckhauser, *Collaborative governance: Private roles for public goals in turbulent times* (Princeton: Princeton University Press, 2011); Kirk Emerson and Tina Nabatchi, *Collab-orative governance regimes* (Washington: Georgetown University Press, 2015).

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