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# SOCIO-EPISTEMOLOGICAL CHALLENGES OF DEMOCRATIC INNOVATION: "THE ETHICS OF INVENTION" BY SHEILA JASANOFF *[BOOK REVIEW]*

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**Sheila Jasanoff**, *The Ethics of Invention: Technology and the Human Future,* New York: W.W. Norton & Company, 306 pp., (hardcover), ISBN 9780393078992.

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## Introduction

"The Ethics of Invention: Technology and the Human Future" is a monographic book written by Harvard STS scholar Sheila Jasanoff. This book was published in late 2016 by W. W. Norton & Company within their "Global Ethics Series" edited by Kwame Anthony Appiah.

Sheila Jasanoff is Pforzheimer Professor of Science and Technology Studies at the Harvard Kennedy School. As a scholar of Science, Technology and Society (STS), she has written more than 16 books. She was founding chair of the Cornell STS Department, and then, the Harvard STS Program, which she directs to this day. Sheila Jasanoff is perhaps one of the most important figures in American and worldwide STS studies. In her vast repertoire of books and publications, Jasanoff has explored the socio-political implications of science and technology with a particular interest in unveiling the relationship between technical governance and democracy. In this pursuit, Jasanoff has led the normative turn in STS, in which ethics and public engagement have become the prime focus.

## The book

It is curious how Jasanoff decided to omit the word 'innovation' in the title of this book and replaces it with the word 'invention'. Invention seems to be a more neutral and far less powerful word than innovation in current social discourse. It's almost as if it was a timid choice of title, seeking to challenge the contemporary spirit of innovation without being called an innovation pessimist. But to call this book 'anti-innovation' would be an oversimplification at the very least. Throughout the book Jasanoff critiques naïve and lazy assumptions about the nature of technological innovation. To Jasanoff, innovation is often "presumed to be a good in itself" (p.114) and often presumed to be easily managed through science and economics alone. But this critique is not directed to devalue the role of technology itself, but rather to reflect on the complex relationship between technology, subjectivity and power.

> Through technology, human societies articulate their hopes, dreams, and desires while also making material instruments for accomplishing them. Collective visions and aspirations, moreover, change and evolve as societies become habituated to new technologies and use them to pursue altered understandings and purposes. Technological choices are, as well, intrinsically political: they order society, distribute benefits and burdens, and channel power. (pp. 242-243)

The author examines key ethical and philosophical concepts through case-analysis of different recent historical events and processes concerning technology. The

book addresses cases like the Bhopal disaster in India, GMO Food, Genetic testing, Designer Babies, Big Data, Cell lines, and many others. Through these cases, Jasanoff debates fundamental issues being tensioned by innovation, for instance; privacy, legitimacy, progress, subjectivity and democracy.

The book is structured in 9 chapters. In the first two chapters, Jasanoff displays the main concepts of the book through which she analyzes contemporary debates. The following five chapters describe controversial cases concerning the limits and failures of technology. Chapter 8 presents current mechanisms to govern innovation and their limitations. Finally, Chapter 9 summarizes the key conclusions and explores the implications and future of the democratization of technological knowledge. This review will not discuss all elements, cases and arguments presented in this book. Rather, this review will highlight the understanding of what citizen's epistemic participation in a democratic governance of innovation would look like through Jasanoff's main ideas.

"The Ethics of Invention" can be understood as a capstone publication to frame the challenges in the search for a democratic, social and well-being driven government of technological knowledge. In this sense, Jasanoff proposal adopts neither an optimistic nor pessimistic view of technology. Instead, the author constructs a vision of technological knowledge in which its failure or success can only be comprehend in the context of the human institutions, actions and beliefs that give it form. As the author expresses:

> But what are the most promising means to ensure that technology will not slip from human control, and what tools, conceptual or practical, can we deploy to hold our proliferating inanimate creations in check? The remainder of this book takes up these questions by looking at the problems of risk, inequality, and human dignity that must be addressed if societies are to live more responsibly with their technological inventions.

In order to even conceive the idea of a democratic governance of innovation, some of the main premises of innovation in today's social discourse must be challenged. Jasanoff describes three fallacies that have shaped the narratives on technological development. These are (1) technological determinism, (2) technocracy and (3) unintended consequences. Technological determinism is 'the theory that technology, once invented, possesses an unstoppable momentum, reshaping society to fit its insatiable demands' (p.14). Technocracy 'recognizes that technological inventions are managed and controlled by human actors, but presumes that only those with specialist knowledge and skills can rise to the task' (p.19). Finally, the language of un-

intended consequences 'implies that it is neither possible nor needful to think ahead about the kinds of things that eventually go wrong' (p.23). Additionally, it helps to diffuse responsibilities once a failure is produced, as if this failure was a consequence of statistical odds rather than human decisions.

All of these fallacies together constitute a socio-technical narrative that has allowed for a controllable and manageable relationship between technology and society, but at the cost of underpinning democratization and social participation in one of the key drivers of social change. Technological determinism, technocracy and unintended consequences are "a trio of commonly held but flawed beliefs, each suggesting that technologies are fundamentally unmanageable, and therefore beyond ethical analysis and political supervision, long impeded systematic thinking about the governance of technology" (p. 247). As Jasanoff summarizes:

> The doctrines of technological determinism, technocracy, and unintended consequences tend to remove values, politics, and responsibility out of discussions about technology. Little of moral consequence is left to debate if machines possess their own logics that push society along inevitable pathways. In that case, technocrats argue, rule by experts is the only viable option, since all we want is to ensure that technologies function well, and engineering design and the assessment of technological risks are much too complicated to be left to ordinary people. Further, given the complexities of all large technological systems, there is no realistic alternative to living with uncertain futures containing unforeseeable threats. Viewed through the lens of unintended consequences, many aspects of technology simply cannot be known or effectively guarded against in advance (pp 28-29)

Jasanoff explores the concept of risk as it relates to the failures of innovation that are typically not presented with the same level of rigor compared to technology's successes. This "failure to aggregate a technology's harmful effects on individual lives may cause significant risks to go unnoticed for long periods of time" (p.37) and help to strengthen the social imaginary that technological innovation almost inevitably produces cultural advancement. This systemic inability to weigh the benefits and damages of innovation is closely related to the fallacy of unintended consequences: "harm occurs without apparent intention precisely because in so many situations involving technology no single actor is ever in charge of the entire big picture" (p.41).

To Jasanoff, risk represents both the potential harms of technology and also the way modern societies have sought to frame it. The framing of innovation's harms is through the idea of risk assessment, "that is, to systematic, public analysis of risk be-

fore citizens are exposed to grave widespread harm, followed by regulation as needed to reduce those risks" (pp 43-44). The social promise of risk assessment policy is that "it confers on citizens a right to know about some of the invisible risks of modernity" (p. 45). Nonetheless, epistemic participation of citizens under the regime of risk assessment is restricted to observation. Jasanoff argues that "almost by definition, regulators conducting risk assessment are forced to ignore knowledge that does not look like science as it is usually understood, that is, knowledge gained through publication in peer-reviewed journals or produced through authorized expert advisory processes (p.50).

Jasanoff critiques the epistemic commitment of risk assessment policy to expert-based deliberation in which citizens are usually left out of the equation. However, she represents the validity of citizen's ways of knowing as potential contributions to the evidentialist framing of policy making as technical problem solving. Thus, to Jasanoff, epistemic exclusion of citizens is restricted to experts inability to determine the usefulness of their experience to their own technical problem-solving activity. As Jasanoff states: "the knowledge of ordinary citizens, which may be based on long historical experience and repeatedly verified by communal observation, tends to be set aside as subjective or biased, and hence as mere belief rather than reliable evidence. Such experiential knowledge, however, can be especially valuable when it is based on direct interactions with machines or natural environments: industrial workers may understand the risks of their workplace better than the design engineers, and farmers know the cycles of crop behavior in their fields better than global climate modelers" (p.50). The case is the same when it comes down to disasters and the clash between experts asserting certainty and citizens casting doubt:

> In a battle between the embodied, experiential knowledge of victims and the speculative, unsupported claims of physicians, it is reasonable to think that the former should have received more credence. In practice, as the shutting down of the clinics dispensing thiosulfate showed, establishment medicine acting in the name of objective science displayed a callous disregard for victims' testimony, though there was little firm evidence to back up the official stance (p. 72).

These two types of epistemic agents produce two particular forms of knowledge: "What a geneticist or medical scientist knows about human allergies is vastly different from what the operator of a grain elevator knows about conditions of seed storage and shipment"(p.99). Scientists produce *abstract scientific knowledge* while workers produce *pragmatic knowledge*. This idea resonates with the Vygotskian distinction of *scientific concepts* and *everyday concepts* (Vygotsky, 1934/1987), none-

theless, Vygotsky's description emphasizes the dialectic relation between both forms of knowledge and Jasanoff seems to present them as simply qualitatively different from each other. According to Jasanoff, the problem is that both type of evidence don't receive the same epistemic credibility by risk assessors: "pragmatic knowledge of the kind processed by silo operators rarely finds its way into peer-reviewed scientific articles or the rarefied forums of risk assessment and policymaking that rely on published science. The resulting official picture of risk or safety across a complex technological system may therefore be misleadingly partial and incomplete" (p.99).

Jasanoff, perhaps intentionally, reflects on the discussions around the issue of epistemic parity. The conundrums between scientist and citizen seem to arise because they are not perceived to be epistemic peers. According to Lo Guercio (2018), two agents become epistemic peers when they possess the same cognitive virtues and evidence in respect to a proposition P. Jasanoff values the epistemic participation of citizen insofar she argues that they possess complementary evidence, evidence that cannot be seen in the scientist perspective. Jasanoff states: "scientific and technological unknowns may seem unknown only because the most authoritative knowers lack perspectives that might have been available from less elevated points of view" (p. 99). In this defense of citizen epistemic participation, she reproduces de idea that evidentialist participation is the only participation imaginable while also reproducing the image of epistemic inferiority (*a less elevated point of view*).

But at this point, Jasanoff's epistemic description of citizen's knowledge and public debate might be reductionist. The epistemic diversity of citizens epistemic activity, epistemic beliefs and public disagreement is far more vast than possible contributions to shared evidence. For instance, through the lens of modal logic (Ballarin, 2010), disagreements about technologies maybe alethic ("it is necessary/possible/impossible that"), epistemic ("it is known that"), deontic ("it ought to be the case that"), or temporal ("it has been the case that") in nature. Or, through the lens of pragmatics, we could state that citizens and experts may be embroiled in debate because they are conducting different acts of speech (Searle, 1975). For instance, one citizen may want to participate in an expressive manner (e.g. to comment on the ugliness of the factory) or with a directive intention (e.g. to demand authorities to take safety seriously) or even to make commitments, to accept, to protest or to renounce. All of these possibilities are ignored when citizens are just treated as objects of information and not purposefully driven agents. In the same sense that she comments on the era of the internet, "we become information" (p.147) to the social world.

Although Jasanoff does not account for the full extent of possibilities in citizen participation, the author does illuminate the particular and often ignored dimension of axiology. To the author, citizen must be heard because technology decisions

are not only technical but also involve the values and forms of life that we seek as societies. As Jasanoff states: "To improve the governance of technology, we need to take better account of the full range of values that humans care about when contemplating the future-not just the value of change but also that of continuity, not just physical safety but also the quality of life, and not just economic benefits but also social justice" (p.58).

Today more than ever, "technology the purposes and conditions of human existence" (p.246). For instance, in genetics science's debates, fundamental questions about the nature and values of life have resurfaced, which scientists have often tried to resolved themselves. These questions such as "when does life begin or end in the stem cell era?" (p.145) or "who is a natural mother" (p.145) are not only technical in essence; "These questions could not be answered by science alone. They belonged as much, if not more, to politics, ethics, and law" (p.145). Jasanoff argues that the law is perhaps the main mechanism to avoid social efforts to divorce innovation and ethics.

The law is powerful, "the law can even turn back the pages if science and technology seem to be flipping too quickly or heedlessly ahead of widely shared values, as is especially likely to happen in a world where resource distribution remains extraordinarily unequal" (p.208). To Jasanoff, science and technology commentators tend to forget that different countries frame innovation in different ways. For instance, Germans have systematically framed technology discussions using more deontological arguments and, in opposition, Americans tend to frame technology discussions using utilitarian arguments (pp. 252-253). Nevertheless, in all cases "the assumption that invention is always well aligned with the public good, at national or global scales, can be revisited and critically questioned, with associated changes in policy and law" (p.208). The fundamental argument in Jasanoff's book is normative in nature. Jasanoff beliefs that through the mechanism of law and policymaking, science and technology can be used to forward society's agenda without endangering it. This is why she closes her book with the following conclusion:

> The parallels between technology and law then become apparent, showing that the former no less than the latter is a potent instrument for fashioning our collective futures. That recognition should spur a deeper ethical and political engagement in the governance of technology. Only if we acknowledge technology's power to shape our hearts and minds, and our collective beliefs and behaviors, will the discourses of governance shift from fatalistic determinism to the emancipation of self-determination. Only then will an ethic of equal rights of anticipation be accepted as foundational to human civilization on our fragile and burdened planet (p. 267).

In the second half of her book, Jasanoff explores different ways in which normative strategies have sought to bring democracy into innovation, the so-called mechanisms of public engagement. These mechanisms have gained attention because of the fact that "cautionary tales have entered the discourse of democracy, underscoring a need for prior consent when governments embark on technological projects that could cause great harm" (p. 238). The author describes examples of public engagement with innovation, such as *technology assessment policies, ethics committees* and *public consultation exercises*. All of them have the "merit of keeping people involved in decisions pertaining to their everyday lives" (p. 266). However, their potential for democratization is limited due to fundamental epistemological and political issues.

For instance, ethics committees work under the presumption "that scientists immersed in the research process are best placed to understand and resolve any dilemmas associated with their work, possibly with the aid of an in-house ethical adviser or two" (p. 234). This premise is closely linked with technocratic thinking that reduces de possibilities of citizen's epistemic participation in the imagination of future ways of living: "These committees, too, operate under constraints that limit the scope of their ethical imaginations […] Though such considerations ensure extreme care in the application of guidelines, oversight frequently reduces to a fairly mechanical process of ensuring that all the right boxes have been ticked". (pp. 232-233). Moreover, the idea of ethics committees concentrates decision-making in a small group of professionals: "the professionalization of 'ethics' in committees charged with supervising research conduct thus raises troubling questions about who controls technology". (p. 237). Overall, politically and epistemologically, ethics committees have strong commitments with technocracy, bureaucracy and concentration of epistemic power.

Technology assessments and public consultations run into similar problems. Technology assessment policies have failed to survive government changes and rulers seeking to reduce the size of the estate. More significantly, technology assessments are often conceived "as serving instrumental rather than broadly democratic ends, including the government's need to reassure concerned publics that moral risks are under control or to develop policy on specifically troublesome issues such as genetic privacy" (p. 234). Public consultations, on the other hand, lost political power when public voting did not align with policy makers analysis.

Jasanoff omits the more serious philosophical problems with public consultation exercises. Without dialogue, joint analysis and deliberation, public opinion is a superficial process. As Giannini (1965) would argue, public opinion requires no commitment and thus does not constitute authentic experience. Giannini (1965) argues

that "the intention to mobilize or consult public opinion, as laudable or socially necessary as it may be, reveals certain irresponsibility: public opinion is not trustworthy because you never know if it is indicative of some commitment with reality or a pure and arbitrary comment for the sake of it" (p.107, own translation). In sum, Jasanoff's critique of public consultation is perhaps too soft; not only is public consultation dependent on the will of policy-makers, but most importantly, it is not clear whether consultation without true elaboration and dialogue is even worth it.

Overall, Jasanoff argues that as a society we need to explore new and more systematic ways to democratically govern technological knowledge. According to Jasanoff, we need to go further than current institutional strategies (such as ethics committees or public consultation) as these mechanisms "are not a substitute for the kind of constitutional convention that our grand bargain with technology in effect demands"(p. 266). More structural and normative efforts ought to reflect critically on "who should assess the risks and benefits of innovation, especially when the results cut across national boundaries: according to whose criteria, in consultation with which affected groups, subject to what procedural safeguards, and with what remedies if decisions prove misguided or injurious?" (p. 249). This will require a new epistemological social pact that goes beyond technocracy and that allows for axiological debate about innovation. Experts constitute a fundamental pillar of societal advancement, but is currently marked by a flawed and "tacit slippage between is and ought that dulls the edge of ethical concern. Any departure from the common sense of scientists is deemed unreasonable, fictional, or fantastic, and what cannot (yet) be done is not considered worth worrying about" (p. 251).

The key socio-cognitive activity behind all forms of democratic governance of innovation is anticipation. Anticipation is also the main conclusion in *The Ethics of Invention*. Anticipation is how societies organize and create better futures. Anticipation is vital and conducted by all societies, and "despite its limitations as an instrument of governance, anticipation is a value no society would care to live without" (p. 254). But anticipation's designs and epistemological operations have not been discussed enough. Certain assumptions about anticipation are no longer undisputed, for instance "in an era when we are more than ever conscious of the unsustainability of high-consuming lifestyles, it is unclear that the futures envisioned by the rich should take precedence over the imaginations of the poor" (p. 257). New practices of anticipation and new anticipatory demands "offers an opportunity for citizens to work together with scientists, engineers, and public officials to envision more inclusive technological futures" (p.238). But the rules and details of this collaboration are still an open question. Jasanoff does not offer a clear way out of the

problem, rather, a thick description of its nature. Ethics of invention is not, as I have argued, a book against innovation. On the contrary, it is almost a love letter, or perhaps a worried letter, about how we have mishandled the very "spirit of innovation" (Godin, 2018) and wasted its emancipatory potential. As Jasanoff writes:

> Yet, as we have seen throughout the preceding chapters, institutional deficiencies, unequal resources, and complacent storytelling continues to hamper profound reflection on the intersections and mutual influences of technology and human values. Important perspectives that might favor caution or precaution tend to be shunted aside in what feels at times like a heedless rush toward the new. As a result, the potential that technology holds for emancipation, creativity, and empowerment remains unfulfilled or at best woefully ill distributed. Issues that cry out for careful forethought and sustained global attention, such as the genomic and information revolutions, are depoliticized or rendered invisible by opportunistic design choices whose partially path-dependent tracks frustrate future creativity and liberation (p. 265).

## Final thoughts

Innovation is possibly one of the most powerful drivers of the future in modern societies. In today's innovation discourse it is becoming more popular to talk about participatory processes to open up innovation and technological knowledge. This is usually supported by the idea that innovation concerns everybody equally. But just like in Orwell's animal farm, it seems that it concerns some people more equally than others. Jasanoff's three fallacies on *technological determinism, technocracy* and *unintended consequences* are crucial to examine proposals of technological governance in order to achieve democratic futures. In presenting her case, Jasanoff touches on key concepts of epistemological, pragmatic and socio-cognitive nature. For instance, we can clearly see parallels between Jasanoff description of the lay citizen and the expert through the lens of *epistemic injustice* as presented by Miranda Fricker (2007). Just as Fricker (2007) describes, the citizen is often given less epistemic credibility by institutions in relation to experts, not based on the merits of the arguments per se, but due to the social identities of the speakers. To paraphrase Jasanoff, citizens are usually *epistemically objectivized* (Fricker, 2007), that is, treated as object of knowledge and not as true epistemic agents capable of interpreting their own world.

Jasanoff's defense for a normative turn in innovation is, of course, not free from critique. As I have argued, the author fails to present a more complex and com-

plete picture of the possibilities of citizen's engagement with innovation dialogue. Citizens may participate in different modalities or with different pragmatic ends. Furthermore, Jasanoff tends to deemphasize the role of dialogue and process over consultation and result. Dialogue is crucial even when agents disagree. As Lugg (1986) states: "in debate no less than in deliberation, ideas are disentangled, coordinated and systematized, reasons are marshalled, suspect assumptions are isolated, alternative proposals are reviewed, and conflicting demands are negotiated" (p.49).

However, not all dialogue designs produce the same results, as every social mediation promotes particular types of social conduct. *The Ethics of Invention* puts the finger in the grievances, but more attention is needed to reflect on the tools to start healing. Jasanoff idea of *technologies of humility* is a good starting point, but we need to begin systematically asking: what are the technologies of democracy? By that I mean, through what social techniques can we produce more epistemically inclusive dialogues, or more committed expressions of opinions, or more just attributions of credibility? Sheila Jasanoff's *The Ethics of Invention* will surely incite new debates and possibilities for scholars and citizens excited to produce a more democratic future for innovation.

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