

Call for Paper: Philosophy of innovation, responsible innovation, and innovation ethics

Synergies in innovation: Mapping and structuring the emerging field of innovation ethics

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1. Introduction

The field of "innovation ethics" deals with normative questions raised by social, economic, political and technological innovation. In the context of this broad formulation, this paper pursues three objectives. Firstly, the paper aims at clarifying the definition of this emerging field, from the perspective of applied ethics. The proposed definition of the articulation between "innovation" and "ethics" will make the diversity of the field appear clearly. We will list a number of sub-fields of applied ethics directly dealing with (technological) innovation. Secondly, the paper defends the hypothesis that this diversity of sub-fields is an opportunity for the emerging field of "innovation ethics". The objective should be to take benefit of the highly-specialized discussions in specific sub-fields and to identify issues, tools, methods which have the potential to become transversal contributions. With respect to the "responsible innovation" literature and its focus on innovations for the market, the paper exemplifies the potentiality of a deeper cooperation between all stakeholders of the fields "innovation ethics". We exemplify this approach by taking two examples: the permanent re-drawing of boundaries and the responsibility of the innovator and its normative expedients. Overall, the paper is a contribution to an on-going crystallization process on the content and boundaries of the "ethics of innovation".

2. Towards a definition of "innovation ethics"

a. Definition

Starting with the "Frascati Manual", technological innovation activities are "all of the scientific, technological, organisational, financial and commercial steps, including investments in new knowledge, which actually, or are intended to, lead to the implementation of technologically new or improved products and processes". Firstly, innovation is about bringing something that has not existed in this specific form in the world. Secondly, innovation is not only about an idea, but includes its implementation in the real world of businesses, politics or, more broadly, social life. Thirdly, there are distinct ways to realize innovation, i.e. to produce an output which is described as an innovation. Fourthly, this working definition remains as ethically neutral as possible. This does not deny the fact that innovation has consequences which might be positive or negative, assuming we could find a common ethical framework to assess them. This (relative) neutrality might rather be contrasted with the concept of "progress", which is inherently filled with ethical content. The concept of "progress" indicates an evolution towards a goal which is presumed to be normatively desirable. Following Blok/Lemmens (2015), it is safe to say that

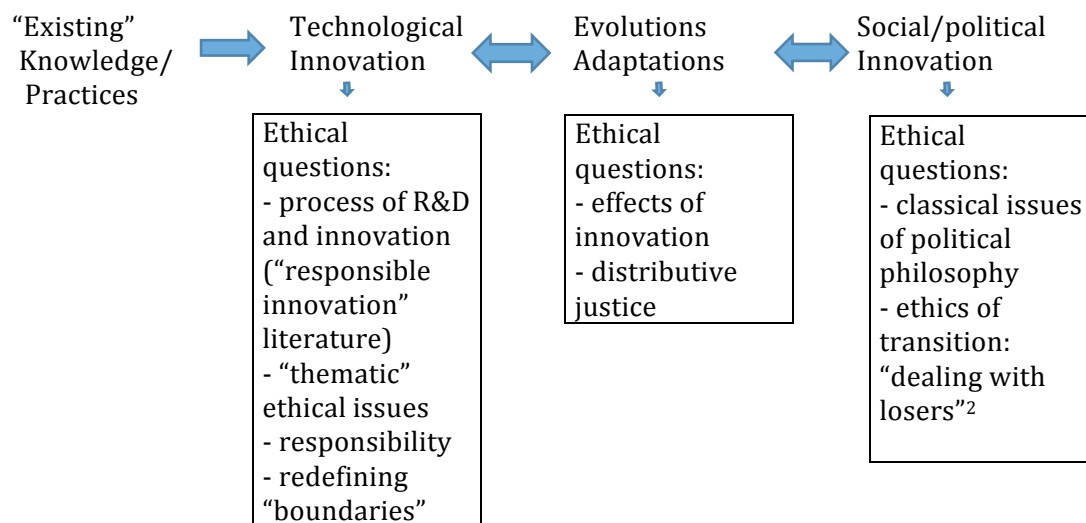
this working definition is part of the paradigm of innovation in the market. Nevertheless, it gives us a good basis to apprehend further types of innovation.

Social innovation is used as a concept to identify and qualify the emergence of new social behaviours and/or norms. Examples might range from small-scale social adaptation (new rules of politeness) to the emergence of new social systems (such as public social insurance scheme) (Ménissier 2011). Social innovation is not about bringing new products onto the market; it operates through the change of norms, rules and cognitive frameworks (Ziegler 2015). *Mutatis mutandis*, the other elements of definitions are fulfilled: focus on novelty, real evolutions in the way individuals behave in society (and not only an idea), distinct means of realization, relative ethical neutrality¹.

By analogy, political innovation might be defined as a process of change or transformation of political institutions, that is, the rules, practices, procedures and conventions that govern the interaction between individuals and public authority and among individuals considered as citizens. Political structures are not defined once and for all: they are constantly evolving. Political innovation might be defined as a specific sub-type of social innovation.

b. Relations between types of innovation

Assuming this working definition, it is essential to note that these different forms of innovation are in interaction. But more importantly, they are also to a certain extent interdependent. In order to make the ethical issues appear clearly, we propose to conceptualize a theoretical sequence of innovation. This sequence is used as theoretical device to identify and focus on the diverse ethical issues raised by different types of innovation. The sequence clearly oversimplifies the reality of innovation processes by highlighting a *single* sequence and by hiding the complexity of a large number of innovation sequences deeply entangled.



On the vertical dimension of our sequence, we formulate the hypothesis that every step raises its own ethical questions. To distinguish among them and to systematically assess them is the core mission of what we call “innovation ethics”. The present contribution focuses on the ethical questions raised in the context of the first step (technological innovation). This allows shifting the usual focus in two relevant ways. Firstly, we do not focus on the potentially detrimental consequences of innovation and the questions of distributive justice linked with them³.

¹ This last point is vividly debated in the literature. More than technological innovation, social innovation is often conceptualized as an answer to a problem defined in ethical-political terms. Hence, the concept is seen as something ethically positive. See Phills et al. (2008)

² On this specific point, Trebilcock (2014).

³ Buchanan, Cole and Keohane (2011).

Secondly, we shift the classical focus of “responsible innovation” (i.e. the *process* of R&D and innovation) towards the thematic questions raised by the specific types of innovations.

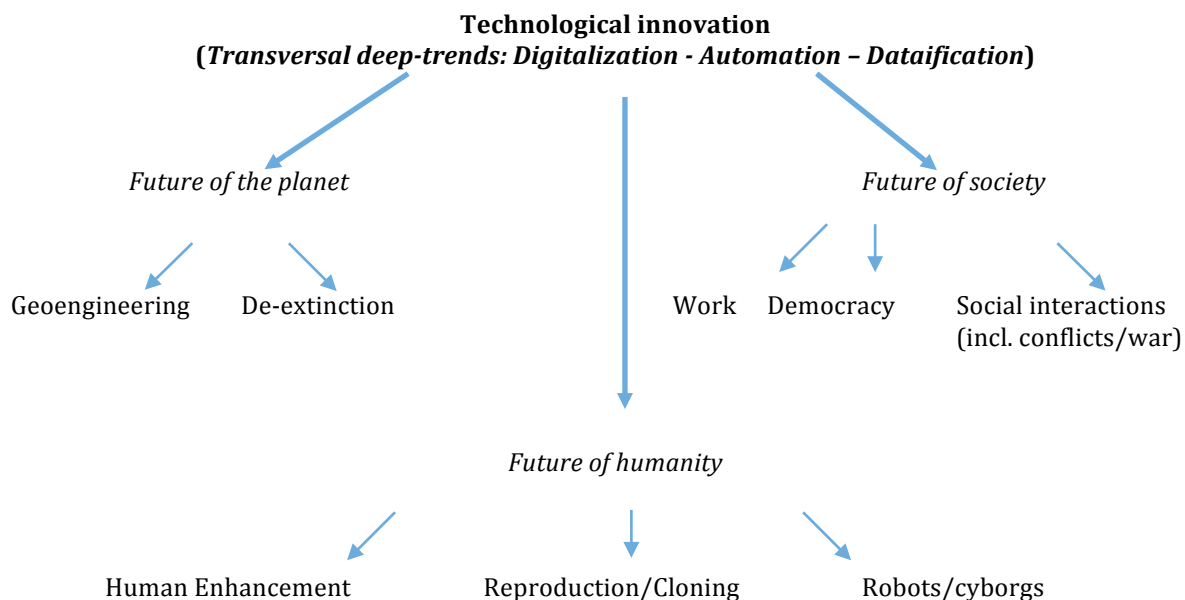
3. The diversity of the general fields of ethics of innovation

a. Mapping the sub-fields

As the figure below illustrates, there is a wide range of sub-fields in the ethics of innovation. The figure is based on our analysis of the relevant literature and the empirical observation on specialized journals and conferences. It is important to highlight that classical fields of applied ethics, such as medical ethics, bioethics or military ethics, are being complemented by more specialized fields. For instance, some of these fields take up parts of what has usually been done as part of medical ethics and focus on specific technological elements within it.

Computer and information ethics (incl. AI) => ethical debates on computational sciences and algorithms
 Big data ethics => ethical debates on the collect, treatment and use of data
 The ethics of blockchain => ethical debates on technology using blockchain (such as cryptocurrency)
 De-extinction ethics => ethical debates on re-creating species (“Jurassic Parc”)
 The ethics of geoengineering => ethical debates on transforming deep climatic processes
 The ethics of drone warfare => ethical debates on specific weapons and new way to make war
 The ethics of cloning => ethical debates on reproducing human beings artificially
 The ethics of human enhancement => ethical debates on improving, correcting, repairing humans
 The ethics of doping => ethical debates in the field of sport
 Nanoethics => ethical debates on nano-scale technology
 The ethics of automatized systems => ethical debates on automatized vehicles, transportation, ...
 Roboethics => ethical debates on robots, cyborgs and the interactions men-machine

The same sub-fields could be mapped in the following way, distinguishing three broad thematic groups (future of planet, future of society, future of humanity).



b. Identifying synergies

The hypothesis of this contribution is that we can gather relevant information on how ethical issues are identified, shaped and addressed in specific contexts before highlighting their potential contribution to the general field of “innovation ethics”. We will develop two cases which are claimed to exemplify the potential of this approach: the issue of “drawing boundaries”

and the issue of “responsibility”. Both issues reflect the characterization of innovation previously proposed by focusing on the novelty of innovation and the radical uncertainty in which innovation takes place.

Permanently re-drawing boundaries

The novelty of an innovation impacts on the way the majority of society’s members at a certain time X perceives what is “given”, “normal”, “natural”, “human” and the like. Technological innovations change these diverse boundaries and impact on how we individually and collectively draw them. We therefore label the set of issues around this question the “boundaries issue”. Of course, it cannot be said that every little technological innovation has a deep impact on these boundaries. However, individually in exceptional cases or cumulatively in the normal cases, these innovations impact on these boundaries.

This question is especially important in the sub-fields of geoengineering, de-extinction, cloning and transhumanism. In all these fields, innovation is seen as putting into question a general distinction between “nature” and “artefact” (defined as the creation of human being). For many authors, artefacts embody human intentionality, while natural entities lack a conception of design. An artefact has a different, and problematic, metaphysical status (Katz 2015).

This specific boundary-issue is paradigmatic because it displays general trends in the ethics of innovation. Firstly, there is a strong tendency to moralize *a priori* neutral facts (if facts can be neutral in the first place). For instance in the nature/artefact discussion, it is often assumed that nature has some deep moral value, especially in sub-fields connected to climate. Interestingly, in the fields related to transhumanism and robots ethics, the “human” who remains “natural” is presumed to have deep moral value. Secondly, these sub-fields and their most important boundaries should all rather be considered along a *continuum* of degrees of naturalness and artificiality (for instance between a garden carefully planted out with native grasses and a coal-fired power plant (Preston 2012: 191-193; Cohen 2014: 167-168)). The artificial and the natural are two opposite *poles of a continuum*, rather than two exclusive metaphysical statuses.

The nature/artefact discussion is one particularly telling example of a boundary being moved and challenged by technological innovations. The ethical questions raised by these boundaries do not depend on large consequences of a specific innovation. The ethical questions remain, even in the absence of relevant impact on individuals and society (as shown by discussion around a single case of cloning e.g.).

Responsibility of the innovator

The second example pertains to the ethical issues directly linked to the “innovator” (be it an individual, a company or a research institution). We will show how the concept of “responsibility” used has been refined across sub-fields and which normative expedients have been developed. The different sub-fields of innovation ethics today work with several, complementary concepts of responsibility:

An *inclusive* responsibility: this responsibility is able to take into account non-human interest in determining if a harm has been committed (animal, natural resources, species, ecosystem)

A *dispersed* responsibility: this responsibility is able to take into account complex causal chains. This pertains both to the number of actors involved in a specific causal chain (inventor, producer, raw material producer, designer, seller, consumer), but also to the time dimension (an innovation might impact on individuals in several years/generations). (Frogneux 2015).

An *aggregative* responsibility: this responsibility aims at integrating small-scale innovations that, taken together, contribute to harming specific interests of individuals or communities (e.g. a startup inventing new way to track people’s data online, participating knowingly, deliberately or not, into the general surveillance of the citizens) (Lichtenberg 2010)

Though the concept of responsibility has been refined and improved, it remains difficult to be applied in the context of innovation. It might be a good tool to assess, *post facto*, responsibilities, but it is difficult to use *ex ante* as an action-guiding principle. In numerous sub-fields, this practical difficulty has lead to the use of ethical expedients in form of the “precautionary

principle” and the “hubris” objection. Interestingly, the use of these expedients is especially strong in sub-fields in which the re-drawing of boundaries is also particularly sensitive (geoengineering and human enhancement).

Using the precautionary principle requires specifying at least the following elements: definition of harm, definition of the good/interests in need of a specific protection, qualification of the degree of uncertainty and its influence on what does “precaution” encompass. (Gardiner 2006: 36-37) For the present contribution, it is interesting to see that the precautionary principle is widely used in specific sub-fields as a means to exercise a kind of pre-emptive control on innovation and, more specifically, on the innovator.

In a similar way, specific sub-fields are characterized by the presence of the “hubris” objection. This objection supposes that some forms of innovation should not be realized because the innovators would display hubris, i.e. that they act “with a reprehensible overestimation of their abilities” (Meyer and Uhle: 5). In the case of technological innovation, engineers show hubris if they overestimate their technical and epistemic abilities.

The example of the hubris objection is useful to firstly show the relevance of the underlying ethical position assumed. This objection relies on a virtue ethics that focuses on the character traits of innovators. The criticism raised against the hubris objection should also encompass this very fundamental level of discussion. Secondly, even if found convincing, the objection is deeply conservative in putting a strong pressure on innovators not to overcome the boundaries that were given to them (or which they should have imposed upon themselves, according to virtue ethics). In this respect, the hubris objection should be opposed to the ambition shown by human beings to permanently improve their well-being and prosperity, thereby permanently putting into questions these boundaries and searching for new limits.

Conclusion

The objective of this paper is threefold: propose a working definition for the concept of “innovation ethics” in order to show the diversity of sub-fields, exploit the thematic discussions in these sub-fields in form of transversal contributions, and inform the process of crystallization of the content and boundaries of the general field.

Depending on their focus, traditions, challenges, these sub-fields have formulated distinct responses to these challenges. The potentiality emerging from these transversal contributions can be distinguished on three levels. Firstly, we should identify and map the relevance of the three mainstream ethical positions (deontology, consequentialism, virtue ethics). Some sub-fields, and more particularly some key arguments/tools in these fields, are marked by the pre-eminence of a specific position on this fundamental issue (e.g. hubris objection). Secondly, the same argument/tool might be formulated and used in different ways (e.g. responsibility). Thirdly, similar issues might be relevant to every sub-fields (re-drawing of boundaries), thereby crystallizing common features of the general field of “innovation ethics”.

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