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Innovation Ethics

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INTRODUCTION

Innovation, no matter if classified as technological, organizational, or social, constitutes a novelty which brings about change that affects a variety of human and non-human stakeholders. Any innovation can cause criticism and/or protests because it more or less brings a dimension of the rejection of existing values, including ethical ones, and thus harms the position of those who benefit from vested interests related to them. Although we will acknowledge the broad nature of innovation, this chapter predominantly focuses on technological innovation, and how it affects

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both relationships between people and relationships between people and non-human actors, such as organizations, machine systems, and the environment. The reason for the focus is that, as we will see, the ethical aspects of innovation are often discussed within the domain of technological innovation (Bourban and Rochel 2021). By focusing on the ethics of technological innovation, we will highlight some concerns related to such innovation which serves as an introduction for a more forward-looking and broader agenda of innovation ethics, based on a particular notion of ethics.

Academics, policymakers, and the general public have different connotations to the concept of innovation. On the one hand, we might have innovation optimists, who have a pro-innovation bias. It has been argued that much innovation literature is presupposing that innovation is good and therefore that resistance to innovation is seen as problematic (cf. Fornstedt 2021). The connotations of innovation have changed significantly during history (see Godin 2020), where the view of innovation has shifted from a more negative, anti-traditional, and anti-social understanding to a much more positive view where innovation is seen as creating new and socially significant values that revolutionize individual lives, communities, and the world, contributing to resolving difficult problems and advancing the progress of humankind. Within the innovation literature, there are also explicitly critical voices who maintain that the dark sides of innovation should not go unnoticed (e.g., Coad et al. 2021; Godin 2020). The pro-innovation bias is visible in related fields such as creativity, mentioned and critiqued by Wang and Murnighan (2015) who argue that creativity needs to be discussed from an ethical point of view. Regarding entrepreneurship, the current predominant understanding is also positive, where entrepreneurship is argued to lead to economic, social, and environmental prosperity (Fors and Lennerfors 2019). At the same time, entrepreneurship is often described as rule-breaking, or breaking with the current way of doing things, which is discussed from an ethical viewpoint by Brenkert (2009). To sum up, this chapter moves within a literature that takes a quite positive view of the concept of innovation. Given that our chapter concerns innovation ethics (particularly within different technological domains), it implies that we do not see the ethical status of innovations as by default positive (nor negative).

Technological innovation will be discussed from the viewpoint of ethics, which broadly and inconclusively describes how one ought to live and act, and what is good and evil. We do not support a view of ethics as the superficial attempts of tech companies to self-regulate and appear ethical (ethics washing), nor as a narrowing of ethics to be such kind of shallow actions, and throwing out the baby with the bathwater (ethics bashing) (Bietti 2020). This chapter rather sees ethics as critical thinking about the central values that various forms of innovation promote and downplay (Lennerfors 2019) and focuses on the variety of value conflicts that emerge through innovation, and how to act when faced with such value conflicts. Ethics, in our account, thus includes but goes beyond concerns relating to particular values such as gender equality and environmental sustainability. Ethics is not seen as only appearing at different pivotal, grandiose events, for example when someone decides to develop a technology, but is omnipresent and an ongoing process. Furthermore, the focus on critical thinking does not mean that we neglect the embodied, emotional, relational aspects of ethics, but although we acknowledge this as crucial within ethics, also such ethical impulses should not be seen as unproblematic and directly acted upon but should be subject to critical thinking. The focus on critical thinking furthermore does not imply that we assume that the ethical subject can distance herself completely from the situation to think freely, but rather that the subject can with increasing practice and craftsperson-ship draw on concepts and experiences to reflect upon and act in the situation into which she is immersed. At the same time, we do not assume that the subject will always manage to critically reflect and reach some kind of ethical excellence, but we assume a heroic, post-heroic notion of the subject, in other words, one who tries to act ethically in the face of the infinite demands of ethics, but often fails.

If one does not assume a thoroughly positive notion of innovation, nor a thoroughly negative one, one would expect there to be a lively discussion about innovation ethics in the academic literature. However, as Bourban and Rochel (2021) argue, innovation ethics is not an established field, although there are discussions using adjacent concepts. For example, Responsible Research and Innovation (RRI) is a practice and research field which has emerged as a response to potential negative aspects of science and innovation. However, Bourban and Rochel (2021) argue that

Responsible Research and Innovation often focus on the ethical aspects of technological innovation in a for-profit context. Furthermore, Bourban and Rochel (2021) point out that there is a plurality of discussions about innovation ethics in different fields and subfields, for example, in ethics or philosophy of technology, design, as well as in different engineering fields. Bourban and Rochel's agenda is to create innovation ethics as a field, connecting a variety of ethical discussions about new technology, with a clearer emphasis on normative ethics. This chapter is aligned with their general effort and intends to construct an own view of what an agenda of innovation ethics could be in the light of the conception of ethics that has been described in this introductory section.

We will go about with this aim in the following way: First, we present the need for an ethics of technological innovation that takes its base in how technology is imbricated with social practices and therefore influences perceptions or actions. We then describe different ways in which this can be implemented when developing new technology, basically focusing on two major strands of literature, which somewhat bluntly could be put as thinking and dialoguing. In this section, we also pay some particular attention to Responsible Research and Innovation which has gained significant spread and popularity. In the following section, we discuss how the contextual factor of competition constitutes a major barrier to innovation ethics as it is practiced from the viewpoint of the methods described in the former section. In a final section, we broaden the discussion and create an agenda for innovation ethics debates.

WHY AN ETHICS OF TECHNOLOGICAL INNOVATION?

We are now living not in a natural environment but in a technology-mediated environment (Imamichi 2009), where various technologies embedded in economic and social systems and daily living settings, often imperceptibly, shape our actions and judgments. In other words, as expressed by Verbeek (2011), technologies shape what we do and how we experience the world and participate in our ways of doing ethics. Referring

to Ihde's (1990) concept of technological intentionality, he argues that technology transforms what we perceive through *amplification* and *reduction*. It amplifies some aspects of reality and reduces others. Through its embedded norms, scripts, or affordances, technology shapes action. Some actions are *invited*, while others are *inhibited* by the very physical characteristics of the technology. Lessig (1999) indicated that technological architecture is one of the four modalities of regulating human behavior in cyberspace, though the same has already been true in real space. Recent discussions on socio-materiality (Leonardi 2009; Orlikowski 2007) take the perspective that any technology is societal in the sense that it is developed, interpreted, and deployed through social processes and simultaneously any social activity is enabled by some sort of technological stuff. Technology does not exist in the world of objective reality, but emerges in a certain societal context. Technology is not independent from human beings and society. They are intertwined or imbricated (Verbeek 2011).

The view of technology and society as imbricated provides us with a good lens to understand the nature of ethical, social, and cultural issues of technology. Although it might seem obvious that our society is mediated by technology, in debates, technology is distanced from society and claimed to solve a variety of social and environmental ills. Hornborg (2001) has called this "technological fetishism," meaning a too intense focus on only the productivity or usefulness of a particular technological artifact or technological system, while the different contextual factors—economic, political, societal, cultural—are also contributing to the viability or problems of the technology. There is no one who is totally independent from technology deployed in one's environment. Simultaneously, we—as individuals or organizations—can actively change or even transform our environment through the development, deployment, and/or use of technologies. Consequently, innovation in technology is one of the most influential factors in our society and we need to consider the ethical and social implications of that innovation. The imbrication of humans, non-human beings, and technologies, within social practices, means that one needs to discuss the ethics of technology.

This way to frame the ethics of technology is useful to understand innovation ethics. Through innovation, whether it concerns technological, organizational, or social, we introduce novelty that causes changes in

established ways of doing things. Innovators in different phases of the innovation process are therefore, through innovation, making choices and distinctions in the world and should reflect upon this impact. It is here important to state that many technologies are open-ended. With the availability of multipurpose science technologies like electronic and atomic technologies in mind, Imamichi (2009) pointed out the importance and necessity of speculating about ethics related to technologies, centered on responsibility as a virtue. Though organizations including companies and governments have powerful means—science technologies—in their control, the locus of responsibility regarding the ways of using technologies remains unclear, letting organizations' nosism untamed. For Imamichi, ethics must be broadened so that it includes *ethica ad rem* (ethics toward things) (Imamichi 2009). The availability of such science technologies has significantly been expanded, thanks to the rapid and tremendous progress of various technological innovations. We can make numerous examples of them including quantum technology, artificial intelligence (AI), robotics, genome-editing technology, synthetic biology, precision agriculture, chemical recycling technology, and nanotechnology. If *the why* of innovation ethics has now been established, how is one expected to go about promoting ethics in innovation processes?

APPROACHES TO TECHNOLOGICAL INNOVATION ETHICS

The different approaches for promoting ethics of technological innovation can be seen as ranging from autonomous to deliberative, from approaches that concern thinking for yourself, to approaches focused on discussing with others. In this section we also discuss Responsible Research and Innovation which is an EU initiative to promote (research and) innovation ethics and has gained significant spread and popularity. We sum up the section, by returning to our own view of ethics.

Autonomous approaches

Within practical domains of ethics, such as engineering ethics, a large number of frameworks for ethical decision-making have been developed, for example, drawing on design methodologies, heuristics, and structured problem solving (Lennerfors et al. 2020; Maner 2002). These are often step-by-step frameworks that go from problem formulation, information gathering, formulation of alternatives, assessment of alternatives, and then a judgment, decision, action, and reflection. Although such frameworks might imply that there is a bias toward grand decisions made rarely, our approach to ethics makes these kinds of frameworks valuable in day-to-day, also minor, decisions which might be required due to an actor facing conflicting interests, affects, and values related to innovation.

van de Poel and Royakkers (2011) have developed a model for ethical technology development which consists of five steps. First, the formulation of goals, design criteria, and requirements and their operationalization. Second, the choice of alternatives to be investigated during a design process and the selection among those alternatives at a later stage in the process. In a technology development process, there are inevitably several alternatives to pursue and all alternatives may not be considered during a design process. To exclude alternatives early on in the design process might have ethical consequences. Third, the assessment of trade-offs between design criteria and decisions regarding the acceptability of particular trade-offs. When we consider various design alternatives, there will inevitably be trade-offs between various values. Some of those values concern ethics; perhaps a conflict between safety and environmental issues. These trade-offs need to be reflected upon and the acceptability of them needs to be explained and argued. Fourth, the assessment of risks and secondary effects and decisions regarding the acceptability of these. This step concerns the indirect effects of the technology. Fifth, the assessment of scripts and political and social visions that are (implicitly) inherent in a design and decisions regarding the desirability of these scripts. In this step, one needs to take a macro level view on the technology under development. Finally, one needs to assess and weigh different impacts on values as well as the likelihood of this impact, for example, whether one

should maximize expected positive value or avoid the negative through a principle of precaution.

The five-step model by van de Poel and Royakkers is a way to support designers to think openly about design alternatives, values at stake, and the short- and long-term impact of the technology. It takes the designer's agency and power as a starting point and emphasizes the thinking process of the designer. Other approaches also exist such as the ethical technology assessment (eTA) proposed by Palm and Hansson (2006). eTA is a proposed method that intends to identify adverse effects of technological innovation at an early stage, by means of a continuous dialogue with technology developers, scaffolded by a set of value concerns: Dissemination and use of information, Control, influence, and power, Impact on social contact patterns, Privacy, Sustainability, Human reproduction, Gender, minorities, and justice, International relations, and Impact on human values (Palm and Hansson 2006). In this checklist approach, the values are in focus, while the framework by van de Poel and Royakkers is more centered on the process of making assessments.

Deliberative approaches

Although there is nothing that hinders the involvement of stakeholders into the mentioned models of technology assessment, there are other models, which focus more on deliberation with stakeholders. For example, Constructive Technology Assessment (CTA) is a method which is based on the view that one cannot find what is an ethically and socially acceptable technology without taking stakeholders' perspectives into account. Most of the tools that are summarized by CTA are therefore aiming at collaboration with a large set of stakeholders, going beyond immediate users of the technology. Such collaborative means are aimed at creating anticipation, reflexivity, and learning.

Another model that focuses on deliberation is *guidance ethics* (Verbeek and Tijink 2020), which aims to provide an ongoing discussion about technology development and technology use. It focuses on ethics from within, rather than on what the authors see as an external tone of assessment. Furthermore, in line with CTA, it is a bottom-up ethics, which

focuses on the views of stakeholders, rather than only on expert assessment. Furthermore, it claims to be about the positive—concerned with what we want—rather than on the reduction of the negative—what we do not want.

Although dialogical approaches are seemingly democratic and inclusive, not all dialogues are ethically unproblematic. Blok (2014) argues that by relying theoretically on a notion of dialogue as harmony, we cannot fully grasp the realities of the conversational situation. Rather, by focusing on difference, we can see the role of the dialogue as deconstructing the self in our dialogical responsiveness to others. Rather than focusing on the dialogical situation as one in which we should convince the other, it is staged as the forum where we are responsive to the demands of the other. From the point of view of philosophy of difference, the purpose of the dialogue is not to express oneself, but to be critical toward oneself; that the parties are not given, but emerge within the dialogue; and that the starting point of the dialogue is "in the continuous enactment or performance of the dialogue" (Blok 2014, p. 184). One should not underestimate the concerns even if dialogue and inclusiveness are promoted superficially.

Responsible research and innovation

Responsible Research and Innovation is a broad initiative, which intends research and innovation to do good to the society into which it is implemented, and broadly promotes all of the Sustainable Development Goals (SDGs). The initiative shows that ethical issues related to innovation are gaining the interest on high political levels, but the concept of Responsible Research and Innovation has also been critiqued for its vagueness.

The public emergence of Responsible Research and Innovation in EU policy discourse was in May 2011 (Owen et al. 2012). Responsible Research and Innovation has been investigated with a focus on innovation in science and technology by the European Commission's Science with and for Society projects, in which inclusion and openness are emphasized, within the framework of the EU Horizon 2020, following the Science and Society-FP6 (2002–2006) and Science in Society-FP7

(2007–2013) projects (*Directorate-General for Research and Innovation* 2020). The Science with and for Society projects aim at developing a European model of Responsible Research and Innovation based on the principle of inclusiveness, involving all actors (researchers, civil society organizations, industry, and policymakers) at an early stage, allowing innovation to be developed in a co-building mode that ensures co-responsibility (Owen et al. 2012). The six pillars, or keys, of Responsible Research and Innovation, as well as of Science in Society, are ethics, public engagement, gender equality, science education, open science, and governance (Archibugi et al. 2014) reflecting its open and inclusive characteristics. In addition, Stilgoe et al. (2013) showed that the four main dimensions of Responsible Research and Innovation are anticipation, reflexivity, inclusion, and responsiveness (Jakobsen et al. 2019).

Reflecting the change from Science in Society to Science with and for Society or the movement into a world of open innovation and user innovation, Carlos Moedas, who served as European Commissioner for Research, Science and Innovation from 2014 to 2019, said that "We need open innovation to capitalize on the results of European research and innovation" (*Directorate-General for Research and Innovation* 2016). Whereas it is natural that Responsible Research and Innovation projects funded by the EU emphasize the prosperity of EU member nations and the respect for European values, this can limit the effectiveness of project results as policy recommendations for Responsible Research and Innovation given the global reach of science and technology. Actually, reflecting on the outcomes of the previous Responsible Research and Innovation research projects, the Horizon 2020 Responsible Research and Innovation Networked Globally (RRING) Project conducted from May 2018 to April 2021 pointed out that the promotion of a European approach to Responsible Research and Innovation through a global network was met with resistance as the grand challenges faced by each country differed by geography, combined with cultural and other issues, and any attempt to "converge" Responsible Research and Innovation globally toward the European model in a top-down technocratic manner is not the correct approach (*RRING Project* 2021).

On the other hand, based on the recognition that there are many responsibilities which have already been defined in research and

innovation but are not coordinated and aligned to cover the larger societal challenges, Stahl (2013, p. 708) positioned Responsible Research and Innovation as a meta-responsibility:

> RRI is a higher level responsibility or meta-responsibility that aims to shape, maintain, develop, coordinate and align existing and novel research and innovation-related processes, actors and responsibilities with a view to ensuring desirable and acceptable research outcomes.

This idea can provide us with a useful clue as to overcoming difficulties in addressing Responsible Research and Innovation at a global level. If we succeed in developing a globally acceptable and practical conception of it as meta-responsibility, it works as a sound basis for deliberative democracy to globally ensure responsibility for research and innovation. In these respects, we should take a positive, forward-looking view on responsibility concerning due care and responsiveness (Pellé and Reber 2015).

In this section, we have discussed approaches to innovation ethics based on critical thinking and deliberation with stakeholders. The ethical subject related to innovation needs to take different values and different input from stakeholders into account in the innovation process. Such choices will inevitably promote some values and it will be impossible to cater to all values or please all stakeholders. Our approach to ethics presented in the introduction fits well with parts of these approaches, as it concerns critical thinking about different ethical values, for example, values pointed out by stakeholders. But our approach avoids reification into a list of given values and maintains that critical thinking about ethics must be processual and iterative. Furthermore, perhaps to a greater extent than the surveyed approaches, we see that the ethical subject develops skill in ethics, almost as a craftsperson, and makes choices in the face of the impossible demands of ethics. We will now discuss the difficulties of implementing ethics, either the approaches listed, or our own approach, in a multi-cultural, competitive world.

CHALLENGES IN ETHICAL INNOVATION IN TECHNOLOGY IN A MULTI-CULTURAL, COMPETITIVE WORLD

All the above initiatives are well-intended but as has been clear, and already mentioned regarding Responsible Research and Innovation, they need to be considered within the broader context in which they are introduced. In this section, we discuss some barriers to considering innovation ethics, namely competitive tendencies in the private sector as well as between countries.

Innovation in the private sector

There is no doubt that those who play a leading role in innovation in technology are for-profit organizations. The engagement in technological innovation in the public sector cannot be successful without the support from private sector companies which possess relevant knowledge, skills, and resources. For-profit organizations usually behave according to the logic of business, which is described using terms such as cost, profit, and market competition and is not necessarily compatible with the logic of society related to ethics and social values at least as a practical matter. The engagement in technological innovation in the private sector usually faces a competitive situation, where companies may prioritize outdoing the competition in innovation rather than attempt to proactively address ethical and social issues related to innovation. The attempt may not be justified based on the logic of business, because it costs money and time, the success or failure of innovation in technology is the decisive factor of corporate competitiveness and profitability and it is difficult to correctly predict what ethical or social issue will occur as a result of technological innovation. The inclusive approach to or multistakeholder governance of innovation may not function well in business organizations. In fact, there are many companies which maintain the attitude of "innovative first, consider the consequences afterwards". Of course, a company can hold out the ideal of ethics by design or sustainability by design. However, no

matter how conscientious a company is, they would never forgive the situation where their rivals, which do not intend to fulfill any ethical obligation in the process of innovation, pull ahead of them in innovation success. Instead, it is no wonder that they assign the highest priority to achieving innovation and postpone the responses to ethical and environmental issues.

On the other hand, business organizations have recently been required to be sensitive on ethical and social issues more than ever. They are now required to show their ethicality and integrity through proactively dealing with a range of frameworks, such as technology's ethical, legal, and social implications (ELSI), environmental, social, and governance (ESG) issues, and the Sustainable Development Goals in addition to complying with laws and regulations, following business ethics and taking corporate social responsibility (CSR). Whereas these requirements can be understood as the requisites for establishing corporate citizenship, many business people consider companies should fulfill the requirements—or responsibilities in negative senses—to appropriately manage the reputation of them and ensure profitability. Ethics, far estranged from our approach, tends to be regarded not as an end but as a tool to secure corporate profitability in the context of business by business people. On the other hand, policymakers and social activists such as environmental activists may wish to use such concepts as instruments to control corporate activities.

International competition for innovative technologies

Innovative technology is strategic in the sense that it can be a decisive factor of a nation's, as well as a company's, competitiveness. Therefore, it is not surprising that a technological innovation project is accompanied by a political and economic ax to grind. This complicates the situation surrounding scientific research, technology development and use, and relevant regulations.

Because a competitive advantage gained and/or sustained by companies based within a country or a region contributes to its economic development, regulations imposed on research and innovation in technology

are not necessarily enacted based on the logic of society. It may make more sense that those regulations which are valid across borders, in particular, are products of international political and economic games; the realistic pictures of them should be understood in the context of competition between countries and regions; and the ethicality of ethical technology policies governmental organizations develop and publish is just superficial. Actually, Japan's Social Principles of Human-Centric AI (*Council for Social Principles of Human-centric AI* 2019) seems to intend to gain and sustain the competitive advantageous position of Japan or Japanese industries through taking the policy initiative in research and innovation in AI. Similarly, the European Commission's Responsible Research and Innovation projects seem to pursue or maximize the Brussels effect (Bradford 2020), presuming ethics is a political and economic instrument. The most serious ethical problem in the context of innovation in technology may be that only the instrumental value of ethics—to gain and maintain a competitive advantage—is acknowledged both in the private and public sectors. We are now in urgent need of finding a way of preventing the instrumentalization of ethics, sustainability, and human values.

Another aspect of international competition for innovation in technology is the battle over values or cultures among nations. For example, European researchers, policymakers, and organizations such as the European Commission often emphasize the importance of gender equality for Responsible Research and Innovation insisting that all relevant actors should engage in the processes of the responsible development and implementation of technologies (*Directorate-General for Research and Innovation* 2012, 2016; Geoghegan-Quinn 2012). However, it may be hard for Japanese people, including business people, researchers, and policymakers, to understand the insistence. In the report from the RRING project, it appears that many Japanese tend to consider that capable people should engage in tasks of research and innovation regardless of gender and maintain that gender equality policies such as affirmative or positive action—assigning the equal number of male and female staff to those tasks—are little more than window dressing, disrespect the staff, and can frustrate the tasks (*RRING Project* 2021). The Japanese

respondents consequently hold that such policies are unacceptable from the viewpoint of professional ethics.

DISCUSSION: AN AGENDA FOR INNOVATION ETHICS

In this piece, we have discussed the need for an ethics of technological innovation, presented methods to do so, and some barriers to innovation ethics based on competition between companies and countries. In this part we will point forward and, based on our conception of ethics, indicate some agenda items for innovation ethics research and practice.

Innovation ethics must promote critical thinking and avoid reification of values

As has been surveyed in this text, innovation ethics often becomes instrumentalized into a checklist, or a set of given values, but to stay true to our conception of ethics as critical thinking there will always be a demand from values that have been excluded from such checklists. However, one also needs to pay attention to the risk of being too open and not specifying which values are at stake, which often leads to that innovation ethics becomes hollow and toothless. Innovation ethics always needs to be reflexive about what is called "ethical" and "responsible" related to innovation and needs to be culturally sensitive and not present values stemming from a particular region as universally ethical. Even obviously positive terms such as mission-oriented innovation needs to be scrutinized.

Innovation ethics needs to also focus on care and maintenance of existing values

Innovation ethics sets the innovation at the center stage, but one also needs to consider the other side of innovation. From the gaze of innovation, innovators as well as users actively choose to *not* go about following

the way things are at the moment. Innovation ethics therefore should also throw light on the various ethical goods of different socio-cultural contexts before the particular innovation. Innovation therefore tends to stand in contrast to care and maintenance of what exists at the present, and this also needs to be included in an innovation ethics to be able to engage in critical thinking about what is at stake when innovating.

Innovation ethics is processual and iterative, and cannot be just invention ethics

In most of the frameworks surveyed and within discussions about innovation ethics, the phases of research and development of technology and putting it into a product/service are seen as the most important for technological innovation to be ethical—and this is what we mean by the focus on invention ethics. However, invention ethics runs the risk of underestimating responsibility in the rest of the technology lifecycle, and how innovators and others can be involved in innovation processes beyond design. We need to consider not only the values embedded in the process of developing innovative technologies, but the values emerging from or proposed by technologies during use as well as the rest of the lifecycle. Innovation ethics should also concern long-term ethical impacts of innovation and how societies monitor the ethics of innovations that are being implemented in society. Given the unpredictability of the innovation process, ethical reflection needs to be iterative and processual, not only in the early stages.

Innovation ethics needs to be open to innovation in a variety of contexts

As Bourban and Rochel (2021) argue, much of the focus on responsible innovation has been on commercial innovations stemming from public research institutions or the private industry. As we have seen so far, perhaps in such a competitive context it is likely that ethical issues will be downplayed, and innovation ethics becomes pointless. Given the

concentration of particularly technological innovation efforts among the for-profit, commercial sector, in any case one needs to discuss ethics and the forces hindering and promoting it. There are important power issues to reflect upon concerning what kinds of innovations get promoted in society, and the ideologies and interests that are behind them. Although we see hope in the approaches we have surveyed also in the private sector, one should not forget to broaden the scope of innovation to take into account also non-technological innovations and those innovations stemming from other sectors. A sound innovation ethics therefore consists of also directing the spotlight away from the private sector and international competition and discusses innovation ethics outside these dominant sectors of society.

Innovation ethics acknowledges the infinite demands of ethics, but still is action-oriented

In some of the surveyed frameworks, a quite strong moral subject is presumed, who can have knowledge and foresee consequences, or presuppose the potential of a collective creation of such intelligence through dialogue. Rather, we acknowledge the infinite demands of ethics and that it is unlikely that one will find solutions that promote all values and please all stakeholders. However, with our view of a heroic, post-heroic ethical subject, we also see innovation ethics as trying to be courageous and do one's best despite the insurmountable changes that are presented. Refraining from action in the face of these infinite demands is also not desirable.

CONCLUSIONS

In this chapter, we followed the current discourse on innovation ethics, focusing on the ethics of technological innovation in the for-profit sector. We then problematized the focus by pointing out the issue of competition and then constructed a potential way forward for innovation ethics. Innovation ethics:

- *must promote critical thinking and avoid reification of values.*
- *needs to also focus on care and maintenance of existing values.*
- *is processual and iterative and cannot be just invention ethics.*
- *needs to be open to innovation in a variety of contexts.*
- *acknowledges the infinite demands of ethics, but still is action-oriented.*

For researchers, our piece can hopefully contribute to stimulating a discussion about innovation ethics, going beyond current discussions of innovation ethics in different subfields. For practitioners, our approach to innovation ethics can problematize the ways in which ethics is discursively constructed in public and present an alternative where innovations need to be critically reflected upon and where innovations need to be seen as having good or bad consequences for the values that our society is expected to promote. We also argue that students in innovation studies, management of innovation, industrial management, as well as business and engineering degrees should be exposed to innovation ethics, to problematize an uncritically positive view about innovation, as well as students in non-technical degrees, some of whom might have a slightly more critical approach to technological progress. It is unlikely that progress toward a better society could be made without technological as well as other innovations, and an ability to think about a broader range of ethical implications can be valuable to bridge understandings among different parts of society and to create a joint exchange of meaning about what a desirable society is and what role innovation can play to advance it.

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