

Identifying the normative challenges posed by technology's 'soft' impacts¹

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In this paper I argue that we can no longer afford to ignore technology's so-called 'soft' impacts, as this type of impact is becoming increasingly prominent in affluent societies where people have sufficient resources to pursue self-realization and where technologies are becoming more and more 'intimate' as they pervade our life-world. These soft impacts come with their own type of normative challenges. The first challenge is to acknowledge the mutual shaping of technology and morality that causes soft impacts to be fundamentally morally ambiguous. The second challenge is to anticipate soft impacts, which requires a rich and thick description of our morally-laden current practices in the light of plausible technomoral change provoked by emerging technologies. The third and last challenge is to avoid both relativism and foundationalism, by opting for an open and learning attitude vis à vis the ways new and emerging technologies put our current morals into question.

Keywords: Technology Assessment, ethics, soft impacts, technomoral change, intimate technologies

Introduction

In the summer of 2014, the Department of Philosophy and Religious Studies of the Norwegian University of Science and Technology in Trondheim organized an international seminar on two important questions in the philosophy of technology:

1. "What are the adequate methods for answering the normative challenges posed by emerging technologies?"
2. How do we combine empirical methods and philosophical theories in answering particular research questions related to technology development?"

In this paper I focus on the first question, but in doing so also touch upon the second one. My main claim is that in our times new – so called 'intimate' – technologies have a type of 'soft' impact (Swierstra & te Molder 2012) that differs markedly from the technological risks – or 'hard' impacts – that we have more or less learned to cope with. We are still in the process of devising methods to deal with the new normative challenges that come with these soft impacts, although some promising approaches can already be identified.

In the first section I explain the – gradual – distinction between hard and soft impacts of technology. In the next section I propose two developments that help explain why soft

impacts are becoming ever more prominent in public discussions about emerging technologies. In the subsequent three sections I sketch how these soft impacts come with their own type of normative challenges. A first normative challenge regards the essential moral ambiguity of soft impacts. I will argue that this ambiguity follows to a large extent from the phenomenon of technomoral change (Swierstra et al 2009). A second normative challenge is how to devise adequate anticipations of these soft impacts. I will argue that although such anticipation seems to be a descriptive endeavour, it is in fact normatively charged. A third normative challenge has to do with the way a society can best come to terms with soft impacts. I conclude with a brief summary of my main propositions.

'Hard' and 'soft' impacts

We have by now learned – often the hard way – that technology is not a cornucopia, pouring forth an endless stream of gifts. Some of these gifts prove to be poisonous, to explode in our face, or to pollute and deplete our environment. Technologies not only make our lives more productive, comfortable, and longer, but can also cause great harm to users and non-users alike.

Over the past century or so, developed societies have struggled to devise methods, strategies and institutions to deal with these technological hazards. One key strategy is the retrospective or prospective assessment of the impacts of technologies. These assessments are meant to provide policymakers with a cost-benefit analysis which helps to decide whether the technology has to be stimulated, regulated, modified, or even banned all together. As it is often easier to avoid future harm than to repair past harms, these forms of Technology Assessment (TA) are usually to some extent anticipatory: what will be the impacts of our current or emerging technologies? Especially in the latter case TA can be used as input to guide scientific and technological development while the technologies in question are still malleable. Of course, the assessment of possible future impacts of technologies that are not yet fully developed can only be highly speculative.

As no one can predict the future, an important challenge is how to ensure that these anticipations are somewhat authoritative and not easily dismissed. An important first step to enhance TA's authority, at least with influential actors like technologists and policymakers, was the development of methods to *quantify* both the *chance* that a hazard would occur and the *undesirable outcome* itself. Quantification helped to transform fuzzy, unmanageable 'hazards' into specific 'risks' that could serve as the basis for policy decisions. But quantification required that the 'undesirable outcome' that constitutes the core of any hazard (or risk), had to be defined in such a way that it lent itself to such quantification. This was achieved by interpreting 'undesirable outcome' in terms of the harm principle, as coined by John Stuart Mill. This famous principle has long served to demarcate the domain of legitimate state intervention in civil society: if clear and objective harm is done, the state should step in and private actors (like companies) should be held accountable to redress the harm done. Clear and non-controversial values like Safety, Health, and – more recently – the Environment are the main values enabling the public identification of technological harms. A third way to ensure a TA's authority was by focusing on problems that can noncontroversially be ascribed to technology actors and corporations. So, a strict line was drawn: a risk is only a *technological risk* if the harm is a *direct causal* consequence of the technology in question.²

Together these three specifications – quantifiability, clear and noncontroversial harm, direct causation – helped to turn unmanageable hazards into manageable risks. They also

helped to create a specific regime of accountability. If impacts of technology answer to these three conditions, they are considered to be sufficiently 'hard' (in the sense of objective, rational, public, and concrete) by technology and policy actors to accept and allocate accountability. This accountability regime provides actors with a powerful incentive to avoid or reduce such 'hard impacts' of technology. Given a legal and political environment that is capable of holding technology actors effectively accountable for the quantifiable, noncontroversial harms caused by their technologies, this discursive construction of 'risk' has thus been a successful and powerful instrument in making TA more authoritative, and technology safer, healthier, and more sustainable.

However, technologies don't exclusively have 'hard impacts' like poisoning, exploding, polluting and depleting. Almost two and a half millennia ago Plato, in the *Phaedrus*, denounced the alphabet as a technology that was destructive to true knowledge and as being politically disruptive. So for a very long time, we have been aware that technologies have other types of impacts too. As a modern example, it suffices to update Plato's concerns about the written text to recent concerns about the Internet. The concerns that surfing the Internet will destroy knowledge and will undermine intellectual virtues by making us shallow and less concentrated (Carr 2011), or that Facebook turns friendship into a travesty (Turkle 2010), are not easy to quantify. Furthermore, it is highly contested whether the new ways 'taught' by the Internet are in fact better, worse, or simply different than the old ways, so there is no consensus whether harm is actually done. And thirdly, even if we were to agree that something important was lost, it would still be unlikely that we could simply blame the Internet for this. It is evident that users make different uses of the Internet and are differently affected by it. As a consequence, it is impossible to identify a direct causal link between technology and impact. In brief: impacts like these are *qualitative* rather than quantitative; the core values at stake are *unclear or contested* rather than clear instances of harm; and the results are *co-produced by the user* rather than being caused solely by the technology. The fact there can be different disagreeing perspectives on the nature and (un)desirability of a consequence, is referred to in the literature as 'ambiguity' (Renn & Roco 2006); the fact that some consequences are causally open because they are codetermined by e.g. human behavior, is recognized as the problem of 'indeterminacy' (Stirling 2003).³ Impacts that are qualitative, ambiguous, and/or indeterminate tend to fly under the radar of the prevailing accountability regime. They are dismissed by technology and policy actors as too fuzzy, or too 'soft,' to take seriously. As a consequence, it is unclear who can be held accountable for them – if anyone. As no regime is in place, soft impacts tend to remain orphan impacts.

It should be stressed that the distinction between hard and soft impacts is not neutral or descriptive. Instead, it is a largely rhetorical distinction brought into play by one group of powerful players (policymakers and technology actors) for practical – or strategic – purposes: for which impacts are they willing to accept some degree of accountability, and for which impacts not. It is therefore to be expected that the distinction is constantly fought about by other parties who seek a place for their concerns on the public agenda. In the rest of this article I adopt the hard-soft distinction as a shorthand for this practical distinction, not as an endorsement of it.

Furthermore, it should also be clear that the hard-soft distinction is a gradual one, and, equally important, that the demarcation line is drawn differently at different times and places. Impacts can (and do) score differently on each of the three dimensions: they can be hard in one but soft in another. For instance, one may be able to quantify the chance that certain genetically modified organisms will spread in nature, without, however, agreeing on whether this would be in fact be a problem. Or we may agree that it is very harmful to play violent

computer games all day, without agreeing to what extent the game or the user is to blame. Furthermore, the line between hard and soft is not carved in stone. For a long time, doing something 'unnatural' was considered to be a clear and noncontroversial instance of harm. On the other hand, if a technology failed to be sustainable, this was hardly noticed. Nowadays, these tables have been completely turned. Engineers and policymakers hardly raise an eyebrow anymore if, for instance, a food product or a way to produce food is deemed 'unnatural'; instead, sustainability has been 'hardened' into an important criterion in the prevailing accountability system. Similarly, as differences in sexual moralities make abundantly clear: what is considered a grave public harm in one culture – e.g. female promiscuity, or homosexuality – is considered to be a private lifestyle choice in another. So, not only is the distinction between hard and soft gradual, it is also linked to spatial and temporal contexts and bound to change with them. This implies that the corresponding accountability regimes coevolve.

Why soft impacts can no longer be ignored

So, at least since Plato we have been aware that technologies have more than 'hard' impacts. It is even fair to say that in traditional societies most of the concerns regarding emerging technologies would in modern parlance be labeled 'soft'. People worried mostly about technology's disruptive effect on religion (e.g. the printing of the Bible) or on existing power hierarchies (e.g. the failed introduction of guns in feudal Japan, as incompatible with the prevailing system of martial honor).

It is only since the Industrial Revolution that public attention has shifted from the impacts typically worried about by priests, philosophers, and artists, to the ever more manifest harms inflicted by industrialization. Whereas the cultural or spiritual impacts of technology became ever softer and thus privatized, the impacts of technology on our health, safety, and environment began to dominate the political agendas. In our modern, technological culture we stake our belief on numbers rather than on words (Porter 1995). Ours is also a liberal culture built on the lessons of the religious wars of the 16th century: a pragmatic way to pacify social conflict is to distinguish between the right and the good (Rawls 1988), between a thin, procedural, binding morality and a thick, substantive, and private morality (Walzer 1994). And ours is a culture in which the dominant instrumentalist perception regards technology as a collection of docile, passive, neutral tools.

However, this era now seems to be ending. Our society and our technologies are evolving in a direction that makes the exclusive focus on hard impacts increasingly untenable. I want to offer two hypotheses to explain why technology's soft impacts are coming to the fore.

First, technological societies have become more affluent. As an accompaniment of this growing affluence our needs have moved upwards, according to Maslow's 'hierarchy of needs'. Most citizens of modern, Western, technological societies spend less time than ever on satisfying their basic needs - food, drink, safety, physical integrity - and more time than ever on satisfying their 'higher' needs like sexual intimacy, friendship, self-esteem, recognition, and self-development. There is an important ethical difference between the basic and higher needs. The former needs give rise to a type of ethics that is basically *protective* and geared towards decreasing our vulnerability. The latter needs give rise to a type of ethics that is more *aspirational*, geared towards human flourishing. If we apply this ethical shift to technology, we can witness a gradual shift away from a type of ethics that centers on avoiding or protecting against technology's harms, to a type of ethics that seeks to elucidate how technology can contribute to realizing positive goals like happiness.

This increased public attention to higher needs provides one explanation for the rising prominence of technology's soft impacts. Basic needs seem more readily compatible with the discourse on technology's hard impacts than the higher needs are. For one, harm is most easily and non-controversially identified in terms of the lower needs. It is much easier to reach agreement on minimizing harm than on maximizing happiness because, as Karl Popper (1945, p.159) pointed out: "Those who suffer can judge for themselves, and the others can hardly deny that they would not like to change places." Secondly, basic (preferably physical) needs seem to be more objective and quantifiable than the higher, more fuzzy, needs. And with regard to causality: in cases where basic needs take center stage, it is easier to establish that someone is simply a victim of technology. In the case of the higher needs, one is most often not simply a victim of the technology but also to some extent a co-culprit.

In contrast, in the case of the higher needs the hard impacts discourse (with its accompanying accountability regime) becomes less convincing. Calories may be quantifiable, but it is much less clear how much knowledge, aesthetic pleasure and self-development 'healthy' people should have each day. And at what exact point can they claim to be harmed if their higher needs are not fulfilled? And to what extent are they themselves to blame for such a lack?

Second, the technologies have changed too. Modern technologies like ICT, biotechnology, and neuroscience come ever nearer to our bodies, minds, and life-worlds. In Chaplin's *Modern Times*, technology typically belonged to the (semi-)public world of the factory or transportation. Technology was not portrayed as pervading the personal, private sphere. And although in the decades following the film intellectuals were concerned about the devastating effects of mass-consumption on the human psyche, what they worried over was technology's *products* invading the private sphere rather than technology itself. Household technologies, radio and television are important exceptions here. However, even granting that, the private sphere was for decades perceived as a low-tech environment.

This has radically changed over the last three or four decades, especially because of the ICT revolution. Many of today's most eye-catching technologies are 'intimate' (Van Est 2014). They are no longer primarily 'there'; they are now also very much 'here'. Biotechnology is turning our bodies, including our brains, more and more into objects for scientific study and technological manipulation. For example, Deep Brain Stimulation deeply invades what we perceive to be the core of our personality: our brains. The same holds for all kinds of enhancement drugs. We are also witnessing the rise of Brain-Computer Interfaces – for instance bionic arms connected to our nerve system or exoskeletons that respond to our brainwaves – which further blur the dividing line between humans and technologies. Visionaries envision a time when we will upload our brains into the computer, thus completely merging with the machine. Even if one discards these fantasies as far-fetched, technologies are growing increasingly important and influential in mediating our contact with the object world (think of Microsoft's HoloLens' augmented reality) and our contact with the social world of fellow human beings (think of the Internet, mobile phones, or telecare systems). These modern technologies are also getting ever more intimate in the sense that they invade our privacy by amassing all kinds of data on a scale that we are still struggling to understand (think NSA or Google). Who can still be sure that Big Data doesn't know more about us than we know ourselves? Finally, intimate technologies not only exist *in* us, *between* us, and *around* us, but they also become *like* us. Robots are starting to take over our tasks and they sometimes eerily resemble how we look. E-coaches give us personal – albeit on the basis of algorithmic automation – advice about how to cope with our problems.

These new 'intimate technologies' raise all kinds of concerns, but *not* primarily that they will poison us, explode in our faces, or pollute and deplete the environment. Nor are they simply instruments that *enable* us to pursue our personal conception of the good life. Rather, they co-define the good life and what we owe to each other. We are beginning to become aware that these technologies co-shape our norms and values; our identities and our mind; our bodies and our emotions; our aspirations, hopes, and ideals; our needs, wants, and desires; our rights, obligations, duties, and responsibilities; our virtues and dispositions. In other words, these new technologies raise a different kind of concerns than the 'hard' ones we were used to.

As a result of these two developments – more attention to higher needs, plus technology becoming increasingly intimate – more people are concerned about technology's soft impacts. And when those in positions of power discredit these concerns as too 'soft' to take seriously, then that only adds to those worries.

The normative challenges raised by soft impacts

Soft impacts raise different, and more difficult, normative challenges than hard impacts. I want to focus on three of those challenges that are particular to soft impacts: their moral ambiguity; the difficulty of describing them in such a way that they can become the subject of public deliberation; and finally, how to deal with them in a constructive way. First I will turn to the moral ambiguity of soft impacts.

Hard impacts come with their own kind of normative challenges, and sometimes these do indeed require profound philosophical reflection. For example, there are difficult epistemic and political issues involved in establishing risk (Slovic 1999; Roesler 2006); there are normative questions about how to weigh the risks against the possible benefits and about who should carry the burden of proof for establishing the risks of a technology (precautionary principle); there are questions relating to individual versus corporate/collective responsibility ('the problem of many hands'), and to short term versus long term responsibility; and finally there are normative challenges having to do with the just distribution of benefits and costs. Philosophers are still struggling with these challenges, many of which have been on the philosophical agenda since Hans Jonas formulated them in the seventies (1973).

Important as these normative challenges of hard impacts may be, compared to the challenges raised by soft impacts they only possess a second-order nature. This is because in the case of hard impacts the core normative question, that is: whether the technological impact itself is indeed (un)desirable, is considered to be answered already. No one in her or his right mind thinks hurting people or polluting and depleting nature is a good thing. As a result of this basic normative consensus, hard concerns come with the expectation that they can be solved *on the basis of empirical facts*: how large is the chance that a certain event will occur? What is the extent of the harm? And is the harm directly caused by the technology under investigation? In this sense, one could even ask whether hard impacts do not primarily pose *factual* challenges rather than *normative* ones. Granted that everyone wants to minimize pain and agrees to delegate other normative concerns to private discretion, all the relevant practical-ethical questions turn into questions of empirical fact. Indeed, one could consider this the particular strength of hard impacts. This makes them highly commensurable with the consequentialist-utilitarian and liberalist discourse favored by policymakers and technology actors.

By contrast, soft impacts are essentially defined by the fact that they are morally ambiguous, and that there is no consensus on the question of whether the impact is good or

not. This ambiguity can be the result of conflicting values, e.g. when we are confronted with a trade-off between privacy and security in the case of surveillance techniques. However, in the case of the intimate technologies mentioned above, the moral ambiguity goes deeper as it is caused by the destabilization of the normative and moral routines that we rely on to assess the (un)desirability of the impacts of those technologies. As stated in the previous section, these technologies affect our norms, values, and aspirations. In short, the technologies themselves turn our normative standards into a subject for ethical doubt, deliberation and discussion.

A good example of the morally destabilizing effects of an intimate technology is shown by the impacts that condoms and the contraception pill had on sexual morals. Looking through the lens of the dominant moral standards of the fifties, these technologies appeared extremely suspect as they allowed women to discard moral standards regarding chastity without being 'punished' by an unplanned pregnancy and the resulting public shame, and they allowed women to subvert the 'natural' hierarchy between the sexes. Looking back we can observe two things. On the one hand, the pessimists were proven right: those technologies indeed allowed women to break away from the restrictive sexual morality and the gender hierarchies of the fifties. On the other hand, the same technologies resulted in today's dominant sexual morality being considerably different from the one that dominated fifty years ago. As a result, the moral pessimism of that decade from our perspective no longer seems warranted (at least not on the grounds put forward then). What our parents depicted as moral decay is now perceived as sexual emancipation and liberation of women.

This example demonstrates that the moral standards we apply to intimate technologies are not independent from those technologies. In other words, our morals co-evolve with the technologies they are supposed to guide. Of course, this is not to suggest that morals passively adapt to inevitable technologies. Morals can and do influence technological development – think about all the attempts to make technologies safer and more sustainable. But this cannot deny that the opposite also holds. The phenomenon that technology and morality *mutually* shape each other, I call technomoral change. And acknowledging and dealing with this technomoral change constitutes the first normative challenge posed by technology's soft impacts.

Moral change is not *caused* by technological change, but can be *provoked* by it. In the end, human beings devise moral solutions to the problems of the world. But technologies can fundamentally change the world, solving or redefining old problems and creating new ones. Established moral routines and ways of understanding the world can thus become destabilized and turn into problems. For a period of time we are no longer sure what moral standards to apply to those impacts, because the technologies in question rob those standards of their self-evident relevance and truth. Of course, in the end the destabilization can result in a reaffirmation of the old morals or even a deeper understanding of them (e.g. one could argue that chastity only could become a truly moral rather than prudential virtue after technology had severed the link between sex and procreation and removed the fear of pregnancy). Alternatively, a shift towards a new broad moral consensus can develop (e.g. few would nowadays justify different moral standards for women and men – which is not to say that such standards do not still exert influence over us), or the issue can be left unresolved.

Anticipating soft impacts

Identifying the impacts of technology is important as a means to establish whether a given technology is desirable or not. In the case of new and emerging technologies, we cannot identify the potential impacts yet, but we have to try to anticipate them. We have seen that the

way to anticipate hard impacts is basically to calculate ‘chance multiplied by the amount of harm’. However, this form of anticipation is not adequate in the case of soft impacts. Here anticipation inevitably takes the form of narrative. To understand why this is so, we should look more closely at what soft impacts are and how they manifest themselves. Soft impacts are not, in distinction to hard impacts, typically isolated events, such as physical harm or an environmental disaster. They are rather changes in *practices*.

The concept of practice has become ever more central to modern philosophy. Since roughly halfway through the 19th century, we have witnessed a far-reaching albeit very gradual and uneven paradigm shift in Western philosophy. Philosophy as a discipline has for more than two millennia been defined by the Platonist primacy of *theoria* over *praxis*. But philosophers have been increasingly questioning this theoreticism, aiming to give ontological, anthropological, epistemic and ethical priority to *praxis*. Modern philosophy can be understood as an ever-boldestening exploration of putting *praxis* first (Reckwitz 2002, Nicolini 2012, Schatzki et al 2001).

For Plato, the primary relation of humans to reality was one of *theoria*, of contemplation. In his philosophy the central sense is the eye, and human beings are primarily knowledge subjects. Following Plato, Western philosophy has since given priority to the problem of true knowledge over the problem of correct action – as it was believed that the latter could only be based on the former. Furthermore, true knowledge could only be about true objects, that is, universals which could be perceived directly by one’s ‘mind’s eye’ (rationalism), or indirectly by one’s real eye (empiricism). Central to all epistemic ideas about true knowledge is the asymmetry between the receiving subject and the object that presses itself on the passive subject. Between those true objects, only harmony and stability can exist. For example, Platonic ideas cannot conflict, nor can the laws of nature. As such, the domain of universals starkly contrasts with the tangible world of particulars in which we, as embodied beings, desire, act, live, flourish, suffer, and die, and where peace and harmony are at best isolated moments in a vast ocean of conflict and strife.

All these elements of the *theoria*-paradigm have been taken apart by philosophers for whom humans’ primary relation to reality was not *contemplation* of the world but *praxis*, the *interaction with* the world that we inhabit as embodied beings. This basic starting point is shared by philosophies as widely divergent as Marxism, pragmatism, phenomenology, post-structuralism, and Actor Network Theory. Philosophers as radically different as Marx, Nietzsche, Peirce/James/Dewey, Heidegger, Merleau-Ponty, Wittgenstein, Arendt, Habermas, Foucault, Rorty, Harraway, and Latour also share this point of departure. For these philosophies and philosophers, not Plato but the Aristotle of the *Nicomachean Ethics* is the hero and main source of inspiration. Not the (mind’s) eye, but the hand – the touch – is the primary sense: we grasp at the world. And whereas the relation between subject and object is asymmetric in the case of contemplation, it is symmetric in the case of touch: feeling a table results from me pressing on it *and the table pressing back*. This attempt to replace asymmetric, hierarchical *dichotomies* with symmetric and dynamic relations where two or more entities mutually constitute each other belongs to the common grammar of all philosophies that look for *praxis* rather than *theoria*: the relation ontologically precedes the separate entities. These philosophies typically embrace heterogeneity (often including some form of conflict), matter, particulars, the body, the emotions, finitude, and so forth. They tend to celebrate that we live in a human-made world, a technotope, and that the distinction between humans and artifacts has always been blurry at best. And if they philosophize about knowledge, they will typically point out its situated and constructed character; the hard work necessary to produce it; its dependence on the body (think of recent developments in

Artificial Intelligence) (Brooks 1990); its being inseparable from values and emotions; and that knowledge was acquired through the use of material devices.

Of course, not all these elements are found in all the philosophers and philosophies mentioned above. But the different elements can be – and are being – assembled into a fairly coherent philosophical approach that has now been formally christened ‘practice philosophy’. For a firmer grip on soft impacts, it is worthwhile to see what practice-philosophers, most notably pragmatists and phenomenologists, have had to say about morality and ethics. They perceive morality as a type of normativity that is distinguished by *strong evaluation*: “discriminations of right and wrong, higher or lower, which are not rendered valid by our own desires, inclinations, or choices, but rather stand independent of these and offer standards by which they can be judged” (Taylor 1986). We are the authors of morality, but we cannot change it by will. Partly this is because morals are deeply constitutive of our identity and engrained in us in the form of dispositions to blame and praise, as is evidenced by the strong link between our morals and our emotions. For another part it is because morals precede the individual. We may also be very well hard-wired for altruism, as e.g. Frans de Waal (2009) argues. The most basic component of morality is our experience of our own vulnerability and capacity to flourish, that enables us to recognize this vulnerability and this capacity in other beings. Sayer (2011, p. 145) puts it like this: “People are ethical to the extent that they are concerned about how to act with regard to others’ well-being as well as their own.” In my own words, morals concern 1) how we should behave towards others, with an eye to their well-being (rule ethics; what do we owe one another), and 2) how we should behave towards ourselves, with an eye to our well-being (ethics of the good life).

Practice-oriented forms of ethics stress that norms and values, including moral ones, are part and parcel of our engagement with the world. And this engagement is not primarily theoretical, as if we were constantly applying explicit rules to practical questions, but practical. To a large extent our normative and moral know-how exists in the form of embodied knowledge, of tacit understanding, tightly linked to our emotions (e.g. compassion, gratitude, shame, guilt, pride, hate, disgust, resentment, embarrassment, indignation, humility). This know-how takes form in particular attachments, commitments, and character dispositions that make us value some things and detest other things. In most cases the fact-value split carries little weight: if I see someone in pain, I don’t first establish if she is in pain and then decide to help. Witnessing innocent suffering immediately calls for action: perception, assessment, and action are all intermingled. Understanding morals in terms of lived practice rather than in terms of a quasi law book containing generalized rules allows one to be interested in how people live their morals in everyday situations. In other words, one strives to understand lay normativity (e.g. Boltanski & Thevenot 2006 (1991), Sayer 2011).

What does this digression teach us about the anticipation of soft impacts? Soft impacts are considerably less tangible than hard impacts, as they manifest themselves in sometimes subtle changes in practices, for example nursing, raising children, or self-management. Soft impacts are not events that can be calculated for plausibility, but they involve changes in the manifold ways we relate to the world, to our fellow beings, and to ourselves. And the only way these impacts can be invoked and made ‘present’ for anticipatory reflection, is by using thick description, or narrative. Regarding the character of narrative, Ricoeur notes that

A story describes a sequence of actions and experiences done by a certain number of people... These people are presented either in situations that change or as reacting to such change. In turn, these changes reveal hidden aspects of the situation and the

people involved, and engender a new predicament which calls for thought, action or both (Ricoeur 1988, 150).

This aptly describes why stories are such a good vehicle for anticipating softer impacts of technology. They match the three basic features of soft impacts: their qualitative character, their moral ambiguity, and the fact that they are always coproduced by technologies and people who adapt their behaviors to those technologies. They help us imagine how we respond to changes in our environment, and invite us to evaluate newly evolving practices from the perspective of insiders. Moreover, stories allow for contingencies and for different, competing responses by different actors. So, the anticipation of soft impacts typically takes the form of vignettes offering snapshots of possible future practices, or scenarios describing how current practices are destabilized under the influence of technologies, and how they may evolve in response to these technological challenges.

At first sight, 'stories' may seem to carry little weight in heated discussions on the pros and cons of new and emerging technologies. There are two reasons, however, why we should not underestimate their power. First, discussions about hard and soft impacts often deal with the future – even in a double sense: the as yet non-existing impacts of as yet non- (or hardly) existent technologies. Stories are powerful ways to present possible futures. Policymakers and technology actors who dismiss stories as fantasies that should best be ignored, willfully forget that all scientific and technological developments are born in a cradle of expectations, promises, and larger visions, which are meant to mobilize professional, political, and financial support (Brown & Michael 2003, Borup et al. 2006). Secondly, the fact that scenarios rest on the imagination does not deny that they are, and should, be supported by empirical evidence, such as what is technologically feasible, what society wants, how technologies and practices interact, human psychology, and so forth (Lucivero et al. 2011), in order to gain sufficient plausibility to win the public's support. So, stories can be, and are, critically tested for their plausibility.

To explore those changes, we can draw on the so-called philosophy of technological mediation (Verbeek 2010). The basic starting point of this philosophical approach is that technologies influence our perceptual and practical relations to the world. Perception is mediated, for instance, because technologies can highlight some aspects of reality and hide others. Action is mediated, for instance, because technologies can enable or stimulate us to undertake certain actions, and forbid or dissuade us to take others. This technological mediation doesn't stop at the door of our moral experience. Investigating how our moral perception and action in the world are mediated by technology makes us aware of recurring patterns of technomoral change that can help us to imagine plausible scenarios regarding future soft impacts (Swierstra et al. 2009, Swierstra 2011, Swierstra 2013).

For instance, technology can mediate our relation to other stakeholders, as in the case when television opens our hearts to the suffering of distant others. Or vice versa, when military technology anonymizes the victims and hides them from our hearing and seeing – as in the case of bombs or military robots. In both cases, our knowledge of, and interaction with, these stakeholders is affected by technologies, with direct results for our moral experience and judgment. Similarly, technologies can make us more or less aware of the consequences of our actions, which also affect our morals. Take for example industrial production technologies that ensure that pollution and depletion primarily happen in faraway places or times, thus hampering the public awareness of those consequences. Or consider the opposite, such as large scale computing that helps us establish that seemingly innocuous actions – like using chlorofluorocarbons (CFCs) as refrigerants and propellants – are actually very harmful in the

long run. Furthermore, technologies can bring people closer together by opening up new practical possibilities that result in new relations and (inter)dependencies. Immanuel Kant (1996, 1793) famously said that 'Ought implies Can,' but the reverse can also often be true: if technologies create new opportunities to do good or avoid harm, new moral obligations and rights appear, and the dividing line between bad luck and injustice needs to be redrawn. So, our rights, obligations and responsibilities are not immune from the technologies that help shape our interactions with the world.

Technology also affects our ideas about the good life and character, i.e. the domain of virtue or eudaimonist ethics. Our desires and frustrations are not independent of the technological landscape in which we find ourselves, as technology directly impacts what we do and do not perceive to be achievable. Similarly, technologies also affect the relation we entertain with ourselves, establishing who we are and who we want to be. All true knowledge starts with self-knowledge, according to Socrates, but self-knowledge is becoming increasingly technologically mediated. This holds true not only for our bodies, but also for our minds, such as in neurofeedback. General views of the world are closely connected to our views of the self and the good life. For example, is the world to be perceived as chaotic or does it contain an order that we should strive to emulate in our personal lives? Can the world be controlled, or does it escape our grasp so that it is therefore better to withdraw into ourselves, as the Stoics maintained? Whether we perceive the world as chaotic or ordered, as controllable or not, these basic worldviews are also closely connected to our science and technology. For a long time, for instance, it was the progress of science and technology that warranted an interventionist worldview. However, and ironically, for many (post)moderns nowadays it is exactly scientific and technological progress that have made the world so complex as to escape our rational grasp. True, the relation between technology and worldview is never unequivocal or unilinear; the same technology can allow competing worldviews. But it is equally clear that worldviews are influenced by science and technology in so far as they are challenged by them.

These and other patterns of technological mediation of moral experience allow us to some extent to draft scenarios that explore plausible soft impacts of emerging sciences and technologies. By this is meant the way emerging sciences and technologies may affect existing practices, including the internal (moral) rules, values and virtues implied therein. Not meant is that emerging sciences and technologies predict them, because soft impacts are by definition indeterminate. They are shaped by how actors decide to respond to the invitations, nudges or provocations that emerging technologies bring. Exploring them in advance enables society to be better prepared for the technomoral future that will eventually unfold. How will specific technologies mediate the relation between actors and stakeholders? Will they help these stakeholders to make themselves heard, or will those stakeholders be all but silenced? Will the technologies make us more or less aware of the consequences of our choices? Will the technologies create new opportunities, and if so, what new claims regarding rights, obligations, and responsibilities can be expected to accompany those novel opportunities? Will the technologies influence how we understand ourselves and/or how we can shape and manipulate ourselves, and if so, how will those new insights and affordances challenge prevailing conceptions of the good life, of a good character, of essential virtues, of essential goods? And how will new technologies influence our worldview, our foundational ideas about chaos and order, fate and control? All of these questions can be asked in the case of new and emerging technologies – not because they will receive definitive and precise answers, but because the questions provide a heuristic that can spark private and collective

imagination of how our practices, and we, may be challenged by the emerging technologies pervading our life-world.

One question remains at the end of this section: it may be a challenge to pre-imagine soft impacts of emerging technologies, but to what extent can it be deemed a normative challenge? It is clear that this type of anticipatory research has to combine empirical methods and philosophical theories. To assess the way emerging technologies may impact society requires both philosophical theories explicating the technological mediation of morality, and solid empirical knowledge of existing practices – knowledge which usually requires the input of the people who know these practices inside out. But I also believe the theoretical challenge is normative in two respects.

First, it is a challenge to create a public space for these types of anticipations. In a liberal society dominated by ‘tough-minded’ technologists and policymakers, explorations of soft impacts are easily discarded as being too fuzzy to take seriously. As a result, concerns about soft impacts are typically delegated to the private sphere of free individual choice. We can no longer afford this privatization strategy, since from the moment technologies enter our life-world, soft impacts are both collective and real and thus deserving of public attention. An easy example is the Internet; although it does not explode or poison us, it has fundamentally changed our economic, academic, relational, caring, and other practices. The new practices that have evolved in relation to the Internet may have started from some individual choices, but they have grown to become so pervasive and solid, that it is hardly a realistic option anymore for individuals to avoid this technology. Soft impacts of emerging technologies therefore require us to redraw the normative boundaries between public and private matters, between public reason and private choice.

The anticipation of soft impacts implies a normative challenge in a second sense, the fundamental *invisibility* of morals. This may seem counterintuitive at first, but lay normativity/morality mainly exists in the form of practical ways of doing and seeing, of *tacit know-how* rather than *explicit know-that*. I often illustrate this implicit character of morality to my students by asking them to write down the moral norms and values that they practice while in my class. What they write down is not so important. What counts is that this exercise is for the students to realize that we have conscious access to only a very limited set of our own ‘norms’ and ‘values’. They are vividly aware that there must be a vast ocean of possible norms and values, but they experience that they only have conscious access to a very limited subset. It is interesting to see what they do manage to write down, for example: “Students should come on time;” “We should listen respectfully to each other;” “Turn off your mobile phone in class.” The interesting question is then, why are only these norms conscious and articulate? The answer is that these norms are visible because they are in one respect or another problematic. Regarding the examples mentioned above all students share the experience that these norms are regularly disregarded by themselves or others. These norms are visible, because they conflict with other desires, preferences, or norms.

The point I am trying to make is one of hermeneutics: of all the normativities and moralities that surround us, we are only aware of the small subset that is problematic. These normativities become problematic when they conflict with competing normativities. I am aware of a norm because it tends to conflict with some of my preferences. Or because – as in the case of a moral dilemma – it conflicts with another norm demanding my loyalty. Or because in an intercultural encounter I find out that what I considered to be self-evident, is weird in the eyes of the other. Or because a new technology disrupts my practical routines, thus forcing me to reflect on the norms embedded in those routines. This is a crucial finding in the context of anticipating soft impacts of emerging technologies. It basically implies that it

is impossible to first describe the existing practice, and subsequently explore how this practice may be disturbed by the emerging technology we seek to understand. The normativity embedded in the current practice only becomes visible because, and to the extent that, it is contrasted with an alternative practice that we can imagine resulting from the introduction of a new technology. Clemens Driessen and Michiel Korthals (2012) have described this mechanism in some detail for two different emerging technologies: so-called pig towers and in-vitro meat. By introducing these technologies into the debate, it became possible to articulate (some of) the meanings, norms and values that are embedded in the current practices of pig husbandry and eating meat. The normative challenge inherent in devising scenarios on the soft impacts of emerging technologies is thus to articulate as precisely as possible, and in rich detail, what are the normative (including moral) stakes inherent in these current practices, and how these stakes may be challenged by the new technologies. At the same time, we must realize that our articulation of these normativities is always restricted by the specific ways they are disclosed by the technologies in question.

Avoiding relativism

It is realistic to assume that in a different technological environment, our present morals will have co-evolved – not as passive adaptation, but as the result of active coping with new realities. But doesn't this observation open the door for moral relativism? This is the last normative challenge posed by soft impacts.

Scenarios are a good way to explore soft impacts, including technomoral change. But from what standpoint can one judge the morals of a possible future? Here we have to avoid two extremes. Moral *presentism* simply favors current morals over the future ones we imagined as part of the scenario exercise. This precludes the possibility that our future selves, or our children, might have learned something worth knowing and applying in the present. Moral *futurism* rests on the opposite mistake of precluding the possibility that we presently possess a sharper insight into rights and wrongs than our future selves will. Once a technological opportunity exists, it is hard to pause and critically reflect on the novel rights and duties that this opportunity has called into existence.

How can one avoid moral relativism, either in its form of moral presentism or in its form of moral futurism? The obvious answer is to look for moral principles that are so basic that they are somehow immune to the flow of time. Such foundationalism, however, is incompatible with the turn from *theoria* to *praxis*, as I sketched it above. Like relativism, foundationalism risks deflating core intellectual virtues such as openness, curiosity, reflexivity, creativity and willingness to learn. These virtues are indispensable in a technological culture, as they reflect its dynamism. We do not need an Archimedean point to decide on *the* best morality. In our search for (moral) truth it suffices, as Hans Georg Gadamer (1986) pointed out decades ago in his book on philosophical hermeneutics, to seek out conflicting perspectives that invite us to question our prejudices. Moral learning can occur whenever people are confronted with 'strange' or new conflicting morals — even when, as in art, we have to devise these conflicting perspectives in our imagination. Moral plurality invites reflection, (self-)criticism, dialogue and the open exchange of ideas. By developing technomoral scenarios, we travel to future worlds where different technologies and morals prevail. It is by seeking this confrontation between present and imagined morality, that we learn to guide technological change in a manner both reflective and flexible, without reifying either the present or the possible future.

Much of ethics is predicated on law, which is geared towards taking the right decision in a certain moment, e.g. left or right; guilty or innocent? In the case of technology, this type of ethics always leads to the choice: Prohibit or Allow? If prohibiting, then there should be clear and present harm. If allowing, end of discussion and reflection. However, if we take a practice-based approach to ethics, alternative paradigms crystallize. For example: how to deal with your adolescent child? Or: how to coexist with your neighbours and co-citizens? In these contexts Yes or No choices make little sense. Here we are dealing with evolving relations that require permanent negotiating, updating, articulating and investigating what is important in life, in society, checking whether existing practices are still the best way to deal with that challenge, trying out different coping strategies such as peaceful cohabitation, separation of domains, outright conflict or compromise. This is neither relativism nor foundationalism; this is coping.

Conclusion

In this paper I have argued that we can no longer afford to ignore technology's soft impacts, as this type of impact is becoming increasingly prominent in affluent societies where people have sufficient resources to pursue self-realization and where technologies are becoming ubiquitous in the life-world. These soft impacts come with their own type of normative challenges. The first challenge is to acknowledge the mutual shaping of technology and morality. The second one is to anticipate soft impacts, which requires a rich and thick description of our morally-laden current practices in the light of plausible technomoral change provoked by emerging technologies. The third and last challenge is to avoid both relativism and foundationalism, by opting for an open and learning attitude vis à vis the ways new and emerging technologies put our current morals into question.

Notes

¹ I want to thank the anonymous reviewer for some very astute comments on this article, to which I hope to have done justice in this version.

² If a party causes harm by misusing a technology, that is usually not regarded as a technological risk in the strict sense, but it can be 'adopted' as a responsibility of regulators.

³ Of course, 'indeterminate impacts' are somewhat of an oxymoron, as these 'impacts' are co-produced by society/the user, which/who is therefore not a passive dupe of technology but a co-producer of socio-technical phenomena.

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