

RESEARCH PAPER

Future value change: Identifying realistic possibilities and risks

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ABSTRACT

The co-shaping of technology and values is a topic of increasing interest among philosophers of technology. Part of this interest pertains to anticipating future value change, or what Danaher (2021) calls the investigation of ‘axiological futurism’. However, this investigation faces a challenge: ‘axiological possibility space’ is vast, and we currently lack a clear account of how this space should be demarcated. It stands to reason that speculations about how values might change over time should exclude farfetched possibilities and be restricted to possibilities that can be dubbed realistic. But what does this realism criterion entail? This article introduces the notion of ‘realistic possibilities’ as a key conceptual advancement to the study of axiological futurism and offers suggestions as to how realistic possibilities of future value change might be identified. Additionally, two slight modifications to the approach of axiological futurism are proposed. First, axiological futurism can benefit from a more thoroughly historicized understanding of moral change. Secondly, when employed in service of normative aims, the axiological futurist should pay specific attention to identifying realistic possibilities that come with substantial normative risks.

Introduction

While philosophers have long sought to unearth morality’s unshakable foundations, in recent years, there has been growing scholarly interest in how morality evolves over time. Examples of recent and current moral shifts in Western societies include the moralization of CO₂-emissions, the demoralization of homosexuality and the elevated moral status of several non-human species. Taking a broader look at history, moral change abounds and manifests itself on various time-scales. As a result, researchers from multiple fields have taken an interest in the topic, scrutinizing, for instance, the evolutionary roots of moral cooperation (Boehm, 2012; Tomasello, 2016; Sterelny, 2021), the sociobiological and material pressures that have shaped moral systems throughout human history (Kitcher, 2011; Morris, 2015; Buchanan and Powell, 2017) as well as the moral revolutions that have occurred over the last few centuries (Appiah, 2010; Pleasants, 2018; Baker, 2019).

Philosophers and ethicists of technology have also broached the topic of moral change, specifically by studying the dynamic relationship between values and technology (Kudina, 2019). While some work on techno-moral change (Swierstra, 2013) is historically oriented (Nickel *et al.*, 2022; Hopster *et al.*, forthcoming), recent lines of investigation also include conceptual, normative and anticipatory analyses of value change. For instance, van de Poel (2021) has articulated a typology of value change, while the techno-moral scenario approach advanced by Boenink *et al.* (2010) is geared explicitly towards anticipating future trajectories of techno-moral change. Such anticipatory work, in turn, is often linked to normative aims. In comparison, policymakers regularly invoke

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the normative planning method of backcasting: start with outlining a desirable future and subsequently work backwards to disclose pathways to realize it. Something similar might be done in assessing emerging technologies (Brey, 2012), or for purposes of value sensitive design (Friedman and Hendry, 2019): identify techno-moral futures which differ in terms of their moral desirability and subsequently adjust technology design to make the actualization of the more desirable futures more probable.

Anticipatory models and scenarios do not aim to predict what *will* occur. Attempts at predicting the future of complex societal dynamics have a record of being hubristic (Jasanoff, 2003; van de Poel, 2016). Instead, the current generation of approaches in foresight ethics (Floridi and Strait, 2020) seeks to anticipate what *might* occur. Given the limitations of our knowledge, as well as the indeterminacy of how causal pathways towards the future unfold, this implies that analysts should anticipate a range of possible moral futures (cf. Boenink *et al.*, 2010). This moderates futurists' predictive ambitions, but it makes the undertaking more rigorous in turn. Rather than succumbing to the tunnel vision of envisioning only one future, the aim of anticipatory studies should be to generate a sketch of the broader landscape of future possibilities.

A proviso needs to be added, however: mere possibilities that do not stand a serious chance of becoming actual are a distraction to futurists and should be excluded from this broader vista. In other words, some sort of plausibility requirement should play a role in scenarios of future value change. There has of yet been little reflection on the precise nature of this requirement. Arguably, the most rigorous methodological proposal to date for studying the future dynamics of moral change has been outlined by Danaher (2021). Under the heading of 'axiological futurism', Danaher proposes systematically exploring axiological possibility space and outlines tools for navigating it. Danaher is aware that the vastness of axiological possibility space poses a challenge for this undertaking. He concurs that speculations about how values might change over time should exclude farfetched possibilities and be restricted to possibilities that can be considered realistic in some relevant sense. But how, exactly, should this realism criterion be understood? Neither Danaher's work, nor existing research on techno-moral change (e.g., Swierstra, 2013) provides a worked-out view to answer this question. Possibilities come in different sizes and shapes. Philosophers commonly distinguish among logical, metaphysical and physical possibilities, and various further modal categories can be distinguished (epistemic possibilities, conceptual possibilities and so on). Which of these, if any, are the kinds of possibilities on which anticipatory scenarios should focus?

This article offers an answer to this question, and thereby seeks to further axiological futurism. Its approach is to take the plausibility requirement at face value: axiological futurists should seek to approximate the historically indexed notion of 'real possibilities'.¹ In the spirit of constructive criticism, this claim will be used to engage with Danaher's (2021) framework, which provides the most rigorous methodological outline to date for studying future value change. The lessons are equally applicable to the techno-moral change literature and to anticipatory approaches in the ethics of technology more broadly. These should be restricted to identifying realistic possibilities, and a historically oriented approach can provide important insights about what these possibilities amount to.

The second proposal of this article pertains to the normative aims of axiological futurism. Axiological futurism may be regarded as a value-neutral tool whose aims are purely anticipatory. But, as noted, the tool can be incorporated in frameworks of anticipatory ethics and value-sensitive design, whose aims are explicitly normative. By employing the tool with normative aims, axiological futurists can benefit from adhering to a further criterion. Not only should they focus on identifying realistic possibilities, they should also seek to identify realistic possibilities that are distinctly risky. An analogy is drawn with anticipatory efforts in the climate discourse. Recent debates in climate science, overviewed in the latest report of the Intergovernmental Panel on Climate

¹Real possibilities have previously been discussed in the philosophical literature, albeit in a rather different context, namely the metaphysical debate over indeterminism and free will (Müller *et al.*, 2018). This metaphysical context is tangential to the current discussion.

Change (IPCC, 2021), suggest that, for purposes of decision-making in the face of deep uncertainty, a concerted effort to pin down the respective likelihoods of different future scenarios may not be very helpful. Instead, the bulk of decision-relevant information pertains to the question of which of the impacts that are regarded as particularly harmful constitute realistic risks. Since similar – if not greater – uncertainty besets anticipations of future value change, axiological futurists are well advised to adopt a similar focus on identifying risky outcomes that are particularly harmful when employing axiological futurism as a normative tool.

Axiological futurism and the ‘mere possibilities’ challenge

Anticipating future value change is an inquiry which Danaher calls ‘axiological futurism’. A key aspect of Danaher’s methodology centres on the notion of an axiological possibility space. An axiological possibility space represents a possible constellation of future values. The representation need not be comprehensive; it might single out a few future possibilities rather than sketching the range of possibilities in its entirety. For present purposes, however, let us consider the entire set of possible future value trajectories. Thus understood, studying future value change involves the systematic exploration of axiological possibility space.

What possibilities are encapsulated in this space? This can be gauged by the diversity of moral theories and codes adopted in current societies. As Danaher (2021, pp.4–5) observes, moral frameworks typically specify the following four components:

- i. *an axiology*: a theory specifying what counts as good and what counts as bad (values and disvalues)
- ii. *agents and patients*: a specification of what makes someone or something a moral subject and/or an object of moral concern
- iii. *internal relations*: a specification of the relationships between the different elements within an axiology, such as their respective priority
- iv. *pattern of outcome*: a specification of the appropriate pattern according to which moral goods ought to be procured (e.g., maximization of goods, sufficiency for each agent etc.)

These parameters do not only vary amongst extant moral frameworks, but also provide an indication of how morality might change over time: the identification of moral values and disvalues may shift, the circle of moral concern may expand or contract, the priority of values and subjects may change and the favoured pattern of outcome may alter (cf. van de Poel 2021).

To give an example of the former – changes at the axiological level – consider the value of equality. As Danaher (2021, p.6) observes:

Philosophers have identified dimensions or parameters along which different conceptions of [this value] can vary. A theory of equality, for example might vary along two dimensions: equality of opportunity and equality of outcome. Given these two parameters, a researcher can construct a simple 2×2 logical space for the value of equality, classifying different possible axiologies depending on whether they score high or low on those two dimensions.

Put in modal terms, philosophers have previously identified different conceptual possibilities associated with the value of equality. In turn, these can be rendered as parameters in axiological possibility space. Which possibilities, however, are admissible? Here axiological futurism faces a challenge, as Danaher (2021, p.5) acknowledges:

Presumably, axiological possibility space is vast – much larger than anyone can really imagine. But equally, many of the ‘possible’ axiologies within this space are not that plausible or interesting: e.g. a world in which the subjective pleasure we experience while scratching our knees is the only recognised good may be possible (in some thin sense of the word ‘possible’) but is not very plausible

and should not concern us greatly. [Therefore] we need some constraints on the boundaries of axiological possibility space to make the project feasible.

Danaher rightly stresses that axiological futurists should not rest content with outlining mere possibilities. Instead, they should take on the more challenging task of outlining possibilities that are realistic, in some relevant sense. But how to judge whether this is the case?

Danaher provides two suggestions. First, a wide range of evidential sources provide insight into what is – and is not – possible in terms of moral change, much of which goes beyond strictly philosophical work. Values differ in current societies, they have varied throughout the course of history and they are associated with distinct psychological traits. These variations and associations shed light on the diversity of possible value systems, as well as some of the constraints thereon. To give one example, Danaher refers to moral foundations theory, which suggests that there are five or six robust dimensions of value in human moral psychology (Graham *et al.*, 2013). If this is correct, and these five or six dimensions are recurring pillars for any moral system, then this sets constraints on the kinds of variations that moral systems can take. Similar kinds of insight about the breadth and constraints of moral possibility space might arise from such fields of inquiry as evolutionary anthropology (e.g., Henrich, 2020) and comparative human ecology (e.g., Flanagan, 2017), as well as the study of human history (e.g., Morris, 2015).

Secondly, constraints can be discerned in existing work on axiological theory. This work suggests, for instance, that there is a fixed set of items that can be included in any possible list of goods/bads, such as ‘subjective pleasure, desire satisfaction, knowledge, friendship, beauty, education, health, money, family [and] food’ (Danaher, 2021, p.5). The same holds for the kinds of entities that are ascribed a certain moral status (e.g., all humans, all sentient beings, all living entities) and the relationships that exist among them (e.g., equal treatment versus hierarchical treatment). While there is certainly a substantial amount of moral diversity, we already have a good idea of what this diversity amounts to.

The general outline of Danaher’s twofold response to the mere possibilities challenge is along the right lines, but its details need refining. Danaher is certainly right to draw lessons from empirical sciences and history in ascertaining what is – and is not – possible in terms of future value change. In fact, these lessons might be taken even further and should outweigh the conceptual considerations to which Danaher appeals. Consider his appeal to existing work in axiology, which suggests that the sets of goods that can be contained in any value system are fairly static. This appeal seems difficult to reconcile with the apparently open-ended character of the value changes that have occurred throughout history. The value of sustainability, for instance, does not seem to be reducible to any of the items in the abovementioned set of goods. Historically, this value was clearly articulated – and has become widely endorsed – only since the last decades of the twentieth century (van de Poel, 2021). Or consider the value of privacy, which – like many other values – has been interpreted differently in different historical epochs (Holvast, 2009), transforming from a physical notion to an informational notion. Given that the conceptualization of values evolves over time, an inventory of the conceptual diversity currently recognized in philosophical work is likely to provide a skewed and overly narrow picture.

There is reason to think, then, that axiological possibility space should be rendered more dynamic than Danaher’s account allows. The axiological futurist’s framework should be more thoroughly historicized. This proposal goes hand in hand with a suggestion to explicate further the conceptual aim of axiological futurism. What, exactly, are the kinds of possibilities that axiological futurists should seek to identify? The answer to this question argues that axiological possibility space should be understood in terms of the temporally indexed notion of realistic possibilities.

Realistic possibilities: a historicist approach

Real possibilities are those possibilities that might actualize, conditional on the state of the world at a specific moment in time. Hence, at some point in time t , the set of real possibilities consists in all states of affairs whose realization is compatible with the state of the world at time t (Betz, 2016). Real possibilities differ from other kinds of possibility that regularly feature in philosophical

discussions, such as logical, conceptual and physical possibilities, by virtue of being a temporal notion. They are anchored in concrete situations and oriented towards the future: what is really possible at any given moment is what can temporally evolve from a concrete situation against the background of what the world is like (Müller *et al.*, 2018). As time passes, real possibilities can become more proximate or remote. What was once a farfetched possibility may turn into an adjacent possibility over time, or vice versa. The remoteness of a possibility depends on its ease of realization: the more difficult this realization is, the less realistic it becomes (Hopster, 2018).

While real possibilities are a metaphysical notion, they have their epistemic counterpart in what I call ‘realistic possibilities’, possibilities that we judge to be realistic to the best of our knowledge. When it comes to sketching scenarios about what might realistically occur in the future, our aim is to approximate the real possibilities as close as we can. The totality of our background knowledge is relevant for this purpose; at minimum, our identification of realistic possibilities should be compatible with this background knowledge (Betz, 2010). But arguably, this minimal constraint does not suffice. Many propositions that are not obviously excluded by our background knowledge seem highly improbable. To reiterate Danaher’s (2021, p.5) example, in a thin sense of being ‘possible’, there might be a possible future world in which the subjective pleasure we experience while scratching our knees is the only recognized good. Arguably, our background knowledge does not strictly *exclude* this possibility. However, neither is there any positive support for this proposition. In the absence of such support, it should be disqualified as a realistic possibility.

What matters, then, for a possible state of affairs to be included in the set of realistic possibilities is not only that our background knowledge does not exclude it, but also that we can give it some positive epistemic support. Such support might consist, for instance, of outlining the mechanism which could give rise to this state of affairs. If this mechanism is well understood and deemed scientifically plausible, then the state of affairs is realistically possible. Historical precedents are another source of insight into realistic possibilities. If some state of affairs obtained in the past, then *ceteris paribus* it might also obtain in the future. Considerations like these are quite relevant, for instance, in the context of assessing long-term risks of climate change (Parker and Risbey, 2015). Our historical and geological record of mass extinctions, rapid temperature shifts and massive sea-level rise provide an important evidential source for taking the prospect of radical long-term change resulting from anthropogenic greenhouse-gas emissions very seriously (Hopster, 2020a).

Now, let us return to the project of axiological futurism. The possibilities that axiological futurists should be after are realistic possibilities, understood in the above sense. Danaher’s (2021) approach to axiological futurism is largely consonant with this proposal: it is thoroughly multidisciplinary, takes input from evidence from various sources and pays specific attention to historical examples to calibrate axiological possibility space. But Danaher’s reliance on conceptual claims about the goods contained in all axiologies might be unduly restrictive and insufficiently anchored in an historical account of what state of affairs might evolve starting from our current position. His approach can be historicized more fully. From the perspective of realistic possibilities, four avenues suggest themselves for readjusting the approach of axiological futurism along these lines.

A first suggestion is to give explicit attention to processes of moralization and demoralization (Buchanan and Powell, 2017) in the anticipatory framework and to entertain seriously the notion, drawing on historical evidence, that such processes are surprisingly open-ended. Moral values can be reinterpreted over time, as the example of privacy suggests. But human practices can also be moralized anew, leading to new values, such as sustainability. Furthermore, practices may lose their moral significance. For examples of the latter, consider the value of chastity, which has lost much of its moral significance in the Western world since the sexual revolution of the 1960s (Hopster *et al.*, forthcoming). Or consider bastardy, which was heavily moralized until the early twentieth century in England (Baker, 2019), but has arguably become entirely devoid of moral significance in English society today. A further dimension of moralization is the objectification of moral issues (Hopster and Klenk, 2020; Wright, 2021), which can similarly shift as time passes. Rather than setting out with a fixed list of goods and bads, axiological futurists might be better

served by incorporating the sliding scales of moralization and objectification as key dimensions in axiological possibility space.

How can we anticipate which objects and entities may be (de)moralized in the future? A second suggestion for the axiological futurist is to take seriously the idea that morality evolves through societal pressures (Anderson, 2016; Hopster, 2020b; Smyth, 2021) and that moral norms and values can often be understood as a functional response to the problems of communal life that societies have historically faced (Kitcher, 2011). If this view is along the right lines, then we should expect that the major challenges societies will face in the future will similarly solicit a moral response. What will be the main challenge that societies are likely to face over the next few decades? And what pressures might these challenges exert on moral norms and values? To view moral evolution as a process of historical, societal learning (Hopster, 2020a), which typically occurs reactively in the face of the challenges that sociotechnical and environmental predicaments engender, provides a helpful angle to get some hold on the realistic possibilities of the future.

Building on this approach, a third suggestion to the axiological futurist is to come up with a more detailed framework of what is involved in stabilizing and disrupting values (Hopster, 2021b). For instance, to what extent do socioeconomic and technological background conditions correlate with the adoption of specific value regimes? To what extent do such conditions enable, or even determine, the respective moral frameworks? As Danaher acknowledges, historical work (especially Morris, 2015) can provide a rich source for answering these questions, and so can various insights from human biology, sociology and anthropology (e.g., Flanagan, 2017). But the merits of these sources notwithstanding, a fully fledged account of how values are stabilized in the interplay with broader societal and technological dynamics is still forthcoming. In this regard, it might be specifically helpful to scrutinize the promise of '(techno)moral niche construction' (Severini, 2016; Hopster *et al.*, forthcoming) as a conceptual framework to describe and anticipate processes of moral change.

My fourth suggestion to the axiological futurist is to study indicators of value change. Consider moral disagreement: is this a reliable indicator of impending moral change? Or does this depend on the nature of the disagreement in question (e.g., Hansson, 2018)? Conversely, is the historical inertness of a value a reliable indicator of its future stability? Or does this depend, for instance, on whether the inertness has resulted from a process of diverse and critical interrogation (Hopster, 2017; cf. Longino, 1990)? As it stands, these questions are under-theorized. But the project of investigating moral change has only recently taken off in earnest. A more rigorous theoretical framework of how morality can change, and of what is predictive of moral changes, will give a better hold on assessing the realistic possibilities of value change that lie ahead.

Lessons from climate scholarship: scenarios and risk

There are some notable parallels between anticipatory projects in the philosophy of technology and in climate scholarship. Global warming is a slow-moving and long-term process; some of its impacts are likely to be felt over the course of decades, centuries and beyond (Gardiner, 2011). As a result, much of climate science – as well as climate policy and climate ethics – is decidedly future-oriented. The instruments that climate scientists have developed to make projections about climate futures are very sophisticated and have emerged through decades of concerted scientific effort (Winsberg, 2018). This holds, in particular, for the computer simulations used in the Climate Model Intercomparison Project (CMIP), which constitute the basis for the climate projections outlined by the IPCC.

The state of the art in climate modelling makes this field an interesting example for anticipatory endeavours in the philosophy of technology, which are by and large still in an explorative stage. A further commonality between anticipatory efforts in these domains is that both are couched in substantial uncertainty. Their sophistication notwithstanding, projections derived from climate models come along with various uncertainties (Hopster, 2022); for instance, measurement errors, the natural variability of the climate system, unknown external pressures on the climate system, the idealizations of simulation models and the potential aggrandizement of model biases through their merger in such ensembles as CMIP (e.g., Baumberger *et al.*, 2017).

Building on CMIP models, key pieces of information provided to decision-makers are the projected pathways of the Earth's mean surface temperature during the twenty-first century, conditional on different anthropogenic greenhouse gas emission scenarios as well as the likelihood that certain tipping points in the climate system will be crossed. While these projections and likelihoods are carefully argued for and meticulously justified, this is done in a framework primarily oriented towards scientific understanding, rather than a framework oriented towards decision-making about climate risks (cf. Sutton, 2019). By way of illustration, the statement that, because of climate change, the Atlantic gulf stream might be overturned during the twenty-first century has been dubbed 'highly unlikely' by the IPCC, based on modelling efforts (IPCC, 2014). Judged by the criteria outlined in the previous section, however, it should probably be included in the set of realistic possibilities. Furthermore, it is a possibility with a serious risk attached to it, as the overturning of the gulf stream is likely to have many corollary impacts that will engender major harm.

For these reasons, in recent years several climate scholars have become critical of the dominance of CMIP models, combined with the IPCC's predictive statements couched in terms of likelihood, in informing climate policymakers (e.g., Shepherd *et al.*, 2018). Arguably, given the uncertainty that is inherent in modelling efforts, CMIP projections should not be the main focal point of policy decisions in the face of the imminent dangers of global warming. Instead, as a policy instrument, these projections should be complemented with scenario approaches, which are better suited for communicating realistic possibilities in the face of deep uncertainty. A prominent scenario approach currently being developed along these lines is the storyline approach (Sillmann *et al.*, 2021). A storyline is defined as 'a physically self-consistent unfolding of past events, or of plausible future events or pathways' (Shepherd *et al.*, 2018, p.555). Storylines do not have any specific probability attached to them. Instead, typical storylines single out compound risks that arise because of climate change (Zscheischler *et al.*, 2020). In doing so, they focus on identifying realistic possibilities that matter from a normative point of view. This approach fits well with core principles of disaster risk management (King *et al.*, 2015). In its latest report, the IPCC (2021) has similarly endorsed the principles of a disaster risk management approach and increased its emphasis on communicating findings regarding low-likelihood, high-impact events.

There are two lessons to be learnt from this recent debate in climate scholarship that should be taken to heart by axiological futurists. The first lesson speaks to Danaher's suggestion to extend axiological futurism with the help of computer-assisted models (Danaher 2021, *passim*). While such efforts are likely to be valuable, they should not be pursued in isolation. Model-based approaches should be developed alongside more qualitatively oriented scenarios, as each of these pursuits comes with its own advantages (Challinor *et al.*, 2018). When it comes to anticipating value change, scenario approaches may be even more important than in climate science. This is because the dynamics of value change are arguably more historically contingent, and therefore more difficult to predict than the dynamics of climate change. Under conditions of greater uncertainty, the usefulness of scenario approaches, relative to modelling approaches, increases. One might take from this that current theorizing on techno-moral change (e.g., Boenink *et al.*, 2010), which has specifically adopted the scenario approach as its preferred method, should not simply be discarded to give way to Danaher's more formalized framework. Instead, axiological possibility spaces may be regarded as instruments to contribute to the rigour of techno-moral scenarios.

The second lesson we can take from climate scholarship concerns the normative aims of anticipatory studies. Axiological possibility space should be tailored to identifying realistic possibilities. An important aspect of the criticism of current approaches to climate modelling is that modellers seek to outline the full range of scientifically credible possibilities. In doing so, they fail to focus on highlighting what (from a risk perspective) are the most salient possibilities among these: the outliers and extremes, the tipping points and the catastrophes that may ensue. Hence, from a normative point of view, climate modellers should have a distinct focus on highlighting possibilities of substantial harm – provided, of course, that these possibilities satisfy the epistemic standard of being realistic (Hopster, 2021a).

Axiological futurists should not fall into the same trap. When operationalized in the context of normative frameworks, such as anticipatory ethics or value-sensitive design, the aim of anticipatory endeavours should not be to outline axiological possibility space in a fully comprehensive manner. There may simply be too many realistic possibilities of value change to entertain, not all of which are equally significant from a normative point of view. Furthermore, given the deep uncertainty at issue, efforts to predict which future value changes are particularly likely to occur may be futile. Instead, a more promising route is first to identify which future value changes, from a normative point of view, would be particularly significant; for instance, because they directly compromise the normative aims of a given technological design, or because they would render the design harmful. Hence, the first step is to pinpoint the most salient normative risks posed by future value change. Subsequently, building on the epistemic toolkit of the axiological futurist, engineers and ethicists should ascertain whether these prospects of ‘risky future value change’ can be regarded as realistic. If they pass the realism threshold, then it is crucial that engineers make adaptable designs, so that the potentially adverse consequences of risky value change can be mitigated.

Conclusion

I have argued for a further crystallization of the conceptual aims of axiological futurism and proposed avenues to advance it, both as an anticipatory framework and as a normative tool. First, anticipatory accounts of value change can benefit from being firmly anchored in our historical understanding of moral change. Accordingly, the notion of an ‘axiological possibility space’ can be usefully spelt out in terms of realistic possibilities. Realistic possibilities are historically conditioned. One important strategy for identifying realistic possibilities of future value change involves considering which processes of moralization and demoralization might occur in the wake of future challenges that societies are likely to face. Secondly, we should take seriously the lessons from recent climate change scholarship, which serve to underline that, where morally relevant (and potentially harmful) and uncertain changes are at play, purely anticipatory scenarios can be toothless. Such scenarios should be combined with a disaster risk mitigation approach aimed at avoiding particularly bad outcomes.

While these considerations are theoretical, they can find a more practical application; for instance, in processes of value-sensitive design. What engineers can take from the former historical lesson is that they should think seriously about processes of moralization and demoralization and associated historical pressures as being crucial to the dynamics of value change. In order to make technological designs that are resilient to value change, then, a key task for engineers is to assess whether the values embedded in their designs are likely to shift in terms of their moral significance and which features of their designs might plausibly be moralized in the future. What engineers can take from the latter, risk-based approach is that assessing their designs to identify which evaluative components constitute the candidates most likely to be subject to future value change may not be the best way to proceed. Instead, specific efforts should be made to identify realistic value changes that make a design specifically vulnerable from a moral point of view, and to mitigate the harmful implications that might ensue.

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