What Does the Debate on (Post)human Futures Tell Us?

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Methodology of Hermeneutical Analysis and Vision Assessment

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1 Introduction and Overview

The debate on human enhancement and posthumanism refers to the concepts and expectations in the field of converging sciences and technologies aiming at interventions into the human mind and body (Roco & Bainbridge, 2002). This debate is among the major contemporary fields of intellectual engagement with future relations between humans and technology. Technology assessment (TA); science, technology, and society (STS) research; reflections in applied ethics; and ethical, legal, and social implication (ELSI) studies have been, and still are, conducted in this field at an early stage of development. However, all these activities are confronted with severe methodological difficulties concerning the lack of prospective knowledge required as a subject of analysis and assessment. It can easily be seen that there is extremely high uncertainty respecting openness about future enhancement technologies and their possible use in society, as well as about "soft" consequences of this use, such as possible changes in the self-image of humans and new relations between humans and technology. Instead of valid knowledge, there are visionary stories, imaginations, narratives, speculations, assumptions and propositions, expectations and concerns that currently form the basis for, for example, TA or ethical inquiry. This situation makes it difficult, perhaps impossible, to apply established approaches to assessing scientific and technological developments in the field of human enhancement (Sec. 2). The criticism of "speculative nanoethics" (Nordmann, 2007; Grunwald, 2010) is an excellent indicator of philosophical unease about this situation.

On the other side, orientation is required also in the field of human enhancement, for example, for shaping the agenda of funding agencies and research policies. This holds in particular for technology assessment aimed at providing knowledge and orientation for policy making (Grunwald, 2009). Thus, existing TA approaches have

to be developed further, and, perhaps, new ones have to be invented and tested (cf. Nordmann, 2010; Grunwald, 2013a).

I will argue that a major role of technology assessment in very early stages of new and visionary developments is a *hermeneutical* one.[1] Based on a perspective that regards futures as social constructs (Sec. 3), I will recall the approach of vision assessment, which has been discussed elsewhere (Grunwald, 2007), and develop it further into the direction of a "hermeneutical futures analysis" (Sec. 4). The emerging novelties and challenges of human enhancement technologies have to be made tangible by making their content, their epistemic foundation, their normative elements, and their strategic constellation as transparent and clear as possible. This challenge leads to the postulate that the "hermeneutical side" of TA should be unfolded and developed further. Technology assessment must, on the one hand, uncover profound cultural, philosophical, and ethical issues. On the other, it must also look at the real-world constellation where the stories of the visionary futures are constructed and communicated by specific actors, as well as at the attitudes, concerns, and interests of the stakeholder groups and persons involved.

This methodological effort is intended, on the one hand, to help prepare society for coming debates by assessing ideas and visions with regard to social values, human rights, ethical criteria, and so forth. On the other, hermeneutical analysis of the current debates on posthumanism includes asking for the reasons why this debate has emerged in our contemporary situation and why it has been attracting so much attention for more than a decade now. Answers to these questions could help uncover and better understand today's specific challenges to the *conditio humana* and could thereby contribute to transparently clarifying our contemporary situation (Sec. 5). The possible emergence of an "enhancement society" based on trends toward social Darwinism and ever-increasing competition may be among the roots of uneasiness in the debate on human enhancement (Sec. 5).

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1   This chapter builds on several publications of the author in this field, in particular on Grunwald, 2012a, 2013a, and 2013b. The added value consists in bringing together the proposal to distinguish between different modes of providing orientation by assessing and reflecting futures (2013b) with earlier work on vision assessment (2007; 2009; 2013a) in the field of new and emerging sciences and technologies, in particular on human enhancement.

2   The Debate on (Post)human Futures in the Light of the TA Experience

Technology assessment was introduced in the 1970s in the U.S. Congress as information resource and support for political decision making (Bimber, 1996). In recent years, its traditionally close relation to prospective research and policy advice (Sec. 2.2) has been challenged by debates on technovisionary futures (Sec. 2.3). While there is still a need for orientation (Sec. 2.1), the classical TA approach no longer works.

2.1   The Need for Orientation in the Field of Human Enhancement

While futuristic visions as in the field of human enhancement often appear some-what fictitious in content, such visions can and will have real impact on scientific and public discussions (Grunwald, 2007). We must distinguish between the degree of facticity of the *content* of the visions and the fact that they are used in genuine communication processes *with their own dynamics*. Even a vision without any fac-ticity at all can influence debates, opinion forming, acceptance, and even decision making. Visions of new science and technology can have a major impact on the way in which political and public debates about future technologies are currently conducted and will probably also have a great impact on the results of such debates—thereby considerably influencing the pathways to the future in at least two ways:

- Futuristic visions are able to change the way the world is perceived. The discussion on human enhancement, for instance, already alters the self-understanding of humans through the simple fact that it takes place (Grunwald, 2007). The *new conditio humana* designates a world in which there is no longer any ideal state of the physical and intellectual constitution of a healthy human being, but in which even this ideal state seems to be formable—independent of the questions whether and when the scientific and technical means for actually realizing a technical improvement of the human body, mind, and society will be available. The societal and public debate about the chances and risks of new technologies will revolve around these visions to a considerable extent, as was the case in the field of nanotechnology (cf. Brune et al., 2006) and as is currently the case in synthetic biology (Coenen, Hennen, & Link, 2009). Visions motivate and fuel public debate because of the impact these visions have on everyday life and on the future of areas of society such as the military, work, or health care and

because they are related, to some extent, to cultural patterns (DEEPEN, 2009). Negative visions and dystopias could mobilize resistance to specific technologies.

- Visions have a particularly great influence on the scientific agenda and, as a consequence, partly determine what knowledge will be available and applicable in the future (Dupuy, 2007). Directly or indirectly, they influence the views of researchers and, thus, ultimately also have a bearing on political support and research funding. Visions, therefore, influence decisions about the support and prioritization of scientific progress.

The factual importance and power of futuristic visions in the governance of knowledge and in public debate is a strong argument in favor of providing early policy advice in the fields of technovisionary sciences with a view to increasing reflexivity and transparency in these debates (Grunwald, 2013a). Policy makers and society should know more about these visions—they must be informed and "empowered" to deal constructively and reflectively with futuristic visions in processes of "anticipatory governance" and "responsible development."

This conclusion is supported by calls for a more democratic governance of science and technology (MASIS Expert Group, 2009). Futuristic visions contain a mixture of facts and values, allowing them to be used for ideological and interest-based purposes. Special consideration must, therefore, be given to the challenge of how democratic deliberation and public debate could be involved in shaping the future course of technovisionary sciences such as human enhancement, taking the described lack of knowledge and the so-called control dilemma (Collingridge, 1980) seriously. An open, democratic discussion of technovisionary sciences is a prerequisite for a constructive and legitimate approach to shaping the future research agenda, regulations, and research funding. The requirement for transparency with respect to future projections and the arguments, premises, and visions they comprise is indispensable (Grunwald, 2013a).

2.2   Impact orientation of technology assessment

It seems to be obvious to meet the described need for orientation with the available and established approaches. Technology assessment, in particular, should be mentioned here, since it was designed for exactly this purpose: to develop and communicate knowledge- and science-based orientation for dealing with the scientific-technical advance and its impacts on society (Grunwald, 2009). The impact perspective with special attention to unintended consequences of technology is characteristic for TA. This also applies to technology design approaches in the

context of technology generation, like constructive technology assessment (CTA; cf. Rip, Misa, & Schot, 1995), where design aims to realize intended and prevent or minimize unintended impacts.

Impact orientation is inherent in central concepts of TA such as the *early warning* of technology-induced risks (Paschen & Petermann, 1992, p. 26), but also the *early detection* of the opportunities of technology in order to use them in the best possible way. Both concepts are about weighing up chances and risks, which are, in the end, only impact dimensions seen from different assessment perspectives (Bechmann, 2007). Technology assessment will contribute to the systematic expansion of foresight regarding the temporal and thematic impacts of scientific and technological progress instead of applying the principle of "trial and error," as was often done in the past. Therefore, research on the impacts of technology is the central analytical element of TA.

Technology assessment impact research must be *prospective* since it investigates the impacts of technologies that do not yet exist or will possibly never exist. Technology assessment can only contribute to design objectives like early detection or early warning if it works prospectively. However, the state of future knowledge in general and knowledge on technology impacts in particular is known to be precarious from an epistemic point of view. Since the possibilities of TA to develop reliable options for action in order to contribute to the realization of design intentions depend on the knowledge on impacts and its quality, this is one methodological focus of TA.

The earliest historical TA approach to solving this problem consisted in the use and further development of forecasting methods (mode 1 orientation following Grunwald, 2013b). The prognostic imagination of future developments was used to create a reliable framework that integrates pending decisions, for example, on the regulation or expansion of infrastructures, in the best possible way. While this approach often works for scientific prognoses, for example, in celestial mechanics or weather forecasts, the necessary conditions—causally closed systems—are generally not given in key societal fields of action and development including the way of dealing with scientific and technological progress. Since the course of the future depends on human decisions that might be influenced by the very impact statements (self-fulfilling and self-destroying prophecies), the problem of prognosis cannot even be solved by additional research. Rather than raising hopes for reliable prognoses, this results in considerable uncertainty about the impacts of technology and a, partly significant, diversity and divergence of corresponding technology futures (Grunwald, 2012a).

Instead of focusing on prognostic impact research, TA has developed possibilities for *orientation* by scenarios (mode 2 orientation following Grunwald, 2013b). Today, scenarios are established in many fields of TA (for example, sustainability

analyses) as a standard concept for the systematic reflection on a future that is basically considered open and, therefore, not predictable. They are particularly common where there is a need for orientation on complex problems; where these problems are of overarching, societal importance; and where different knowledge, diverse opinions, and views need to be integrated (for example, Heinrichs et al., 2012). In this way, TA has learned to handle the openness of the future and the implied unpredictability in a constructive way.

2.3   The Debate on (Post)human Futures—beyond the Scope of TA

The necessary precondition of mode 2 orientation to be applicable is the existence of well-founded corridors of the envisaged future development. Frequently, those corridors are mirrored in sets of scenarios where often best-case and worst-case scenarios serve as the borderlines of "sensible" future developments. In the human enhancement debate, this precondition is not fulfilled: neither the mode 1 nor the mode 2 approach is applicable.

The human enhancement area is only one among other fields in this regard. In the past decade, there has been a considerable increase in visionary communication on future technologies and their impacts on society, for example, in the fields of nanotechnology, the converging technologies, synthetic biology, and climate engineering (Zülsdorf et al., 2011; Coenen & Simakowa, 2013). Visionary scientists and science managers have put forward far-ranging visions that have been discussed in science and the humanities and that also have been disseminated by mass media and have led to societal debates. These futuristic visions refer to a distant future, some decades ahead, and exhibit revolutionary aspects in terms of technology and of culture, human behavior, and individual and social issues. As a rule, little if any knowledge is available about how the respective technology is likely to develop, about the products that such development may spawn, and about the potential impact of using such products. Extremely high degrees of uncertainty respecting openness are, thus, involved, leading to severe controversies with regard not only to societal issues but also to the feasibility of the visionary technologies. Images of the future, then, sometimes range from paradise-like expectations to apocalyptic fears, without a reliable and agreeable possibility to rank the pro and con arguments in a transparent way (Grunwald, 2012a; 2012b, Ch. 10).

Frequently, TA aims at weighing risks against opportunities and providing an integrated, comprehensive, and balanced consideration. In the field of human enhancement and other technovisionary debates, however, this is not possible because

it is not yet clear which possible technical developments should be considered as risks or as opportunities. On the contrary, the same technical issues can be taken as motivation to express fascination and euphoria, on the one hand, and as threat to humankind, on the other. Depending on different ethical positions, extremely contrary conclusions may be derived. Compare, for example, the position of Harris (2010) based on a liberalist view, with the position of Sandel (2007), characterized by a more communitarian stance. Thus, interpretations and assessments of the future prospects related to "converging technologies for improving human performance" (so the title of Roco & Bainbridge, 2002) show the *maximum imaginable disorientation*: they oscillate between expectations of paradise and of catastrophe (Grunwald, 2007, pp. 385ff.). If no approaches were available for assessing and scrutinizing diverging futures in a "rational" sense, then the seeming arbitrariness of the futures of human enhancement and their assessments would destroy any hope of gaining orientation by reflecting on future developments, as is the usual business of TA.

Thus, a classical TA-type approach will not work in this field simply because of the lack of knowledge about expectable consequences. It is absolutely not clear what the subject of an assessment should be (by the way, this was also the kernel of the criticism against "speculative nanoethics," Nordmann, 2007). One way of dealing with this situation could be, from a TA's point of view simple: Let's wait

- either until the debate has disappeared again because of its possibly nonrelevant content (in this case, the debate might well be conducted in philosophical seminars or in the "feature" sections of newspapers but would be lacking any practical relevance)
- or until more and better knowledge is available as subject to sound assessments as soon as the scientific and technological progress allows for more specific insight into paths of development, innovation possibilities, risks and opportunities, and so forth.

However, this strategy of waiting would contradict what has been said in Section 2.1—there is a need for orientation already today. Thus, we end up in a seemingly aporetic situation: orientation is needed but not achievable because of the lack of valid knowledge about innovation pathways, diffusion of enhancement technologies, and the consequences of their use. So it seems that the aim of providing this orientation though future communication is not achievable. When there is both a negative and a positive utopia, uncertainty and confusion are even increased. New tools for structuring, interpretation, criticism, rationalization, and assessment of visionary future communication are needed to overcome the described aporia.

3   Visionary Futures as Social Constructs

To continue along this path, it is advisable to recapitulate briefly the nature of future expectations, here especially of visionary futures. We make statements and forecasts on the future, simulate temporal developments and create scenarios, formulate expectations and fears, set goals, and consider plans for their realization. All this takes place in the medium of language (Kamlah, 1973) and is, thus, an element of the respective *present* time. Forecasters and visionary writers cannot break out of the present either, always making their predictions and projections on the basis of present knowledge, present assessments, and present values and interests. For this reason, we can talk about *possible* futures, about alternative possibilities of imagining the future, and explain why we expect something in the future. These are always *present pictures of the future*, but not pictures of what the future reality will be (Goodman, 1954; Picht, 1969).

If we talk about cyborgs or far-ranging human enhancements being possible in the future, we are not talking about whether these developments will "really" occur and what this occurrence would "really" imply but how we imagine *today* their possible manifestations in the future—and such imaginations differ greatly or diverge completely, as is not surprising in a pluralistic society (Grunwald, 2012a). Futures are, thus, always something contemporary and change with the changing attitudes, knowledge, diagnoses, hopes, and fears in each present. Futures are, thus, not something separate from the present, but a specific part of each present.

Futures do not exist *per se*, and they do not arise of their own accord. On the contrary, futures are "human-made" and constructed in a more or less complex manner. They are created by authors, teams, and institutes, who and which have interests, perspectives, diagnoses, expectations, and so forth. The shaping of futures is purposive action. Futures, regardless of whether they are forecasts, scenarios, plans, programs, visions, or speculative fears or expectations, are "produced" using a whole range of ingredients such as the available knowledge, value judgments, and suppositions. This constructed character of any future (that is, that it is the result of a construction process) is an essential point of departure for developing methods to extract orientation from them in cases when neither mode 1 orientation (by prediction) nor mode 2 orientation (by scenarios) would work (Grunwald, 2013b).

A discourse concerning content and quality of future statements is, thus, a discourse about the diverse components (knowledge, assumptions, extrapolations, values, and such) that are present in the respective positions on the projected developments and about the methodological approach to creation of the respective pictures of the future. A dispute about enhancement and posthuman futures, therefore, does not refer to the events projected to come about in a future present but to

the reasons that the respective futures and visions are brought forward today. Thus, in taking seriously that visions of human enhancement are social constructs, we could learn something about the intentions of their authors, about their perception and discussion in scientific disciplines and in the public, about hidden hopes and expectations, but also fears and concerns by analyzing them.

In a nutshell, in the absence of the possibility of applying approaches allowing for mode 1 or mode 2 orientation, there is no possibility to use futures in the familiar way for orienting opinion forming and decision making. What remains to be done is performing a *hermeneutical turn*: focusing on what the visions of human enhancement might tell us about our present time and using them as a means of diagnosing our contemporary situation. However, this mode 3 approach (Grunwald, 2013b) describes a completely different mechanism of providing orientation compared to what we normally expect from considering and assessing futures by mode 1 and mode 2 approaches. The only orientation they can provide given their irreducible divergence is a hermeneutical insight to allow a better informed and reflected debate for preparing to make decisions and to take measures. It is a matter of reflexive clarification of the conditions under which people can act and decide today, taking into account divergent future perspectives. So, mode 3 orientation can only be understood as an offer to improve the conditions of an open, transparent, and democratic deliberation and negotiation facing strongly diverging pictures of the future.

4   Toward Hermeneutical Futures Analysis

New or further developed methodical approaches are needed to analyze and assess futuristic visions, especially their content, their cultural background, their degree of reality and probability, their feasibility, their normative aspects, and their impact on the public and political debate. Visions must be made the subject of prospective *hermeneutical* analysis in order to better understand their content and their strategic constellation. The primary issue is to clarify the *meaning* of the future projections: What is at issue; what rights might possibly be compromised; what images of humankind, nature, and technology are formed, and how do they change; what anthropological issues are involved; and what designs for society are implied in the projects for the future?

Thinking about these issues is obviously not aimed at direct policy action but is more about understanding what is at stake and issue in the debates on human enhancement—contributing to a "hermeneutics" of possibly changing elements of

the *conditio humana* (Grunwald, 2007). In this way, hermeneutical reflection based on philosophical and social science methods such as discourse analysis can prepare the groundwork for anticipatory governance informed by applied ethics and technology assessment. Ultimately, this may promote democratic debate on scientific and technological progress by investigating alternative approaches to the future of humans and society with or without different technovisionary developments.

This "hermeneutics" of visions should address not only the cognitive but also the normative content and value dimension of the visionary communication, which are both culturally influenced. Hermeneutical analysis could result in better understanding of the origins and roots of the visions by uncovering underlying cultural elements that often form the background of normative attitudes and value assignments. An example of this type of analysis can be found in the DEEPEN project (DEEPEN, 2009; von Schomberg & Davies, 2010). One of the findings was that cultural narratives such as "opening Pandora's box" and "be careful what you wish for" form deep-ranging patterns of perception in the visionary public debates and concerns (on nanotechnology, in this case study).

However, the hermeneutical analysis of visions is not limited to a cultural and philosophical analysis of their contents and conditions. "Understanding" also includes knowledge about the contexts of action in which these visions were created and are communicated. To this end, a map of involved actors, including their institutional interdependencies, should be created using socioscientific means. Since future communication always has an intervening character (Grunwald, 2012b), it is also used for strategic purposes. Therefore, the knowledge of motives and interests of the actors involved is an essential momentum of a comprehensive understanding.

The expectation is that hermeneutical analysis in this interdisciplinary approach will help exploit futuristic visions to provide orientation. It might benefit from recent thoughts on vision assessment (Grunwald, 2009; Ferrari, Coenen, & Grunwald, 2012). Vision assessment should realize an early involvement of reflective analysis and prospective assessment in new fields of science and technology in order to meet the criticism that TA again and again came late. In R&D processes, it should provide accompanying analysis and reflection: a kind of "real-time TA" working simultaneously with the ongoing advances in science and technology (Guston & Sarewitz, 2002). In general, the public and political debate about future technologies could be informed by providing "meta-knowledge" about the visions under discussion: about their origins, their underlying premises and values, as well as about their societal impacts. Obviously, these thoughts can be considered as preparatory work for the hermeneutical futures analysis suggested here.

Another task of hermeneutical analysis could be to uncover the *biography of visions* (following Grunwald, 2013a). Futuristic visions are created and disseminated

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