

Issues in the Debate on the Ethics of Considerable Life Extension

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1. Introduction

Over the last few years, ethical issues related to considerable life extension have gathered much attention among philosophers. This has largely been inspired by the development of emerging medical technologies such as regenerative medicine, stem cell research, and telomere manipulation. The idea of an extremely long life immediately raises many serious questions about the desirability of such a life and its meaning to our understanding of us as humans and of our mortality.¹ In this paper I will introduce some central arguments that have been presented in the debate on the ethics of considerable life extension. By way of reviewing the debate I will aim to show that the idea that there is a single, unified debate on the topic is quite questionable.

Evaluating the general desirability of life extension requires taking various viewpoints into account as comprehensively as possible. If one wants to end with a general conclusion, such as supporting considerable life extension, one should hold that all (or most) aspects of considerable life extension are acceptable, or even desirable. But there are many different questions related to considerable life extension. Is it morally acceptable for an individual to live for an extremely long time? Should we uphold the “natural human life cycle” instead of pursuing extreme longevity? Is it morally acceptable to develop technologies that radically extend life? How should we regulate the scientific research on technologies that might lead to considerable

¹ In this paper, I focus on the practical ethical debate on life extension. I want to thank the anonymous referee for pointing out that considerable life extension touches upon many existential and phenomenological questions that are not discussed in this paper. Such questions involve, among others, the relation of life’s quality and its length, and the meaning of mortality and finitude. These questions are admittedly important but are unfortunately outside of the scope of this paper. For classic phenomenological views on the meaning of death and finitude, one can see, for example, Heidegger’s *Being and Time* (first published in 1927).

life extension? Some of the issues are overlapping, but they can also be treated as separate issues. Many arguments fall under the general category of discussion about considerable life extension despite their different focus. But since the concept of a general discussion is so vague, it seems that the issues often bear only a kind of a family resemblance to each other.

Some authors, such as Gregory Stock (2005), approach the discussion about considerable life extension as a general debate between “pro” or “con” views. Stock argues that “It may seem self-evident that extending our vital years would be desirable, but so many people have argued the contrary that it is worth looking closely at both the personal and social consequences of such a development”². On this view, people either take a generally negative view on life extension or the generally positive view (which he himself holds). Stock represents the relatively common viewpoint that the question is *either/or*: either we support considerable life extension or we oppose it. Such a view creates a very black and white image of the discussion, and can be accused of being a form of bifurcation fallacy. Obviously, one may accept *some* aspects of considerable life extension but reject others, or remain neutral about other aspects. It is important to distinguish arguments about a single issue from arguments that concern the general ethical desirability of considerable life extension.

Let us start by considering what the notion of considerable life extension is supposed to mean.

2. What Is Considerable Life Extension?

Considerable life extension refers to considerably extending healthy human life by means of emerging medical technologies. Such technologies include regenerative medicine, gene therapy, stem cell technologies, and so on (I have excluded “mind uploading”, that is supported by many transhumanists, as a way to pursue eternal life). A recent study shows that the area of brain called the hypothalamus, which also controls reproduction, growth, and metabolism, has a central role in the aging process of mice. The study suggests that this

² Stock and Callahan 2005, 208.

information may eventually help us to create treatments for aging-related diseases and might help people to live longer.³

Many technologies are seen as possible tools for extending life radically. An important point is that the aim of considerable life extension, as understood here, is the extension of *healthy and vital* life. Practically no one supports the view that we should extend life at any cost, that is, the view that the extra years would have intrinsic value regardless of the quality of life.

However, even if there are some prominent research results, there is so far absolutely no scientific proof that we could manipulate the biological process of aging in a whole human being. There are some empirical matters that I wish to introduce in order to try to create a clear picture of the issue in question. I shall start by defining three main points. These are the distinctions between lifespan and life expectancy, the unattainability of human immortality and the nature of the scientific research that might lead to considerable life extension.

First, there is an important difference between *life expectancy* and *lifespan*. Life expectancy is the number of years that a person is likely to live based on statistics. Life expectancy can be stated in the form of lifetime expectancy at birth or at a certain age. Thus the life expectancy of a single individual may also vary. For example, according to the UN, a child born in the Congo in 2011 had an average life expectancy of 58 years.⁴ However, if the child is to survive to see, let us say, his or her 50th birthday, it is possible that he or she may be estimated to have a life expectancy of, say, 68 years because of political and medical reforms made in the country during his or her life. These kinds of changes in life expectancy have been documented in some countries and are mostly due to improvements in the societal situation, for example in health care and education. According to the *Global Burden of Disease Study 2010*, the *healthy* life expectancy is increasing more slowly than the regular life expectancy. The overall life expectancy has increased but, at the same time,

³ Zhang et al. 2013.

⁴ UN World Mortality 2011 report.

people face longer periods of disability, often related to aging, which explains the relatively slow increase of healthy life expectancy.⁵

Lifespan refers to the average time which a human being (or a member of another species) is likely to live under average conditions. Contrary to life expectancy, the maximum lifespan of humans seems to be impossible to increase by social factors alone. The maximum lifespan has stayed around 100 to 120 years for hundreds, or even thousands, of years now. The reason for this is *senescence*, the biological process of aging that eventually leads to death of the organism. Senescence is a biological feature that will eventually occur in every individual regardless of his or her physical or mental fitness. What is important to notice is that extending the human life expectancy does not require the same kind of *technological* innovation and input that extending the human lifespan does. As stated above, life expectancy is highly influenced by political and economic arrangements, and can also be improved greatly by reforming them. The maximum lifespan, on the other hand, cannot be notably increased without improving our scientific and technological understanding, which is exactly what needs to be done in order to develop successful technologies for considerably extending human life.

Second, human *immortality* is not an attainable goal. This is simply due to the fact that even if we managed to stop aging for good, we would still be mortals. It might be possible, hypothetically, for scientists to find a way to halt the process of aging: it would then be possible for a person to live forever. This is what is sometimes called *biological immortality*. However, the terminology is perhaps misleading. Even a theoretical possibility to live forever does not equal immortality simply for the reason that a person who is immune to aging is by no means immune to accidents, homicides or diseases. As stated by some of the leading scientists of the field, “The prospect of humans living forever is as unlikely today as it has always been, and discussions of such an impossible scenario have no place in a scientific discourse”⁶.

In the philosophical debate, the word *immortality* is often used in the context of considerable life extension. In some cases it is clearly a matter of

⁵ Global Burden of Disease Study 2010.

⁶ Olhansky, Hayflick, Leonard & Carnes 2002.

choice of words and involves no misunderstanding. In some cases it is clearly stated that immortality is just a word and not used in a literal sense but its outcome is less clear. In the ethical discussion, there are multiple references to literature on immortality, such as Bernard Williams's "The Makropulos Case: Reflections on the Tedium of Immortality" (1973) and philosophers often use immortality as analogous to a considerably long life. However, a life of 120 or 500 years is hardly similar to immortality, and using the concepts analogically can produce implications that are untrue of considerable life extension even if they are true of immortality, or vice versa.

Third, a lot of the scientific research that might lead to considerable life extension is actually motivated by the will to better understand the process of aging and/or to find cures for severe diseases. Aging-related diseases such as Alzheimer's and different types of cancer are major causes of death. Research into aging might result in treatments that extend life notably, which is sometimes seen by the critics as a negative outcome that is pursued by individualistic people who want to live forever. But this might not be the case: a considerable life extension method could, to put it simply, be produced as a "side-effect" of biogerontology research or finding a cure for cancer. During the past few decades, there has been, for example, much successful research in *telomeres*, the ends of the DNA chromosomes that have an important role in protecting the chromosomes.⁷ Studying the functioning of the telomeres is one way to open up possibilities both considering understanding human aging and understanding how to control the mechanisms that cause cancer.

One might easily think that curing aging-related diseases is primarily in the interests of so-called developed countries. However, according to the World Health Organization's statistics, for example, more than 70 percent of cancer deaths occur in the so-called developing countries.⁸ Thus there is a possibility that research related to considerable life extension might play a role in finding a cure to what is largely a problem of the "less developed" areas of the world. Although it would undoubtedly be, as it is today, a separate

⁷ For well-known studies about relation of telomeres, aging and cancer include, see e.g. Olovnikov 1973, Szostak & Blackburn 1982, Greider and Blackburn 1985, and Greider & Blackburn 1989.

⁸ WHO Cancer Fact sheet N°297, 2012.

challenge to arrange equality of distribution of medical technologies, this does not give enough reason to put the matter aside.

The empirical features introduced above are important for understanding the discussion about considerable life extension for a reader who is not familiar with the topic. I will next move on to review some of the key themes of the ethical discussion.

3. An Overview on the Ethical Discussion

Most authors in the field seem to be inspired by the same point: the increasing possibility that we might be able to live considerably longer due to promising scientific discoveries. Some philosophers are more interested in metaphysical questions, such as the badness of death, while others approach life extension technologies from a more practical ethical perspective. The question of whether we should, as a society, allow life extending technologies or perhaps even support them, is in itself a complicated and multilayered one. We might be interested, for example, in a certain technology, in medical decisions considering individual patients and doctors, or justice in health care in national or global scale.

In what follows, I will discuss eight questions that have been mooted in the debate, concentrating mostly on practical ethical issues. The questions overlap but it is hardly the case that, in general, one could deduce an answer to one question from the answer to another question. The list is by no means exclusive but it gives a good idea of the type of questions that have been discussed. The eight questions are:

- (1) Is it morally desirable for an individual to live very long?
- (2) Whose interests should guide research into aging?
- (3) Which policy is more benevolent regarding life extension technologies?
- (4) Should we try to defeat the biological process of aging?
- (5) How should we regulate the scientific research on technologies that might lead to considerable life extension?
- (6) Should we reject life extending technologies because of the

overpopulation problem?

(7) Should we uphold the “natural human life cycle” instead of pursuing extreme longevity?

(8) Is it morally acceptable to use technologies that extend life radically?

At the end of this chapter, I want to examine a broader question: is considerable life extension generally desirable? But let us start by examining the eight specific questions.

(1) *Is it morally desirable for an individual to live very long?* It is possible to evaluate the desirability of long or eternal life without being involved in the practical ethical debates, familiar from medical ethics and bioethics in general. In his classical paper, “Death”, Thomas Nagel stated that he would be happy to live very long or even eternally but takes no stand on any empirical possibilities of life extension.⁹ In that paper he was merely interested in the meaning of life and death as such and did not want to contribute to practical issues concerning considerable life extension.

Nagel’s argument has been used in the more practically oriented discussion for example by Christine Overall (2005) who sees Nagel as a supporter of considerable life extension. The claim provides an example of how metaphysical questions are sometimes brought into the realm of practical ethics (although the usability and relevance of those metaphysical questions is by no means evident).¹⁰

(2) *Whose interests should guide research into aging?* Nagel’s view provides an example of consideration of philosophical issues without taking into account any practical aspects. On the other hand, one might say something like “I think living forever would be a nice goal per se but I do not think it should actually be allowed under the current societal circumstances”. Such a view is more practical and is clearly normative. Singer’s 1991 view provides an example of such an approach. He states clearly that he does not oppose life extension *as such* but is worried about the negative societal outcomes.

⁹ Nagel 2010 [1970].

¹⁰ I have argued for this position in more detail earlier, see Rantanen 2012.

Singer approaches considerable life extension by examining how it fits the interests of three groups: present individuals, future individuals, and the human species. He asks us to imagine that we are a part of an international committee that should decide whether or not to proceed with the research and development of a considerable life extension drug. Singer argues that we should evaluate the ethical desirability of considerable life extension based on how well it serves the interests of both present and future individuals. According to him, we should not recommend proceeding with the development of the life-extension drug. As he puts it, perhaps we should “be guided by concern for what will lead to the greatest total amount of happiness, or welfare, over time”¹¹. Since Singer acknowledges that a considerably long life is desirable for an individual, the strength of his argument against considerable life extension is dependent on, *inter alia*, the validity of his claims considering the future generations.

(3) *Which policy is more benevolent regarding life extension technologies?* Russell Blackford has argued against Singer’s position by claiming that developing a considerable life extension would be benevolent. Blackford has stated that an individual who, in the context of Singer’s example, would vote for the developing of the life-extension drug should not feel any regret but instead the person should feel virtuous. According to Blackford, developing the drug would be the most benevolent thing to do. He argues that Singer’s utilitarian approach is too rigorous and that instead of maximizing the sum of global happiness over time is not necessarily our moral requirement. Instead, we should support a plurality of values and go ahead with developing a life extension drug.¹²

Whereas Singer’s view evaluates the interests of possible future individuals to count as more important than our current wish to prolong our lives, there are many people who see considerable life extension as a unique possibility for the development of individuals and the human race. For many, this implies a right – or even an obligation – to keep developing new considerable life extension technologies. A further point to notice about

¹¹ Singer 1991, 144.

¹² Blackford 2009, 747.

Blackford's paper is that it provides an example of a piece that is as much *a critique of a single argument* (Singer's) as it is a statement about the benevolence of promoting life extension.

(4) *Should we try to defeat the biological process of aging?* Representatives of an optimistic view toward life extension embrace extreme longevity both as a personal goal and as something that should be supported by society. They think we should quickly move on with developing the technologies and provide them for people. Aubrey de Grey, who is a well-known life extension enthusiastic, has stated that the goal of biogerontology research should be to defeat aging.¹³ It is hard to argue against the fact that he often brings up: aging kills a lot of people. However, it is clearly more difficult to define what this means in terms of our responsibilities to do something about it. De Grey's manifesto raises an important question that has been central in the general human enhancement discussion, namely the difference between treatment and enhancement. It is worth noticing that if aging is seen as a disease then it seems to follow, simply put, that it requires medical treatment and is not a capacity that should be discussed in the realm of human enhancement.

Many supporters of considerable life extension technologies are operating from a highly individualistic standpoint, which has also been used as a criticism against them. This standpoint manifests itself as visions of individual development and goals, and sometimes as neglecting the possibility of widespread negative effects. However, visionaries such as de Grey see considerable life extension as a possibility to nurture human well-being and the flourishing of human species by overcoming the disadvantages of aging.

(5) *How should we regulate the scientific research on technologies that might enable considerable life extension?* Many philosophers support some form of careful and cautious approach to developing considerable life extension technologies because of the risks related to the technologies in question. Walter Glannon, for example, claims that "there are biological and moral reasons to carefully consider the implications of exploiting this [life extension] technology on a broad scale to extend the lives of people in the present and near future"¹⁴.

¹³ See e.g. de Grey and Rae 2007.

¹⁴ Glannon 2002, 339.

In the case of considerable life extension, as in the case of all new technologies, it is a significant question whether the assumed benefits will outweigh the risks. Glannon is especially worried about genetic manipulation and its possible implications regarding human evolution and reproduction. John Harris and Søren Holm (2002) have named Glannon a representative of the precautionary view.¹⁵ Glannon himself does not explicitly mention the precautionary view but Harris' and Holm's claim is reasonable if (and only if) we understand the precautionary view in a broad manner, as suggesting that we should carefully consider the risks of a certain technology before going further to develop it.

(6) *Should we reject life extending technologies because of the overpopulation problem?* John K. Davis' (2005) view provides an example of an approach that emphasizes the importance of individual freedom. Davis uses the term "Malthusian objection" to refer to a criticism of considerable life extension according to which proceeding with the technologies would cause an unbearable overpopulation problem - even more unbearable than the current one. However, he does not take the Malthusian critique to be a sufficient reason to restrict the development and use of the technologies.

Davis believes that even if considerable life extension were likely to cause a severe (more severe than the current one) overpopulation problem, this is not a sufficient reason to restrict the development and use of the technologies. According to him, "the best social response to the Malthusian objection is to let people decide individually what is in their best interest – no matter how the facts turn out"¹⁶. However, it is important to notice that he states that his objection is not based on rights or justice. Rather, it is based on total human welfare and is especially meant to tackle the Malthusian objection. Thus we cannot take Davis's reasoning as a general argument for life extension.

(7) *Should we uphold the natural human life cycle instead of pursuing extreme longevity?* Some thinkers, such as Leon Kass (2003), accept neither the goal of pursuing extreme longevity nor the societal outcomes. Kass has expressed his

¹⁵ Harris and Holm 2002, 355.

¹⁶ Davis 2005, 42.

concerns in the following manner: “Confronted with the growing moral challenges posed by biomedical technology, let us resist the siren song of the conquest of aging and death”¹⁷.

Kass represents a view that emphasizes the importance of appreciating the current form of life and upholding continuity by nurturing the human heritage through our children and grandchildren. He believes that being aware of our mortality makes life meaningful (an adaptation of the old view that death gives life meaning), and that an extremely long life would decrease the meaning of the choices we make and the beauty we experience. Kass’s view relies on Jewish beliefs and religious rhetoric but a similar approach might also be defended from a purely secular standpoint. It is also good to notice that Judaism generally allows a tolerant, if not even an enthusiastic, approach on contemporary medicine and biotechnology.¹⁸ So although religious views are sometimes associated with somewhat conservative attitudes towards technological development, they can be compatible with supporting even radical technological changes (just ask the Mormon Transhumanist Association).

(8) *Is it morally acceptable to use technologies that extend life radically?* It is important to distinguish between the moral and legal acceptability of considerable life extension. Moral disapproval is not necessarily enough to restrict the use of life extending technologies in the society. Daniel Callahan takes a negative stand on life extension: he wishes that people would not accept the technologies but does not support any strong regulation of them. He says that he would like to stigmatize the research that aims to radical life extension but would not prohibit it. According to Callahan, the fact that many people are willing to extend their lives says nothing about the desirability of life extension. He also argues that it is not fair that some people continue to live for a very long time causing a financial pressure for the younger ones to contribute to the society in a way that involves taking care of the elderly people’s social security and health care.

¹⁷ Kass 2003, 344.

¹⁸ See e.g. Cohen 2005.

Callahan has a clearly negative attitude toward considerable life extension but does not state that it should be prohibited. In his own words, he “probably won’t succeed in stigmatizing it, but it is worth a try”¹⁹. Callahan’s approach provides an example of a view that is negative about the goal and the costs of developing considerable life extension but does not really suggest that the development and use of the technologies should be restricted in legislation. In that sense, even if he does not explicitly express this it seems that he is placing more weight to the importance of individual freedom than to the negative aspects of life extension.

I have now introduced eight sample arguments that have been presented in the ethical discussion on considerable life extension. It has turned out to be far from simple to reach any general conclusions about the ethical desirability of considerable life extension. This is due not only to the complex philosophical questions involved but also to the numerous approaches that one can take and the difficulty of defining what can be seen as an argument for or against the *overall* ethical desirability of considerable life extension. At first sight, there seems to be a general theme that holds the discussion together, that is, the ethical desirability of considerable life extension.

The issues involved in the philosophical discussion on considerable life extension often overlap, and reading them as one debate makes it easier to understand the variety of questions that exist. However, it seems that whenever someone takes a very simple and general view on life extension, he or she commits a bifurcation fallacy. This is also known by other names such as black and white thinking and false dilemmas. The fallacy is committed by evaluating only two mutually exclusive options when, in fact, there are more options available. Some simple examples would be “Either you support a free market or you don’t” or “Either you believe in God or you are an atheist”. In both cases there is plenty of room for opinions that are situated in the middle ground rather than in either of the two given options. To state that “Either considerable life extension is good or it is bad”, does not provide a full understanding of the debate.

¹⁹ Callahan 2005, 218.

Answering one question does not imply that you have found an answer to the others. For example, claiming that it would be desirable to defy the biological aging process says nothing about whether we should accept technologies that pose a notably high risk to the population on a national or global level. Or, to give another example, to argue that worries about the overpopulation problem are not enough to justify regulation of life extending technologies in society says nothing about whether we should prefer upholding the natural human lifecycle to living extremely long.

Sometimes a statement about a single issue *may* have many underlying implications. A view that supports legislation that allows generous funding and public support of the development and use of life extension technologies is an implicit statement for the moral acceptability of such technologies. But this does not work so well the other way around: saying something about the moral acceptability of life extension does not (in most cases) imply any normative statements about legislation. This is the case with Callahan's view, for example. Even though he wishes to stigmatize the use of life-extending technologies, he explicitly states that he does not support their prohibition.

I have now introduced some key questions regarding the current ethical discussion on considerable life extension presented as formulated by specific authors, and explained how too narrow an understanding of the debate may result in seeing the discussion too much in black and white. Next, I will present my conclusions and some thoughts about the relevance of my argument to the ethical discussion considering life extension.

4. Concluding Remarks

In this paper, I have briefly explained what is meant by considerable life extension. Eight specific questions that have been examined in the philosophical debate were listed. I argued that it is questionable that there exists a unified debate on the ethics of considerable life extension. Some authors tend to label arguments about specific aspects of life extension as general views on considerable life extension. In this final chapter, I would like to make some concluding remarks and analyze the relevance of my claims to the ethical discussion on considerable life extension. The analysis of the

debate is, I believe, not only of philosophical interest but also important considering the widespread public attention that the visions of considerably extended life have gained and the scientific possibilities provided by new medical technologies.

I would like to emphasize that my aim is not to criticize any particular theory or author for mistaken views as much as to point out that the views that are considered as a part of a single debate may not share a mutual focus. When we are looking at the ethical problems related to considerable life extension, we are looking at many different topics such as metaphysical notions of death to practical ethical questions about policies and cultural values. It would be a mistake to say that the various questions are not related at all. But they seem to bear only a kind of a family resemblance to another.

Some views tend to focus on the individual view whereas others focus on the societal. Some authors are worried about both the individual *and* the societal costs (or the costs to human race) of life extension. If we are interested in the societal consequences of considerable life extension, then we need to look beyond individual preferences. Exploring the relation of prudential values and the general interests of the society is a key factor in determining the desirability and feasibility of developing and using considerable life extension methods. As Singer has claimed, life extension might be desirable for individuals but not for the present and future generations as a whole.

Whether or not we consider considerable life extension ethically acceptable depends much on the standpoint we take. It is problematic if the various standpoints combine and are taken to create a unified discussion and as representing statements about the overall desirability of life extension.

Many of the worries raised by people who take a cautious view on life extension are based on empirical factors that, for the moment at least, cannot necessarily be proven either right or wrong. It is almost impossible to tell how increasing the lifespan by tens or hundreds of years would affect human evolution in terms of fertility, the menopause, epidemics of infectious diseases, and so on. This is due not only to the difficulties of predicting future events but also to the uncertainty considering the type of scientific

experiments required and the medical technologies that would be used for life extension. In other words, the consequences of developing and adopting considerable life extension technologies will be heavily dependent on which specific medical technology would be used and what would be the goals of the scientific research. It is also not clear what kind of cultural and economic effects the increased lifespan would have.

When we consider philosophers' approaches and their possible implications on our individual views and policy making, it is important to keep in mind the motivation of the philosophers. People who share an attitude toward something may disagree about the reasoning behind the shared view. Moreover, people who disagree about what should be done regarding considerable life extension may agree on many arguments considering the desirability of life extension. We should also pay attention to the motivation of other actors related to the discussion. If we ever want to achieve a general view about life extension, we would have to consider the motivation of individual people, of the state, of medical corporations, of scientific research, and so on. When evaluating the desirability of a certain technology, for example, it might be worth our while to consider the motivational factors behind supporting such technology.

Consider an example. I have referred several times to Singer's 1991 paper about life extension. There his final stand on developing a life extension drug was negative given the problems related to total amount of welfare over time. But in his commentary published in 2012 in *Project Syndicate*, he seems to be giving life extension another chance. Even if he is not ready to say that Aubrey de Grey's visions were right, Singer sees possible advantages in investing in anti-aging research. In his words, "De Grey might be mistaken, but if there is only a small chance that he is right, the huge pay-offs make anti-aging research a better bet than areas of medical research that are currently far better funded"²⁰.

This also comes back to the point made earlier about the uncertainty related to empirical matters. Singer's view, as an example, seems to depend on what are considered to be the realistic prospects in the scientific research. The

²⁰ Singer 2012.

question of what would be a realistic future scenario regarding medical technologies is in itself a complicated one. Courtney Everets Mykytyn, for example, has pointed out that “anti-aging medicine is a highly contentious term that means different things to different groups”²¹. In this case, the term “anti-aging medicine” is used specifically for medicine that is oriented toward aging, which makes things more complicated still. Some of the medical technologies that might provide an input to anti-aging medicine are not necessarily oriented in such a way, which means that a national regulation of anti-aging medicine is not enough to cover all the research that might contribute to the goal of considerably extending human life.

The doubt that I have is this: sometimes what seems to be the common ground for discussion, a possibility to radically extend human life, generates very different lines of discussion. This debate, as other similar ethical debates, can be made easily understandable for philosophers as well as for decision-makers and the general public in terms of *either/or* -thinking. However, it would be in everyone’s best interest if philosophers and bioethicists were to resist the temptation to simplify matters in such a manner, especially when dealing with an issue that is of genuine interest to decision-makers and citizens in many countries.

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²¹ Mykytyn 2006, 279.

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