Future Technologies We Want

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Content

Chapter 1:
Introduction

Why this book?

It's not my everyday job to write a book about what ordinary people can contribute to creating sustainable new technologies, so why make the effort? Reading books by the philosopher Hans Jonas has inspired me and many others to think about innovative ways of controlling new technologies that engage governments, scientists, companies, non-governmental organisations and individual citizens. This is the substance of the present book.

Some 40 years ago, Hans Jonas warned that technological progress is so powerful that it can put the existence of the human race and the ecosystem of the whole planet earth at risk. At that time, the late 1970s, the main concerns were with the threat of nuclear weapons of mass destruction, large scale environmental disasters and pollution, and unsustainable depletion of non-renewable natural resources. He called upon all of us to contribute our share in a common responsibility and new ethics for our high technological society. He stressed that this new ethics should not just prescribe responsible behaviour of an individual citizen such as Kant's categorical imperative: *"Act anytime in such a way, that you treat humankind in your own person as well as in any other person simultaneously as a goal in itself, never merely as a means to an end."* Instead, Jonas called upon us all together to *"Act so that the effects of your collective actions are compatible with the permanence of genuine human life."*

The reason for this new ethics of responsibility is inherent in the very nature of the challenge posed by technological development. Technological development has three characteristics. First, it has the power to change the world's ecosystem at an irreparably large scale. Second, it could potentially lead to the extinction

of the human race. Third, it is intrinsically cumulative in nature. This means that small contributions of individual persons are continuously added and that their effects are multiplied in a collective, technology driven progress. This process escapes any individual person's power to redress and counter-balance its impact. None of us can stop it on our own.

Immanuel Kant, in the 18th century, still lived in a society where nature as a whole was unaffected by any human intervention. Back then, the main ethical problem for everybody was to comply with norms for good behaviour that could be understood by anyone. In contrast, Hans Jonas demonstrated that in the 20th century our circumstances are no longer so stable. This inspired him to call for what is known as 'consequentialist ethics': He pleaded for an ethics that takes responsibility for the long-term consequences of actions by many people, which are amplified by technological interventions. His 'principle of responsibility' should prevent such conglomerates of social and technological developments from getting out of hand. Since no individual is powerful enough for such a task, he stressed the necessity for collective action. To give this ethics of responsibility hands and feet, Jonas urged us to develop future scenarios of what new technologies developed in the laboratories of universities and companies today may in the future mean for humankind, society as a whole or the environment. Policy makers should believe negative scenarios sooner than positive ones. If the worst-case scenarios indicated potential catastrophic impacts, measures should be taken to prevent this before the technology was even developed. All activities that could lead to the extinction of the human race should be prohibited, as a generalised version of the commandment "you shall not kill".

In the subsequent decades, since the 1980s, numerous other philosophers, social and natural scientists and engineers have been thinking about these issues. Many people have proposed new ways of thinking about the future of technologies and sustainable development. Others have developed methods for engaging stakeholders and common citizens in dialogue about the potential effects of new technologies. The participants in these dialogues should come up with new ideas to ensure that we end up with beneficial rather than risky technologies. This has resulted in a wealth of ideas. Unfortunately, these ideas are mostly hidden from the average citizen in inaccessible scientific journals. Even when these articles are open access, and free or inexpensive, they are usually written in a language understandable only to highly educated specialists. Popularising some of these ideas is one reason for writing this book.

In parallel to this academic discussion, several United Nations declarations have called upon governments as well as other stakeholders and citizens to either contribute to sustainable development or to responsible scientific research and innovation.

Sustainable development can be defined in various ways. Probably the most influential definition is the one proposed in Our Common Future: *"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: the concept of needs, in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs."* (WCED, 1987)

Sustainable development has been promoted in three global conferences organised by the United Nations since 1972. The UN Conference on the Human Environment (1972) proclaimed that Science and Technology development offers benefits and risks to the human environment. The declaration attributed responsibility for stimulating the benefits and limiting the risks to states, citizens, communities, enterprises and institutions. Twenty years later, the Rio Declaration on Environment and Development (1992) went beyond traditional protection of the environment. For the first time, it called upon the international community to care for present and future generations of humans. Another twenty years on, the RIO+20 conference (2012) resulted in the "Future we want – outcome document". This document explicitly considered sustainable development of technologies, in addition to social and environmental aspects:

"Paragraph 48. We recognize the important contribution of the scientific and technological community to sustainable development. We are committed to working with and fostering collaboration among the academic, scientific and technological community, in particular in developing countries, to close the technological gap between developing and developed countries and strengthen the science-policy interface as well as to foster international research collaboration on sustainable development."

These discussions on sustainable development have been translated in seventeen concrete and measurable UN Sustainable Development Goals, to be achieved by 2030. These goals have been adopted by the UN General Assembly in September 2015, as a follow up to the Millennium Development Goals that have driven international cooperation on fighting poverty between 2000 and 2015. The potential contributions of science and technology to the current

Sustainable Development Goals are more pronounced than in the period 2000-2015. On the one hand, the scientific community is more committed to contributing scientific advice and technological solutions, on the other hand policy makers are more aware of what science and technology may contribute. A key platform for achieving this is the UN Technology Facilitation Mechanism with its STI policy forum, which is open to representatives of all stakeholders.

In parallel to these international discussions about sustainable development, the United Nations Educational, Scientific and Cultural Organisation (UNESCO) has developed rules for responsible scientific and technological development. The basis for this rule-making for science and technology has been laid in the International Covenant on Economic, Social and Cultural Rights (1966). In this document, the member states of the United Nations proclaimed the freedom of scientific progress, and the right of all people to share in its fruits. At that time, science was still considered a positive thing in the interest of humanity and the main problem was to give all people a chance to benefit from it.

Eight years later, the general conference of UNESCO adopted the Recommendation on the Status of Scientific Researchers (1974). This recommendation gave guidance fostering free and responsible scientific research in academia all over the world. The conference recognised both the potential benefits and the potential threats for humanity that could result as a consequence of scientific research. In particular, the results of scientific research could be used *"to prepare wars involving destruction on a massive scale or for purposes of the exploitation of one nation by another"* or cause complex ethical and legal problems. UNESCO called upon member states to develop adequate science and technology policies. The governments of these countries should also take care of the necessary training, payment, worker protection and career perspectives of scientists. The training of scientists should include awareness of ethical and societal aspects of research.

Some twenty years later, concerns over the risks of genetic engineering for the future of the human race inspired another UNESCO Universal Declaration on the Human Genome and Human Rights (1997). This declaration attributed responsibilities for ethical governance of genomics to states that should regulate this area of science and its applications. In addition, the declaration called upon scientists to respect research ethics guidelines while contributing to genomics research. The 1999 Declaration on Science and the Use of Scientific Knowledge, adopted by the World Conference on Science, includes proposals to improve the contributions of science to sustainable development. Governments are called upon to adapt the national institutionalisation of science, while

scientists are called upon to adhere to research ethics principles. The UNESCO Universal Declaration on Bioethics and Human Rights (2005) broadened its scope from the genome in particular to medicine, life sciences and associated technologies in general. States were tasked with the responsibility to regulate bioethics by adopting new laws. In addition, individuals, groups, communities, institutions and corporations, public and private, were offered guidance on how to consider their share in common responsibility. Recently, UNESCO has been working on a revision of the 1974 'Recommendation on the Status of Scientific Researchers.' The updated text was intended to *"reflect contemporary ethical and regulatory challenges relating to the governance of science and the science-society relationship"*. The revised recommendation was adopted by the general assembly of UNESCO by 14 November 2017.

These and many other initiatives have been taken to govern emerging technologies in responsible ways. The problem is that all these efforts don't add up. They take the form of a project here and an initiative there. Each activity can easily duplicate efforts or undo work done by others with similar aims. Furthermore, there is no overall global government with the powers and legitimacy to control the technologies. This book aims to shed new light on the ideal conditions fostering future technologies we want.

How?

The book takes the form of a thought experiment. That does not mean it is not real. I do not describe projects that have already been done with visible results, so in that sense the cases discussed do not exist. But they are still realistic: they could become a reality in the not too distant future, provided that enough people in the right places get excited and start contributing to put these or similar ideas in practice. In addition, a large selection of practical initiatives contributing to the aims of sustainable development and responsible innovation are included, to show what can be done in the real world.

In the first half of the book, I show the potential benefits, risks and flexibility of emerging technologies in three case studies:

- *"User-centric technology ends conflicts over mining".* I show how a new technology could help break a stalemate in a seemingly unresolvable social controversy.

- *"The importance of biosecurity for everyone".* I show what you and I can contribute to preventing that lifesaving biotechnologies are misused for weapons of mass destruction.
- *"Designing peaceful drones".* I argue that everyday knowhow of making toys may help rendering it more difficult to use unmanned planes for hostile purposes.

This part is followed by a short chapter bridging the cases and the second half of the book. There, I explain the technological, legal, philosophical and societal conditions enabling such future sustainable technology development in four contextual chapters:

- *"Improving the global system to regulate technologies".* I build upon an idea by the philosopher Jürgen Habermas for dual national and global citizenship for all, and explore what this could mean for international law regulating new technologies.
- *"Value-sensitive design offers technical fixes".* I highlight recent initiatives by engineers as well as philosophers to build respect for ethical norms such as privacy, security and human rights into the design of new technologies, and explore what contributions this could make to future technologies we want.
- *"A communitarian approach to dialogue about technologies".* I discuss how different worldviews influence how you can see your own and other citizens' roles in shared governance of these technologies.
- *"Stakeholder communities govern technologies".* I show which groups and networks of companies, experts and international non-governmental organisations are already involved in the discussion on sustainable technology development and how they could do more.

Where?

You may be surprised that I do not show how you can influence the development of new technologies in your own town or country, but take a seemingly far away global perspective instead. I focus on the international level, because that is where these new technologies are being created. Traditionally, science is a global endeavour aiming to produce new knowledge and new tools in the interest of all humankind. This has first been formulated in the International Covenant on Economic, Social and Cultural Rights in 1966 and is still valid. Likewise, multinational companies are developing, producing and trading new technologies in worldwide value chains. Minerals mined in Africa can be incorporated in products manufactured in Asia and sold in your local shop around

the corner. And of course, these global scientific communities and multinational companies are criticised by international NGO's that just as easily bring together activists from all over the world and give voice to local communities such as poor farmers living in mining regions, representing their interests at the United Nations or in international media. After all, we live in a global village.

The problem is that this process escapes the national legal systems and governments responsible for protecting you and your fellow-citizens against the consequences of these emerging technologies. At the same time, the international law-making system is unable to take over an international responsibility to protect the rights of individual human beings. The problem is not a lack of interest from the side of this international community. As briefly discussed above, both the United Nations conferences on Environment and Development and UNESCO have been developing international norms and ethical principles for sustainable and responsible science and technology for half a century. But their authority and power to enforce the implementation of these norms and principles remains limited. I offer potential solutions for solving this international governance gap and invite you to join the global community striving to produce future technologies we want. Eventually, it may turn out that the UN Technology Facilitation Mechanism is the best equipped international organisation to coordinate international law-making on sustainable and responsible technology development, but that is open to political deliberations.

What?

I do not propose original ideas nobody has ever dreamt of before. It is also not a textbook, teaching students how to become an engineer or a philosopher. Instead, I explain current ideas from philosophical, social and natural scientific literature in accessible form for anyone willing to take the time to read it. I also sketch an ideal future world. Yes, you may consider this book as a science fiction novel, but one that could become reality one day.

Who?

I am a physicist and philosopher with a passion for responsible global governance of emerging technologies. I have written the book for anyone who shares this same passion, from whatever background. Most likely readers are members of one of these four communities. Scientists with an interest in sustainable development are one group. Civil society actors interested in exploring the

contributions of science and technology to the UN Sustainable Development Goals are another. Members of the maker movement stimulating consumer control over emerging technologies are a third audience. The maker movement is another word for do-it-yourself hobbyists who create technologies in their own free time, including the biotechnologies and drones discussed in this book. Last but not least, policy makers discussing new international agreements on sustainable development or responsible innovation may also be interested.