

impact that new technologies are having on the understanding of our individual or group subjectivity, together with a reasoned and competent close examination of some of the most qualified responses available today. We are fully aware that we are faced with an open front, whose borders are difficult to understand and which are in constant evolution in terms of content. “Mapping” the portions of territory which are from time to time object of discussion seems the best way to interpret this “battle” of and with contemporaneity, endeavouring at the same time not to lose sense of the challenge to numerous acquired certainties which this necessarily implies.

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Technologies change – do we change as well?

On the link between technologies, self, and society*

Alberto Pirni and Antonio Carnevale

1. *Quid novum?* Some preliminary overviews

Technology has always been a significant anthropological component in human history. This would range from fire to the wheel, from the invention of movable type to the innovations of the textile industry in the England of the first industrial revolution, to cite only the most macroscopic examples. Why therefore should we be surprised at the innovations brought about by fields such as the so-called *Information and Communication Technologies* (ICT), nanotechnologies and biotechnologies, cognitive sciences, robotics and research on artificial intelligence? Why, given that at present they are not particularly widespread technologies, should we worry about how they will be used in the future? Why think that their use will change the human condition so radically as to prompt an ethical reflection that accompanies us in a more informed way towards that future?

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Obviously there is no answer, or rather no overall explanation that resolves in unison all these doubts. We cannot totally cut ourselves off from the historical moment in which we live in order to fool ourselves that we understand the sense of this moment. Also an attempt at a simple *Zeitdiagnose* would undoubtedly be difficult, on the one hand, doubtless a compromise on the other, if not downright misleading, on the whole, with respect to trends that today we can only begin to envisage, but not yet “read” or fully understand.

However, if one were to attempt to embrace in a single vision what is happening around us, we could with some margin of certainly affirm that the technology of the last few decades has changed. In the opinion of the author, this has become clear along due distinct but correlated profiles.

On the one hand referring to a first profile, it could be affirmed that the latest technological developments, namely the so called “new technologies”, are not only (and perhaps no longer specifically) concerned with how man relates to the world, but also – and here specifically – how man relates to himself. Traditionally, technological innovations were – more or less consciously – committed to finding an answer to a recurrent question about “man’s role on earth”. Seen retrospectively, the (multiple) answers to such a question could be summed up as an infinite variation on the topic of man’s attempt at domination over the earth. Examples of this fundamental attitude can easily be found in the history of science or technology, from the invention of the first primitive tools to the telescope, or from the first airplane to the personal computer, not to mention the different generations of “war machines” or the technologies devoted to the improvement of navigational possibilities, just to give a few other examples.

Now, the unprecedented perspectives opened up by new technologies shift relevant attention towards an (until now) unsuspected frontier: the single human subject, understood as a whole of enormous complexity, but nevertheless not impossible to conquer. In other words, the territory to be conquered is no longer *external*, but completely *internal* to the individual person, to each one of us. This could appear as a banal result and quite a limited field. On the contrary, its frontier promises the conquest of an immense and potentially inexhaustible territory, and inaugurates for man a *new* form of domination over a *new* world. Firstly, on a preliminary and material level, the

exploration of this territory (the human body and brain) obviously presents a plethora of problems, which technical developments are about to make more approachable.¹ On a second level, such developments involve a not less relevant variety of juridical problems, related to a series of questions regarding legal liability, protection of property (and of intellectual property) rights, and respect for fundamental rights, just to mention some of the most susceptible juridical areas.²

For that matter, a result that is in many ways analogous can be reached attempting to follow the traces of a second and not less relevant profile of the relation between the human being and technology. For a long time the “anxiety” of technological development was essentially directed towards the enhancement of human capacity to produce useful objects and services for the conservation and reproduction of life itself. We can think of various tools, for example the automobile or all those technological devices we know as “electrical appliances”, probably without pausing critically on the meaning of the word. The most recent developments, however, enable us to catch sight of a technological evolution on the horizon which can be understood not (or not only) as an answer to the fundamental needs of life, but also as an extension and mediation of that dimension of life that the Latins called the *inter homines esse*.

Adopting for the occasion the terminology of Hannah Arendt,³ we could say that whilst the technologies we have known so far have more directly had to do with the dimension of work and production – that which Aristotle referred to as *poiesis*, that is action directed at the production of an *ergon*, a work – future technologies will impact much more on the dimension of *active life*, that is the dimension of acting typical of the human – the sphere of *praxis*, again according to

¹ For example, consider the innovative possibilities opened up by biomedical research (nanotechnologies, neural interfaces or micro-invasive surgery) or applications (biomechatronic prostheses and sensory devices), as well as by the evolution of radiology in diagnostic and therapeutic fields (fMRI, PET, and so on) up to the scanning (electron) microscope.

² There is a reflection in this direction in A. Pirni, A. Carnevale, «The Challenge of Regulating Emerging Technologies: A Philosophical Framework», in E. Palmerini, E. Stradella (eds.), *Law and Technology. The Challenge of Regulating Technological Development*, Pisa University Press, Pisa 2013, pp. 59-75.

³ H. Arendt, *The Human Condition*, Chicago University Press, Chicago 1958.

Aristotle, that which specifically connotes the human being as such. According to Arendt, working activity corresponds to the biological and functional development of the human body, of the growth of life understood as human existence, for its own sake, with no further qualities or distinctions. Differently, *active life* is the activity that corresponds to the non-natural dimension of human existence: it can neither be reduced to nor absorbed by the “natural” cycle (birth/death/rebirth). *Active life*, which is necessarily expressed in the social dimension, is reborn and recreated in life itself. The meaning and value that we give to things is reborn each time we carry out an action and this is conserved in the memory of others.

In this sense, the outcome of *active life*, acting, gives life to an “artificial” world of things, clearly distinct from the natural environment. Within this world each individual life is comprised, whilst the very meaning of human action lies in overcoming and transcending these limits. In this second meaning, according to Arendt, the human condition of *active life* is the *being-in-the-world*. Human action is the only activity which puts humans in a direct relationship with one other, which prompts the desire to communicate, to be recognised not as human beings *sic et simpliciter*, but as subjects personified within concrete and personal stories, inexorably individual biographical narratives and determined social contexts.

In this way, we find ourselves having to face two points of view that may very well help to frame the sea change that we are experiencing. On the one hand, this awareness regarding the shift in “technological reason” from domination the external world to that of domination over the “internal world”, that is over the sphere that most irreducibly belongs to the individual, such as the body and mind, enables us to direct ourselves with perspectives of unprecedented problematic complexity which connote today, above all, the immense area of the neurosciences. On the other hand, the reference to Arendt’s perspective ushers in an experiential point of view that German philosophy was unable to discern at first hand, but which refers to a dimension – that of self-creation, the characteristic truly typical of human behaviour – able to accompany the reflection into the no less extensive contexts of artificiality made possible by the latest technological developments, from information technologies to the frontiers of biorobotics.

2. A re-opened space – I: from digital technologies to the juridical sphere

We are thinking precisely of *ICT* and of how the constant increase in the quantity and quality of information and resources associated with information systems is bringing about the creation of veritable digital identities.⁴ The image that we build interacting in real and virtual social contexts is increasingly less controllable by the individual, which is the subject who in modern juridical systems was the natural depositary of every right regarding their own identity. It is increasingly entrusted to unpredictable and random combinations – we might think –, but willingly oriented, partially or selectively – we might fear.

But alongside combinations and reconstructions of our self desired by others or selected by software programs according to fuzzy logic, there is also a growing range of possibilities associated with so-called *lifelogging* or *self-tracking*. This is a series of possibilities and methods of collection, conservation and digital elaboration of personal data associated with the entire sphere of daily life. These range from forms of digital diaries, which elaborate in the short or long term “mood curves”, but which also conserve traces of eating habits, or of the individual’s most recurrent actions or movements, to micro cameras, which repeatedly document every moment of our day, in order to “archive everyday life”. This is not to mention procedures of neuro-feedback, which restore the feedback of our “cerebral current”, that is of the synaptic and neuronal links and giving it back to us in a readable form, almost as if it were a “digital statement” of what our brain “has done” in a specific period.⁵

The immense migration of data has made it possible to build increasingly extensive databases, in some way favouring processes of

⁴ In this regard see the interview of Luciano Floridi in this volume: «Ethics of Information: Ontology, Responsibility and New Moral Agents», interview with Luciano Floridi (by Marco Nuzzaco).

⁵ For a preliminary framing of this issue, see the studies of G. Bell - J. Gemmill, *Total Recall: How the e-Memory Revolution Will Change Everything*, Dutton, London 2009. The second edition of the same book was published under the title: *Your Life, Uploaded: The Digital Way to Better Memory, Health, and Productivity*, Foreword by B. Gates, EPUB, New York 2010.

data mining – techniques that have the aim of extracting knowledge or information regarding the personal preferences of persons and groups and which may be used for scientific, economic or industrial purposes. Analysing the tastes of consumers, social network search engines condition us to purchase goods increasingly closer to the image that we assume of ourselves by operating directly or indirectly on the Web. In this way our virtual life fills our real life with products and sense. The new information technologies are creating an environment which is at the same time real and virtual in which future generations will spend most of their time.

The basic idea that drives all these devices, both material and virtual, is the ambition to create authentic “digital assistants”, which manage to know everything about us, but also, potentially, know us better than we can ever imagine, arriving at the point of suggesting choices to us, or directing us towards objects, persons, places or situations which potentially could meet with our favour or interest.

This combination of possibilities certainly possesses a cosy and pleasant side, but conceals a potentially infinite series of risks, on both an ethical and juridical plane.

Considering them together for a moment – whilst a more detailed analysis of the single particular cases is certainly due – this set of technological innovations implies the start of an important rethinking of the limits of juridical subjectivity, considered within the entire spectrum of its possible enactment.⁶

As is well-known and as the history of European law has consolidated in various ways, the human subject possesses its own set of norms, configured as a centre of imputation of rights and duties. The basic question which inevitably extends to all the problematic contexts dealt with here can be summarised in the following terms: should the existence of the human being as an ethical-juridical centre of imputation remain unchanged or should it be modified to the point of being unrecognisable with the change of the human being, that is with the mutation of its “concretizations” or also of its “fragmen-

tations” or possible “recompositions” – in physical, mechatronic or digital terms?

The profiles typical of law in its classic divisions take inspiration from highly consolidated principles, from *habeas corpus* to the principles of self-determination or autonomy, from freedom of action and movement, social and political freedom and freedom of expression, to the sphere of privacy. How much longer can these profiles be considered untouched and unobligated to redefine themselves from their very foundations with respect to the unprecedented challenges posed by the uncontrollable advent of new generation technologies?

The case is when the limit of one’s own corporeity is no longer a sufficient barrier to the potential intrusion by others. In other words, the juridical discussion, from Roman juridical tradition on, has always needed limits in order to be consolidated. They may be extremely wide, such as those of states, or of smaller administrative districts such as regions or municipalities, or even more limited. Examples could be a piece of land, a dwelling, premises intended for commercial use, a parking area and so on. The law, as it has been conceived up till now, interpreting the concept of limit, also fits well with smaller dimensions, that is with the most wide-ranging single objects, from the automobile to the wrist watch, in order to determine property, legitimise use, regulate exchange, attribute liability in cases of abuse, damage to third parties, and so on.

Last but not least, the law has always been at ease with the human body: it has sanctioned its borders, decreed the inviolability from all points of view, from the physical to the patrimonial (the human body cannot be wrongfully mutilated, nor purchased or sold). The human body has been constituted as centre of imputation and individual, precisely “personal” responsibility, fixing the profiles of attribution or liability, direct or indirect, for the actions performed by a person in possession of a body or for the consequences of those actions.

So, today, the basic question to be posed for the law in its entirety becomes at this point radical: does this set of instruments still hold? Can the human body still constitute a solid and univocal bastion for the concept of limit, on which its very same juridical “defendability” has been founded and enacted so far? Or must we perhaps admit that the whole “box of juridical tools” has no alternative but to attempt to

⁶ A significant reflection in this regard can be found in the recent research of S. Rodotà. See above all: Id., *Il diritto ad avere diritti*, Roma-Bari, Laterza 2012; Id., «Technology and Regulation: A Two-Way Discours», in E. Palmerini, E. Stradella (eds.), *Law and Technology*, cit., pp. 27-36.

bring itself up-to-date so as not to become completely useless or ineffective with respect to the theme of corporeity, in the era of its technological and digital reproducibility, of mechatronics and biorobotics, of biological-synthetic implementation and human enhancement?

This is a subject that would be presumptuous to dismiss in a few words given the plethora of fields and implications involved, but which is however a theme to be faced in our future as one of our priorities which cannot be postponed.⁷

3. A re-opened space – II: from neurosciences to biorobotics

However, it is not only the space of information to be affected by the sea change provoked by new technologies that is posing new challenges as regards legal matters. Synthetic biology and research on artificial intelligence have definitively altered the relationship between what is “natural” and what is “artificial”, starting from what we mean when we refer to the “mind” and its function in the process of learning. Still in recent years the intellectual debate on the working of the brain has rested on two great pillars of Cartesian rationality, which is the epistemological distinction between a *rex extensa* and a *rex cogitans*. Numerous scientists and philosophers have devoted themselves to an attempt to fix the significative source of cerebral functioning on one of the two poles, maintaining the indomitable aspect of the neuronal nature of the brain (notably Dennett) or, alternatively, the impossibility of excluding a minimum degree of conscience in the governing of the mind (Searle, Nagel, Ricouer, to mention only a few).⁸

⁷ In this volume, albeit prompted by diverse preoccupations, the following works explore in detail specific angles of this set of issues: J. Nida-Rümelin, «Agency, Technology, and Responsibility»; B.-J. Koops, «On Legal Boundaries, Technologies, and Collapsing Dimensions of Privacy»; P. Asaro, «Determinism, Machine Agency, and Responsibility»; W. Wallack, «Techno Sapiens, Moral Machines and the Combinatorial Impact of Emerging Technologies»; N. Sharkey, «Towards a Principle for the Human Supervisory Control of Robot Weapons».

⁸ The essential reference in this regard is D.R. Hofstadter, D.C. Dennett (eds.), *The Mind's I: Fantasies and Reflections on Self and Soul*, Harvester Press, Brighton 1981, a volume which has stimulated lively debate, still in progress. Among recent works

However, thanks to the mapping of the human genome and above all thanks to modern techniques of visualization of cerebral structures, today we know that both schools of thought were partially right and partially wrong. Although no neuronal or biological mapping (thinking of the genetic sequence) is able to determine with precision a particular type of behaviour, it is however true that possession of a certain neurological structure increases the likelihood of an individual carrying out some form of aggressive or anti-social behaviour. As Pietro Pietrini has shown in numerous research works and reiterated here, lesions in areas of the prefrontal cortex bring about an impulse control disorder and the loss of the capacity of judgement. The development of the neurosciences, therefore, has found in neuro-images an excellent tool to understand how the biological reality of the brain is modulated and built at a neurological level. From this point of view, in order to understand how neurological processes function what is central is the relationship of the brain with the surrounding environment.

As the theories of so-called “*embodied cognition*” have shown,⁹ the reality of the functioning of the brain are not written in its biological structure, but in the way in which this enters into relation with the surrounding reality, starting from the emotions and the remaining functions of one’s body,¹⁰ and concluding with social behaviour and the influence of cultural models.

Technology, with its origin in history as a means of helping and supporting the human being, increasingly tends to want to resemble the human being, assuming the role of substitute. We can observe this tendency at work specifically in *biorobotics*. The propensity of engineers and designers is to build machines that are ever more integrated with the capacity of being human, to the point of envisaging

see: D. Dennett, *Freedom Evolves*, Viking Press, New York 2003; Id., *Sweet Dreams: Philosophical Obstacles to a Science of Consciousness* (Jean Nicod Lectures), The MIT Press, Cambridge MA 2005.

⁹ For a generic overview, see: F.J. Varela, E.T. Thompson, E. Rosch, *The Embodied Mind: Cognitive Science and Human Experience*, The MIT Press, Cambridge MA 1991; G. Lakoff, R. Nuñez, *Where Mathematics Comes From: How the Embodied Mind Brings Mathematics into Being*, Basic Books, New York 2001.

¹⁰ A. Damasio, *The Feeling of What Happens: Body and Emotion in the Making of Consciousness*, Houghton Mifflin Harcourt, New York 1999.

the possibility of imitation or replication (as occurs in the case of the humanoids or cyborgs). What is emblematic, in this sense, is the technological history of robots. Initially developed to serve on industrial assembly lines in order to accelerate the productive process, robots have progressively come out of the factory environment and have increasingly entered into direct contact with everyday life – in the domestic sphere and in entertainment, and recently also in the context of medicine and social assistance (examples are the surgical robot *Da Vinci*, or the companion robot *Paro*).

This shift has above all meant a significant strengthening of safety standards and a specification of juridical responsibility in order to better identify guilt in the case of malfunction of the robot or in the case in which a working robot damages things or injures persons (in fact different ethical-juridical profiles must be distinguished, between a robot operating in an assembly line and one that is working among people).

However, the aspect of liability does not mark an end to the novelty of the new relationship between humans and robots. The widely foreseen diffusion of robots in the society of the future will increasingly move machines closer to the desires of persons to use technologies for the most wide-ranging of reasons. Robots become therefore objects of desire because they anthropomorphise what, as human beings, we expect from technology. Probably due to the fact that robots have developed a great symbolic importance built up by a plethora of science fiction literature and cinematography, there is no technology like robotics capable to the same extent of stimulating the imaginative projections of popular culture. Barbara Henry's essay enters the discussion here, illustrating the breadth of this legacy of imagination by proposing a comparison between robot cyborgs and the Golem, imaginary anthropomorphic figure of Hebrew mythology.¹¹

¹¹ See, in this issue, the essay by B. Henry, «Imaginaries of the Global Age. "Golem and others" in the Post-Human Condition».

4. Technological development and possible society

But will the new technologies have a bearing only on individual identity, on corporeal or mental self-representation of single persons? Or will they also influence an increasing part of our modality of social action, that is of "living with others"? What would happen if there emerged various mutations in form and substance of poles of social identity? In which kind of society would we live if the emerging technologies were to develop to their full extent? Is there not the danger that a review of the limits of subjectivity could also require transformation of a higher order?

With respect to these questions, it is certainly not possible at the moment to elaborate clear answers. Perhaps, as regards the last question, if we should reach a realistic evaluation based on what exists today and what is available in effective terms, and not only at an experimental or prototypical level, we would be tempted to answer no. Nevertheless, bridging the gap between facts and values, between reality and imagination, we do not believe that for a comprehensive assessment of the impact of new technologies we must limit ourselves to considering only that which currently exists. Within a few years there could be widespread use at a global level of technological devices that today are merely at an experimental stage.

That these devices will modify our "being social", our capacities and ways of socialization more than is today visible or attemptable can be easily foreseen, and this at the same time will constitute a further significant problematic context. This is a context in which, in every likelihood, categories inherited from the past such as identity, alterity, individualism, community, society, intersubjectivity, interaction, trust, security, social bonds, authenticity, relationship, recognition, and still many others, will be – and already are – "compelled" to be fully redefined, if we wish to avoid or at least alleviate the destiny of explanatory inefficiency that awaits them.

The reiteration of questions such as these prompted the initial idea that brought about the creation of this volume of *Politica & Società*, and which has now assumed the form of a clear route which, one hopes, is united in its basic intention to make a contribution to understanding the "technological new things" which

advance, and their effects at an individual and social level – but which is intentionally non monochord or univocal in the interpretations presented.¹²

¹² For that matter, according to the present writer, the path here taken does not constitute an extemporary moment of reflection. On the contrary, it slots smoothly into a perspective of project, that of the project Robolaw (www.robolaw.eu), which has had numerous moments of scientific coagulation. Among these, with regard to this specific context, see: E. Palmerini, E. Stradella (eds.), *Law and Technology. The Challenge of Regulating Technological Development*, cit. (with contributions by: A. Arcuri, F. Cafaggi, A. Carnevale, M. D'Ostuni, B.-J. Koops, L. Nocco, E. Palmerini, M. Passaro, A. Pirni, S. Rodotà, A. Santosuosso, E. Sirsi, E. Stradella, A. Vedder, G.S. Virk, A. Zei); A. Vedder, F. Lucivero (eds.), *Beyond Therapy v. Enhancement? Multidisciplinary Analyses of a Heated Debate*, Pisa University Press, Pisa 2013 (with contributions by: F. Battaglia, S. Beck, F.W.A. Brom, A. Carnevale, M. Coeckelbergh, C. Harnacke, P. Haselager, B.-J. Koops, F. Lucivero, B. Olthof, A. Peeters, H. Shah, K. Schelle, M. Schuijff, A. Vedder, K. Warwick, B. Zabel); B.-J. Koops, A. Pirni (eds.), «Ethical and Legal Aspects of Enhancing Human Capabilities Through Robotics», *Law, Innovation and Technology*, n. 5 (2013), 2, Special Issue (with contributions by: A. Bertolini, J. Borenstein, B.-J. Koops, M.N. Gasson, F. Lucivero, Y. Pearsons, A. Pirni, M. Schellekens, P. Vantsiouri); F. Battaglia, A. Carnevale (eds.), «Reframing the Debate on Human Enhancement», special issue of *Humana.Mente*, n. 26 (2014) (with contributions by: N. van Camp, C. Coenen, J.-C. Heilinger, D.-J. Fletcher, V. Gerhardt, A. Gotlib, B. Henry, R. Mordacci, A. Pirni, J. Nida-Rümelin, N. Mukerji, P. Robichaud, P. Salvini, F. Santoni de Sio, W. Sims Bainbridge, S.L. Sorgner, F. Swindells, N.A. Vincent); A. Carnevale, A. Pirni (eds.), «Robotics and Public Issues: a Philosophical Agenda in Progress», *Cosmopolis*, n. 9 (2013), 2 (with contributions by: P. Asaro, B. van den Berg, D. Bonino, A. Carnevale, J.M. de Cózar-Escalante, L. Grion, C. Laschi, A. Pirni, D. Ruggiu).

Agency, technology, and responsibility¹

Julian Nida-Rümelin

Abstract

The author presents a philosophical account of the relationship between human agency, technological devices, e.g. autonomous robots, and our concept and criteria of responsibility. He argues that i) an agent is defined by having intentionalities qua giving and taking reasons for her actions, that ii) these reasons are normative, objective, and non-algorithmic, and that thus iii) autonomous robots are not real agents to which responsibility for actions can be ascribed. Therefore, the author sees no need to change the concept of responsibility in the face of autonomous robots. Instead, he considers the criteria of responsibility to have become more complex.

Keywords: responsibility; reasons; technology/robotics; agency; intentionality.

I. Introduction

I aim to develop a philosophical account of the relationship between human agency, technological devices, and our concept and criteria of responsibility.

What changes if technologies are involved in human action? There are two philosophical camps that are divided on this question. The first camp, which is mostly related to the artificial intelligent movement, states that, in principle, computers or robots can act like

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¹ This text is based on my talk held in Pisa on November 29, 2013. I kept the colloquial style of the lecture in this version, too.

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Foreword

In November 2013 the international conference *Investigating the Relationship between Future Technologies, Self, and Society*¹ was held at the Scuola Superiore Sant'Anna – Pisa. The conference, organised and funded by the European project ROBOLAW (*Regulating Emerging Robotic Technology in Europe: Robotics facing Law and Ethics*), was arranged to promote interdisciplinary and international discussion among experts in the fields of medicine, neuroscience, engineering, jurisprudence and philosophy. The purpose of this exchange of ideas and opinions was to identify and debate the main implications which regard the link between individuals and society in the development of emerging technologies. This monographic issue of *Politica & Società* collects together most of the contributions presented at the conference².

The issue opens with an introductory essay by the editors, Alberto Pirni and Antonio Carnevale. This outlines a background framework regarding the main themes involved in a multi-faceted debate in constant evolution. Questions deriving from the developments of digital

¹ *Investigating the Relationship between Future Technologies, Self, and Society*, International conference, 28-29 November 2013, Pisa. Contributions were by Bert Gordijn (Dublin City University), Barbara Henry (Scuola Superiore Sant'Anna, Pisa), Bert-Jaap Koops (Tilburg University), Pietro Pietrini (University of Pisa), Julian Nida-Rümelin (Ludwig Maximilian University, Munich), Noel Sharkey (University of Sheffield), Wendell Wallach (Yale Interdisciplinary Center for Bioethics) and Kevin Warwick (University of Reading).

² In addition to the contributions cited above, we asked Peter Asaro and Luciano Floridi for a contribution in order to offer the reader a still wider spectrum of viewpoints.