FOUR ETHICAL POSITIONS ON TECHNOLOGY

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Abstract. The Ethics of technology is one of the key topics and main conundrums of contemporary applied philosophy. Technology has a genuine and hybrid condition. Both human species creation and real environmental factor, technology fosters human species evolution on its turn. It is a dyadic evolutionary process. In this article it will be content that the literature on philosophy of technology is not as homogenous as many tend to think. The difference between approaches, solutions and reasoning on the technological "should" are grounded at a deeper level of the authors' personal belief and attitude toward technology. As consequence, the entire intellectual and conceptual ethical edifices and, consequently, the projection of future development and solutions diverge because of the fundamental differences between the perspective or "belief" about technology (the rational construct) and the "attitude" towards it (affective dimension). Along this line, the article delineates and depicts four epistemological positions on ethics of technology and their usefulness.

Keywords: ethics of technology; metaethics; epistemological attitude; ontological belief; artificial moral agency.

1. INTRODUCTION

Contemporary ethical issues and theoretical developments are in direct dependence on the way in which technology is understood. Earliest philosophical conceptions conceived technology as the totality of the human "artifacts", but technology also encompasses the totality of the technical activities ("practices") as well as an entire typology of the technical knowledge ("episteme")[1]. It also comprises the social technologies from social software and communication capabilities to legal systems and standardized procedures. These last aspects are of vital importance for understanding what technology is and the true nature of the relation that humans have with it.

[1] See Bogdan Popoveniuc, *Filosofia Singularității. Creierul global – o etică a gândirii fără om* [Philosophy of Singularity. The Global Brain – an Ethics of Thought without Man], Cluj-Napoca, Eikon, 2016, chapter 1. Technology and Technological Mindset.

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Technology – as the set of practices for manipulating, creating and/or transforming natural and technical objects. By doing so, it becomes part of its own understanding and of the relational framework with the world. A good illustration is the transformation of the scientific paradigm of psychology, where the metaphor of mind-computer (software-hardware) became archetypal, and the theoretical statistical fitness is the landmark for the validation of any empirical(!) research. In consequence, the contemporary paradigm of understanding technological progress is not any longer about previous bipolar positions such as those between optimism and pessimism. There are positive and negative effects of technology on our thinking as well as on the way in which human life is conducted. Technology and Techne infuses all practices, relations with the other and the environment, and even fosters our environment. These effects are intrinsically to a world which finds its foundations in technology and progress due to the technological input in almost all aspects of its economic, social and cultural life.

2. REALISM *VS* IDEALISM WITHIN THE ETHICS OF TECHNOLOGY

In relation to the technological progress, the understanding perspective of the "superior values" is decisive in all the debates and proposals related to an Ethics of technology. There are two sides that consider that all the ethical "weighings" have to be righteous, but which, however, differ in how they conceive and understand what one would consider to be right. One side mainly refers to observing the current standards and existing social norms, such as laws, customs or a constitution, whilst the other side refers to a universal righteousness that deserves to come alive on the backdrop of a larger societal evolution. Therefore, one of the sides will look for solutions *within* an existing historical context, whilst the other side although will consider this historical context as a starting point, will also attempt to surpass it towards the realization of a humanist type of righteousness. One faces two problems when reflecting on these issues. One problem is that the first position militates towards finding a realistic resolution, which is usually preferred and chosen nowadays when attempting to find the right answers to various societal problems related with technological progress. Until now, this was the dominant strategy. According to this way of understanding technological progress, immediate solutions are preferred in relation to a given socio-economic context. It also rejects other solutions because these are seen as idealistic and, therefore, without a chance to become a reality. This first strategy seems to be reasonable and natural. Apparently, it seems to have functioned well when it came to solving issues related to technological advancement. It was based on taking mending measures or those that were meant to minimize the negative effects of the technological progress. Unfortunately, this strategy has brought us to the present situation in which the effects of the technological progress and technology-supported augmentation of human activity on a global scale cannot be controlled or diminished any longer. At least not through the action of some self-regulating mechanisms of a formal social contract, i.e. through the state and its national institutions. The management of huge collectivities and large-scale economic and industrial structures makes

any significant change very hard to implement due to reluctance of the political systems[2], organizations,[3] and economic path dependence.[4] The present problems have a global scale size and the development of the social and political systems does not permit a systemic and coordinated intervention on such large a scale. Perhaps the best example of this reality is the failure of the recent Paris Agreement on Climate Change, in the context that most of the world leaders and populations credit, at least partially, the scientific evidence related to global warming and its risks. The Paris Agreement was implemented only partially, at local level and without any generally agreed legal support. Even when faced with the imminence of a global disaster and extinction, the second tier values, such as the national interest and prosperity, seem to be still in the first place on a principal role.

There is another problem with these short-sided and short-term solutions. The intention to control the future development of the technology falls into well-known "Collingridge's dilemma". "The social consequences of a technology cannot be predicted early in the life of the technology. By the time undesirable consequences are discovered, however, the technology is often so much part of the whole economic and social fabric that its control is extremely difficult. This is the *dilemma of control*. When change is easy, the need for it cannot be foreseen; when the need for change is apparent, change has become expensive, difficult and time consuming."[5]

Until the moment when technology would be more widely developed and implemented, its impact cannot be easily anticipated. This seems to mean that its ethical impact cannot be judged neither retrospectively, nor in a prospective way. Retrospectively because the previous ("old") ethics are not applicable to the new socio-cultural structure any longer. Prospectively, because the speculative character permits too many versions, on the one hand, and the fact that the new society can significantly differ from the present one inasmuch as some of the underlying considerations do not apply any longer or would apply in a completely different manner. In addition, one encounters the issues surrounding the ability to act in an empowering way. Once technology is part of a socio-economic structure, control and change are extremely difficult due to the social costs involved. People are especially concerned by economic consequences among others, to give up of the existing investments and integrated infrastructures, i.e. the aforementioned path dependence phenomenon and of the ancient loss-aversion human drive. The impact of an ethical discourse about technological progress is reduced because for many it is too close to science-fiction narrative. This situation persists as long as it takes time until the maturation of any technological advance and its full effects to became obvious. Unfortunately, starting from that moment, any change is very hard to implement. This is due to the complexity of technological advancement.

[2] Ian Greener, "The Potential of Path Dependence in Political Studies", *Politics*, vol. 25, nr. 1, 2005, pp. 62-72.

[3] Jörg Sydow, Georg Schreyögg, "Organizational Path Dependence", in *International Encyclopedia of the Social & Behavioral Sciences*, Elsevier, 2015, pp. 385–89.

[4] Douglass C. North, *Institutions, Institutional Change and Economic Performance*, Cambridge, Cambridge University Press, 1990.

[5] David Collingridge, *The social control of technology*, London, New York, Frances Pinter Publishers, St Martin's Press, 1980, p. 11.

3. THE COMPLEXITY OF TECHNOLOGICAL PROGRESS

Any technological revolution presupposes three stages.[6] In the primary phase (*introductory*) of the new technologies, the tools are still esoteric in nature, the number of those who benefit from them is relatively small, these are only understood by a close-knitted elite, the production costs are high, but with a limited utility and with a minor social integration as well as with a marginal social impact. In the intermediate phase (of *permeation*), technological products are being spread and standardized, the number of users is on the rise, the associated costs are being reduced, whilst their utility is getting higher, the societal integration is on the medium side whilst their marginal impact becomes observable. In the last phase of technological revolution (or the *power* phase), technology reaches a powerful level of integration within the society and, in effect, it does become available and imperative for the development of other products. It is now understood and utilized by the majority of the population and it has a wide utility value and small associated costs of production. Therefore, in this last phase, the impact of technology on society becomes impressive. The situation is even more dramatic in the case of the emergent technologies that use new concepts, methods, and techniques, and that are not previously tested and whose impact is hard to be evaluated. Even though these are in the research and development phase, the list of promising emergent technologies in the making is already big: the medical nanotechnology, the synthetic biology, the 'Internet of Things' and the ambient intelligence, the personal and industrial robots, the web semantic, the quantic computers, the affective computing, the augmented reality, the intelligent materials and the neuro-electronics. Some of these technologies have an increased risk of not being able to be controlled appropriately after their implementation. An example can be the so-called generic technologies (or *enabling technologies*) which can lead to technological revolutions with a major impact on the social system. The *stand-alone technologies* such as the antibiotics, the car or the clock had a limited impact and on a single field or industry. However, *generic technologies* such as the fossil-powered engines, the integrated networks, the Internet, the Nano-technologies do all affect entire industrial sectors, social domains and even the human species as a whole, e.g. neuro-technologies can directly influence the cognitive development. Their promise to offer new and, in addition, potentially superior solutions to the current issues faced by the existing technologies leads to the development of the imagination and creativity and a hyper-optimistic stance not for but against any preemptive or precautionary spirit[7]. Their massive impact on the social and economic system is the most important issue. This leads to significant transformations in some key domains in society such as education, health, personal life, body integrity, transport, telecommunication or mass-media. However, these are prone to drive to a locked augmented state of being. Once implemented on a large scale, their change is

[6] James H. Moor, "Why we need better ethics for emerging technologies", *Ethics and Information Technology*, vol. 7, nr. 3, 2005, pp. 111–119.

[7] Andrew Stirling, "Precaution in the Governance of Technology", *SPRU Working Paper Series (SWPS)*, 2016-14, pp. 1–23, www.sussex.ac.uk/spru/swps2016-14, accessed on 30 April 2022.

extremely difficult as they are strongly anchored in the economic, political and cultural system. One can witness these from the difficulty – and even the practical impossibility – of replacing the highly polluting fossil-based industry, which sustains the vital economic base of the current transport system (with its related infrastructure, e.g. roads, motorways, petrol stations) with an ecological industry, based on a different production and use of electricity, e.g. electric roads and cars.

From here, the imperative to be addressed at least partially from the onset, in an ethical manner, the way in which these technologies appear to us with all their good and bad attributes. In their beginning, the associated risk related to their production is customarily completely neglected. Still, the "scientific" analyses related to the risk evaluation, alongside with any prospective studies, the cost-benefit analyses (utility-based) or those based on the stakeholders' and investors' involvement, as well as the deliberative thinking and the process of democratization, are all inefficient in relation to the conditional frame of an un-ethical intelligence. "The ethical evaluation of technologies is doomed to be always anachronistic being either 'too early' or 'too late': when we develop technologies on the basis of specific value frameworks, we do not know their social implications yet, but once we know these implications, the technologies might have already changed the value frameworks to evaluate these implications."[8] At the same time, studies on human trustfulness reveal the general propensity toward small cheating and abuse, for bending the rules when there is the opportunity for personal gains. The rapid pace of technological progress creates continuously a fluid grey zone of appropriate behavior. It requires a more extensive and voluntary reflection on how and what principles of ethical conduct should be applied. In the business world and not only, any new technological breakthrough pushes the dishonest conduct to the limit. It takes time until the capabilities, effects, and limits of technological innovation are experienced and become visible and the desirable and abusive ways to use are obvious for everyone[9]. Hence, any prospective analysis of the impact of technological innovation on people and society should be rather pessimistic, than optimistic. The joyfully anticipated benefices will have larger and, even more different, bad side effects than expected. The human-technology dialectical relation requires such critical analysis on the psychological grounds of ethical approaches to technological progress.

4. ETHICAL STANCES ON THE TECHNOLOGICAL PROGRESS

An analysis of the contemporary ethical literature related to the technological progress reveals that the ethical discourse, how the main ethical issues are approached and how moral risks are conceived, depends on two aspects. The first one is the modality in which technology is conceived as well as it is its relationship with the human species

[8] Olya Kudina, Peter-Paul Verbeek, "Ethics from Within: Google Glass, the Collingridge Dilemma, and the Mediated Value of Privacy", *Science, Technology, & Human Values*, vol. 44, nr. 2, 2019, p. 293.

[9] Edward J. Balleisen, *Fraud: An American History from Barnum to Madoff*, Pronceton, Princeton University Press, 2017.

from an ontological perspective. Four main positions can be distinguished: technology = tools, technology = social system, technology = co-generic to the human, and technology = post-human and an autonomous reality as auto-poietic system. The other dimension is the axiological one. It results, or not, from the attitude generated by the perceived ontological relation of humans with technology and in connection to the belief about the role and the place of the human being in the world. According to this perspective, one can identify four distinct types of blunt *positions* toward the technological progress:

> *Mourning*, which is an eschatological perspective, mostly religiously reinforced;
> *Resigning*, based on a secular and hyped perspective on the global technological risks;
> *Denial*, embraced by the scientific negationists of technological negative effects;
> *Exaltation*, represented by scientists with reasonable confidence that humanity will find technological means for balancing the future technological pace for human race's benefit.

The *Mourning* perspective sees in the technological progress an act and process of dehumanization and perversion of the human being that is doomed to become extinct. Once it was released, the Technology has taken humanity away from its natural state through an analogous process to the 'original sin'. The human destiny has become connected to these and, therefore, the only salvation is the return to the nature, tradition and simplicity. In this image the tapestry of the classical theological notions are woven in with the myths and the futuristic utopias/dystopias depicted by transhumanism. "Wherever we find technological dreaming, religion is not far off."[10] The cessation of the human within the transhuman project is due to the deterministic ineluctable innovation, which is looping off technological progress (*futurum)*, and it can be overcome only by a transcendental miracle (*adventus*) from a theological perspective[11].

The *Resigning* perspective encapsulates the entire literature based on global catastrophic risks[12]. This attitude starts from the premise of the improbability of the conscious life in the universe and of the multitude of existential risks on the human species. Therefore, the possibility of the (self-)destruction of the life on Earth, as a consequence of the technological progress, does not represent any longer a significant danger through its relation to a number of potential extinction factors.

The *Denial* perspective is supported by positivist scientists, especially those from the natural sciences or from engineering field. Usually they are "narrow-minded", morally blinded or ill-motivated scientists, like those considering climate changes as an entirely natural occurring phenomenon[13], or self-absorbed engineers, unable at least to glimpse the big picture that lays outside of their technical activity.

[10] Michael S. Burdett, *Eschatology and the Technological Future*, Routledge, 2015, p. 237.
[11] *Ibidem*.
[12] Nick Bostrom, Milan M. Cirkovic (eds.), *Global Catastrophic Risks*, Oxford, Oxford University Press, 2008.
[13] Constantin Crânganu, *Schimbările climatice. Un ghid (uneori) incorect politic* [*Climate Changes. A Guide (sometimes) politically incorrect*], Bucureşti, Integral, 2020.

The *Embracing* perspective is the one that recognizes the existential problems and risks of the technological progress and, as consequence, tries to identify viable solutions or development strategies such as the Luciano Floridi's[14] technological gambit or the moral bio-enhancement strategy of Julian Savulescu[15].

However, these "existential" general positions do not relate directly to certain positions on the ethics of technology. The reason is that the *belief* about technology (how is conceived as ontological reality) and *attitude* about technology (how it relates with our person), are neither overlapping, nor consistent. Moreover, they are interrelated and often it is difficult to decide if the conception (or the wishful thinking) is the one that determines the attitude on the relationship with the technology or the mode in which this relationship *is felt upon* is deciding the ontological perspective on technology. According to affective tone (positive or negative) and rational conception on the "naturalistic" character of technology results four types of ethical positions regarding technological progress.[16]

Attitude / **Belief**	NEGATIVE	POSITIVE
MANAGEABLE	*Frustration Anger*	*Embracing*
UNMANAGEABLE	*Depression*	*Acceptance*

Weak **Strong** **Moderate** **Ultimate**

The four ethical positions based on the belief and attitude toward technology.

4.1. THE WEAK POSITION

This position is founded on the premise that technology does represent the ensemble of instruments created by the human beings over their developmental span with the purpose of exploiting, controlling and adapting to the environment in order to make everyday life easier. All technological devices are produced and controlled by humans, being complementary to his development as a species. Technology has no structural determination on the development of the human species. Technology is simply conceived as a sum of tools and technological devices invented for make people's lives easier. Technology has had a positive impact right from its advent over the development of the human spe-

[14] The technological development will "benefit environment more *significantly* and *quickly* than actually harm it, and that there is enough time for such gambit to pay back." Luciano Floridi, *The Fourth Revolution: How the Infosphere is Reshaping Human Reality*, Oxford, Oxford University Press, 2014.

[15] Ingmar Persson, Julian Savulescu, *Unfit for the Future. The Need for Moral Enhancement*, Oxford, Oxford University Press, 2012.

[16] For an illustration of the application of this general ethical perspective to the problem of the development of artificial intelligence (AI), see Bogdan Popoveniuc, "AIRSE: The Ethics of Artificial Intelligent Robots and Systems", in Antonio Sandu, Ana Frunză, Elena Unguru (eds.), *Ethics in Research Practice and Innovation*, IGI Global, pp. 283–295.

cies; therefore, this position argues that technological development must be encouraged. In addition, this perspective tends to argue that all the troubling issues that occur along with the advance of technology are exclusively due to the lack of responsibility of those who utilize these new technologies. Furthermore, the unethical practices and individual or group ill-usage are suggested to be those who lead to the harm of all involved, especially due to the creation and the usage of some destructive technologies. However, the line of reasoning continues and shapes up an argument that suggests that no technology is harmful *per se* as long as it was conceived as a solution for the problems or for satisfying some human necessities. The derivative negative and initially unforeseen harmful effects can and will be controlled once with the technological advancement.

According to this position, the ethical argument is almost completely eliminated by simply passing of the responsibility over to the users of technology. On the contrary, from the perspective of those involved in the development of innovations, the technological progress would not even need to be directed, as the costs related to this would overcast the potential and possible benefits.

This line of argumentation does only confer a neutral, functional and *post factum* role for ethics and the moral values, which are themselves, conceived as technological devices, i.e. conjectural instruments that have appeared from the simple necessity of adaptation to social life and without a particular (or *epiphylogenetically*) function related to the evolution of human civilization. Therefore, this perspective seems to be subsumed to the so-called *strong social determinism* perspective according to which the social developmental laws are fundamental for the competition between societies, e.g. economical competition being of primary importance. From a social evolutionism perspective, the one that possesses the most advanced technologies is privileged in terms of a more effective exploiting of resources and, in doing so, also winning a competitive advantage, which in turn will lean to conferring her "superiority".

4.2. THE MODERATE POSITION

This perspective argues that technological progress has an important ethical dimension due to its strong influence on the human life. This position mainly focuses on the *technological impact*, so that this line of argumentation emphasizes specific technical aspects and ethical problematics of a short-term nature. Among them, what typed of technologies are developed; their (immediate) effect on health and environment; the impact of the new technologies on the work market; as well as on the economic inequalities, the human rights and so on. It states that the social actors always determined the course of technological evolution, although the society's auto-regulation mechanisms – such as education, politics and legislation – must be improved. At most, technological advancement is seen as unavoidable for human progress, understood as increasing comfort and well-being.

Although it regularly supports claims of an ethical or normative nature, it argues that the control on technological progress is undesirable. Following this line of argumentation, this position continues to sustain that whilst societal progress is linked to scientific

and technological progress, then any obstacle in their path would affect the societal progress. The scientific freedom, expressed through the action of universities with their fundamental combined educational and research function, would be sufficient -it is being contended- for regulating and controlling this evolution. This perspective is generally that of a *realist pragmatism*, which considers, in addition, that deontological professional regulations are prospective enough for anticipation and prevention of the possible negative effects of the new technologies even if they are to be applied to a larger scale on the human species.

From the perspective of a governance of technological progress, a particular sensibility and cooperation is necessary so that all involved in the development of the technological devices would respond to the public opinion's worries in relation to the negative consequences and issues that are arising from the utilization of these new technologies. A collaboration with other experts from other disciplines becomes therefore "a must" and, more specifically, with those from within the social sciences – psychology, anthropology, economy and law – so that the context and the consequences of their findings can be fully understood and used. This would lead towards an increase in the standards and a bettering of the control mechanisms within the planning process as well as that of completion and utilization of the new technologies. The introduction of some transparency mechanisms in relation to these procedures as well as determining what is available to all become an imperative.

Both previous ethical positions are based on the conceptions of science as being fully objective. Science having a neutral, with some beneficial nuances, status is a widespread conviction amongst the wider public and the scientific circles. The same thing is believed about technology, which is habitually conceived as being neither good, nor evil in itself, a double-edged sword at human's will disposal. However, this simplistic and untruthful essentialist perspective conceals the dialectical relationship between human species and its technologies, mental and material altogether, and is bound to a narrow and deceiving understanding of the distant effects and ethical implications of technology, at large, and biotechnologies, in particular, on human lives and the evolution of the human species. I contend that this image is deceptive, as long as, the technology is (and, in part, it has never been) no longer an aggregate of instruments and tools, but forms (the most part of it) an *epiphylogenetic reality* (Stieger)[17] of modern humans. Nowdays, as long as people are living mostly in a technological-made environment, *Onlife* in a symbiotic virtual reality (Floridi)[18], their cognition, and consequently, their comprehension, is technomolded, and hence the principles of autonomy, justice, beneficence, and non-maleficence in bioscience and public life are prone to misunderstanding. This conceptual confusion has significant implications on ethical reasoning, decision-making and public policies, as will become clear from the last two ethical positions.

[17] Bernard Stiegler, *Technics and Time: The fault of Epimetheus*, Stanford University Press, 1998.

[18] Luciano Floridi, "Soft Ethics and the Governance of the Digital", *Philosophy & Technology*, vol. 18, nr.1, 2018, pp. 1-8.

4.3. THE STRONG POSITION

This position is based on the premise that technological development is a co-generical and natural process inherent to the human being, from her first carved stones to the nuclear reactors and is a constitutive part of the symbiotic relationship between brain and material instruments. The *epi-phylogenetic* perspective of the human development – referring to maintaining of the phylogenetic experience in and through technical objects – is understood as a break away from the classical organization of the evolutionary development. The latter argues that human evolution has resulted from "the organizational evolution of the organic matter" and, on the other hand, technological evolution had resulted from the "organization of the inorganic matter". This view is based on *technological determinism* who claims that advancements in technology are the cornerstones of the new phases in human history. The social evolution is structured on the pillars of technological innovations. Human history is, in fact, the history of technological progress. Technologies weave the entire fabric of social structure. Practically speaking, from the beginnings of humanity, one can point out towards a techno-social system in which the language, the cars, the Internet or "any operable knowledge system aimed at solving various practical problems"[19] are no other things than evolutionary enhancing tools. Nowadays, not only human beings form a social system, but also their roles and social statuses, the infrastructure, the laws and procedures, and also the scientific data, its ideologies and knowledge are social technologies. Technological progress has its own internal logic, that of efficiency, complementary to social progress, and determining the development of the social structure and cultural standards. One can say this differently in that the development of the human species cannot be delimited from technological development. As consequences, the ethical avenues should be adapted to the developmental level of todays' technology and not in the other way around. The way in which one attempts to approach technological challenges as well as its normative principles will have to base his line of reasoning on both the present and anticipated technological possibilities. Moreover, the prescribed rules will have to be adapted in relation to the foreseen changes being brought about by the innovations and the techno-social transformations. For example, there is the possibility to create human embryos and therefore the in-vitro fertilization has to be reflected upon from the present and anticipated moral standpoint and will have to be adjusted and limited to practical problems of efficiency. This will assure that these interventions will be optimized, the benefits increased, the harmful effects diminished, and their unforeseen secondary effects controlled from the beginning.

4.4. THE ULTIMATE POSITION

This position is better understood in analogy or as an extension of the hypothesis of the "egoist gene". Technology is a system of organization of the inorganic matter that has

[19] Jin Zhouying, *Global Technological Change. From Hard Technology to Soft Technology*, Intellect Books, 2005.

resulted from the development of the organic matter that was prearranged to create tools through which life can continues even in the absence of organic life. Technological devices are apprehended as *constitutive* prosthesis of body *qua* "human" and not simple prolongations or extensions of it. "The evolution of the «prosthesis», not itself living, by which the human is nonetheless defined as a living being, constitutes the reality of the human's evolution, as if, with it, the history of life was to continue by means other than life: this is the paradox of a living being characterized in its forms of life by the nonliving – or by the traces that its life leaves in the nonliving."[20]

This is the position of *strong technological determinism*, according to which technological progress is autonomous, and every innovation leads to the development of another function for the needs of humans and society. This peculiar form of natural determinism argues that this evolution is *necessary* and *determined by the laws of nature*, in the same way as the evolution of species – the strongest survives and the intelligence has been selected as being a superior competitive technology through the process of natural selection. The capacity to build even more performant tools does not represent just the exteriorization of an ability, but it is the development of a hybrid cognitive skill within the frame of the progress of the human species. From here the inevitability of the transhuman epilogue of the Global Brain[21] and furthermore of the Cosmic Singularity. "In the aftermath of the Singularity, intelligence, derived from its biological origins in human brains and its technological origins in human ingenuity, will begin to saturate the matter and energy in its midst"[22], and the whole Universe wakes up.

The ethical argument is therefore foreclosed through the fatalistic premise of the fact that technical progress cannot be controlled. This perspective has real and major consequences on social development based on the self-fulfilled prophecy. In this resides its ethical risk, too. If the end is unavoidable, there is no original responsibility for humans. The precautionary principle[23] is replaced by the more transhuman oriented proactionary principle.[24] The technological fatalism limits (at least motivationally) the thinking to the alternative solutions and of a world in which the technology is a real resource and not just a means to an end. The great peril comes from the fact that this line of argumentation can justify the race towards the technological weaponisation, strongly supported in any case by the free market system, with its lethal effects on the humanistic aspects of humanity and, why not, on the future of the human species.

[20] Bernard Stiegler, *Technics and Time: The fault of Epimetheus*, pp. 50, 152 – 153.

[21] Peter Russell, *The Awakening Earth: The Global Brain*, London, Routledge & Kegan Paul, 1982.

[22] Ray Kurzweil, *The Singularity is Near: When Humans Transcend Biology*, New York, Penguin Books, 2005, p. 35.

[23] Søren Holm & John Harris, "Precautionary Principle Stifles Discovery", *Nature*, vol. 400, nr. 6743, July 1999, pp. 398–398.

[24] Max More, "The Proactionary Principle", in *The Transhumanist Reader*, John Wiley & Sons Ltd, 2013, pp. 258–67.

5. ETHICS OF EMERGING TECHNOLOGIES

The analysis of the public perception reveals that the perspective through which the politicians and the social institutions seem to argue is based on the moderate positions according to which the technology is seen as a set of instruments and techniques that are developed and utilized by human beings and that have general beneficial effects on the progress of humanity. The different types of approaches towards technological progress promote invariably technical methods of control and anticipation of the technological development and emphasize on human morality to a very small degree. Ethical analysis of emerging technologies has many forms from generic, experimental, anticipatory approaches[25], risk analysis, ethical technology assessment[26], the techno-ethical scenarios approach[27], ETICA approach[28], ATE approach[29] to participatory and deliberative[30]. The ethical analysis implies different levels or a combination of perspectives, problems being analyzed at a general technological level as well as at the level of the technological products and the susceptible ethical characteristics of its applications.[31]

Nevertheless, their common core is the underlying thesis of technology conceived as complementary to human being and its evolution. The dimensions of civilization affected by technological progress, which must be taken into account through the ethical evaluation of technologies, are numerous and can hardly be organized in an exhaustive and consistent framework. Technology deeply affects the dissemination and use of information, social control, influence and power, social contact patterns, privacy, sustainability, human reproduction, gender, minorities and justice, international relations and human values.[32] Any checklists that can be proposed for the anticipatory ethics of (emerging) technology "are necessarily incomplete and may result in ethical issues that are specific to a particular technology or domain being missed."[33]

[25] Ozcan Saritas, "Systemic Foresight Methodology", in Dirk Meissner, Leonid Gokhberg, Alexander Sokolov (eds.), *Innovation Policy or Policy for Innovation? In Search of the Optimal Solution for Policy Approach and Organisation*, Springer Science & Business Media, 2013, pp. 83–117.

[26] Elin Palm, Sven Ove Hansson, "The case for ethical technology assessment (eTA)", *Technological Forecasting and Social Change*, vol. 73, nr. 5, 2006, pp. 543–558.

[27] Marianne Boenink, Tsjalling Swierstra, Dirk Stemerding, "Anticipating the interaction between technology and morality: a scenario study of experimenting with humans in bionanotechnology", *Studies in Ethics, Law, and Technology*, vol. 4, nr. 2, art. 4, 2010.

[28] Bernd Carsten Stahl, "IT for a better future: how to integrate ethics, politics and innovation", *Journal of Information, Communication and Ethics in Society*, 9(3), 2011, pp. 140–156; Bernd Carsten Stahl, Richard Heersmink, Philippe Goujon, Catherine Flick, Jeroen van den Hoven, Kutouma Wakunuma, Veikko Ikonen, Michael Rader, "Identifying the ethics of emerging information and communication technologies: an essay on issues, concepts and method", *International Journal of Technoethics*, vol. 1, nr. 4, 2010, pp. 20–38.

[29] Philip A. E. Brey, "Anticipatory Ethics for Emerging Technologies", *Nanoethics*, vol. 6, 2012, pp. 1–13.

[30] Maria Giaoutzi, Bartolomeo Sapio (eds.), *Recent Developments in Foresight Methodologies*, New York, Springer, 2013.

[31] Philip A. E. Brey, "Anticipating ethical issues in emerging IT", *Ethics and Information Technology*, vol. 14, 2012, pp. 305–317.

[32] Elin Palm, Sven Ove Hansson, "The case for ethical technology assessment (eTA)", pp. 543–558.

[33] Philip A. E. Brey, "Anticipatory Ethics for Emerging Technologies", pp. 1–13.

Paradoxically, those taxonomic approaches on strategies for enhancing ethics of technology are themselves tributary to the same technological mentality that they strive to master. It is part of cognitive technology that appropriate the real by dividing it in discrete strips, which are further combined into a general map, i.e. the so-called *computational thinking*. As consequence, the suitable means, or ethical measures for attaining the desired goals (a sustainable, safe, private, secure, autonomous or whatever else desirable "ethical" aspects of human life are conceived) are envisage in an automatic, abstract, pragmatic and non-humanistic way. What is missing in this picture is exactly the self-reflective stance, which humans were unaware of in their entire history, with all the disasters and atrocities this allows to happen.

Human evolution is a continuous "in-the-making" process. With the escalation of technological progress, the human become increasingly part of its own creation. If previously technology was *epi-phylogenetic*, now it becomes as well *sub-phylogenetic* and *allogenetic* because it is now the ground and it modifies and transcends (knowingly?) the phylogenetic process. During the past *phylogenesis* of the *homo* (as) *faber*, technology accompanied dialectically human development. Now humans actively and intentionally increase technology's participation on its existence, by orienting technological innovation and progress toward enhancing their own constitution (corporeal, social, and psychological) and adding allogenic technological dimensions of external extensions of human constitution. The process has the pattern of a developing feedback loop, any innovation generating changes at cognitive level, which on its turn, become capable to imagine new enhancements. The process is now (self-)reinforcing and oriented. We are able willingly to modify and enhance our characteristics. Consequently, we are intentional self-creators (or modifiers) and responsible for *what* we intend, not only for the intended (and unintended or foreseen!) consequences of our innovations. Therefore, the ethics of technological progress should become self-reflexive. The unethical and problem-focused rational thinking on what and how we are allow doing and making and the estimated consequences is not enough anymore. It must also cover the reflection on *what makes possible* this rational system, our current anatomic, psychological, cultural, and historical characteristics, on *how it is this being* that reasons *in such* way, and *what it could become*. Technological progress must be designed critically and prospectively, anticipating the future stance in all its possible paths and forms. Accordingly, the ethics of technology should incorporate (critically!) the prospective and proactionary principles as key dimensions of its reasoning. A self-enhancing innovation that is conceived desirable today can be unsuitable for how we will be tomorrow precisely because this innovation itself and many others. The technological progress is self-referential, and its Ethics should be as such, i.e. metaethical. The Ethics of technology is fated to be fluid, in a ceaseless dialectic change, and dialogical. The traditional rational criteria such as utilitarianism and deontologism, although still benchmarks for ethical judgement and decision-making, reach their limits and are relativized and weaken under the siege of the incessant challenges brought by technological advancement. Should they be dropped out? Not at all, but they must be enhanced too. In the first place, "as emerging technologies converge, it becomes clearer

that the ethical issues raised by these technologies are at core similar and familiar. It would be a waste of resources to take up the ethical questions in parallel; i.e., it is not profitable to invent a "new kind" of ethics for each new technology. Instead, we need to get better at productively engaging the familiar ethical questions that cut across those emerging—and converging—technologies.

It is time to go from speaking about hyphenated ethical enterprises (gen-ethics, nano-ethics, neuro-ethics, synbioethics) to speaking about the ethics of emerging technologies."[34]

In the second place, the ethics of technology is a bet. The aim of a either neutral or commitment to any particular moral theory is at least problematic, if not utopic and potentially deleterious, as long as the essence of human consciousness is deeply axiological plural. The possibility of a more profound relationship between the progress and the future of the human species is imminent, as it stands from the numerous contemporary philosophical analyses. Since their formation people were embedded in a technological environment. It is a difficult task to become aware about the mix between *technology* and *the evolution of the human race* and its impact on human thinking. The limits of my world are the limits of my language, as Wittgenstein put it. Technology also forms a linguistic and symbolic system, infusing our values, thinking and culture. It would be like asking a fish to explain the water in which it swims. As technological products and technological settings become more elevated, complex and ubiquitous, intrinsic parts of everyday life, humans become unaware of their influence on their life. They use technologies that they do not understand, and they are not aware about that. "He uses the technical miracles created by superior men without wonder nor surprise, as a kitten accepts a bowl of milk. Far from aspiring to higher reasoning, he is not even aware that higher reasoning exists. He classes his own mental process as being of the same sort as the genius of an Einstein. Man is not a rational animal; he is a rationalizing animal."[35]

As numerous studies in moral psychology have already revealed, automatic evolutionary moral intuitions[36], cultural encoding[37], patterns of socialization,[38] a complicated mixture of emotional[39] and rational[40] processes guides unconsciously and quasi-consciously our ethical reasoning.[41] Our evolutionary organic nature did not prepare us

[34] Erik Parens, Josephine Johnston, Jacob Moses, *Ethical Issues in Synthetic Biology: An Overview of the Debates*, The Hastings Center, 2009, p. 4.

[35] Robert A. Heinlein, "Gulf", in *Assignment in eternity*, Baen Books, 1987, p. 59.

[36] Jonathan David Haidt, *The Righteous Mind: Why Good People Are Divided by Politics and Religion*, Pantheon, 2012.

[37] Natalie Gold, Andrew M. Colman, Briony D. Pulford, "Cultural differences in responses to real-life and hypothetical trolley problems", *Judgment and Decision Making*, vol. 9, nr. 1, 2014, pp. 65-76.

[38] Deborah J. Laible, Gustavo Carlo, Laura M. Padilla Walker (eds.), *The Oxford Handbook of Parenting and Moral Development*, Oxford, Oxford University Press, 2019.

[39] Joshua Greene, *Moral Tribes: Emotion, Reason, and the Gap Between Us and Them*, Penguin Press, 2013.

[40] Terry Horgan, Mark Timmons, "Morphological Rationalism and the Psychology of Moral Judgment", *Ethical Theory and Moral Practice*, vol. 10, 2007, pp. 279–295.

[41] Hanno Sauer, *Moral Judgments as Educated Intuitions*, Cambridge, MA: MIT Press, 2017.

for dealing with technological "onlife" living and technological environment challenges. Impersonal interactions, distant and unpredictable consequences of intentions blur personal responsibility.[42]

At the same time, what is called Ethics is a rational language system encapsulating the ideals of human moral psychology. However, human ethical reasoning has a very dynamic phenomenology of moral semantics. A perpetual swinging between one and another, ego and otherness, selfish assertiveness and prosociality, and self-responsibility and other-responsibility. Ethical concepts are vivid and changing according to one's experience. They are organic, alternating and self-enforcing, and cannot be fixed in a stable consistent program code. Their lived-meaning oscillates between the infra-ethical level[43] of the responsibility in general, and ultra-ethical level[44] of the responsibility to the singularity of the other. The global network of moral actions between humans, machines and IAs by sustained systemic interactions mingles and fades personal and felt responsibility. The mixed (human and nonhuman) multiagent systems distributes morality.[45] Technological infrastructure and innovations are neither ethical neutral nor having an ethical dual-use, as weak ethical position presuppose.[46] There is always a teleological intention, incorporating a more or less moral scope in their design. The potential harmful effects a technology is a global propriety. This is a different thing from that resulting from the individual or intended harmful use. If you make a social network for monetization, your algorithms will increase the probability for unfair or harmful use, bad effects and higher magnitude of immoral behaviors, although they were "not intended".

Although, or precisely because of the fact that the technology supplements us *epiphylogenetically*, our ethical reasoning is more exposed to dangers of misunderstanding, biases and wrong judgements in fully technological settings. While intrinsically to evolved and civilized societies, technology is just a part of human being and society. If this relation is misunderstood, the submission to technological dependence state can transform technological progress from an enhancing to a carcinogenic process. If it is not already. The first ethical imperative is the critical and open-minded assessment of the place and influence of technology on our personal life and for the entire species. Second, the affective tone of attitude toward technology should necessary be positive if we want a constructive future. As consequence, a strong ethical position should be at the base of any inquiry and the anticipative ethical concepts related to technological evolution.

[42] Joshua D. Greene, et al., "Pushing moral buttons: The interaction between personal force and intention in moral judgment", *Cognition*, vol. 111, nr. 3, 2009, pp. 364–371.

[43] Luciano Floridi, "Distributed Morality in an Information Society", *Science and Engineering Ethics*, vol. 19, 2013, pp. 727–743.

[44] Jacques Derrida, *The Gift of Death*, translated by David Wills, University of Chicago Press, 1996, p. 68.

[45] Luciano Floridi, John W. Sanders, "On the morality of artificial agents", *Minds and Machines*, vol. 14, nr. 3, 2004, pp. 349–379.

[46] Luciano Floridi, "Infraethics–on the Conditions of Possibility of Morality", *Philosophy & Technology*, vol. 30, 2017, pp. 391–394.