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The correlation between ethics and technology

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THE CORRELATION BETWEEN ETHICS AND TECHNOLOGY

Peter G Kirchschräger, Switzerland³²

2.1 Introduction

As introduced above in the introduction, ethics is the scientific discipline that involves analysing moral questions and problems, discussing decisions and actions as legitimate or illegitimate, and analysing good/bad and right/wrong, respectively.

Originating from the Greek term *technologia* combining *techne* (art, technique) and *logos* (animating principle pervading the universe), technology entails the pursuit of a higher or more fundamental end or meaning. “When we speak of technology, we think of the power we are able to exert, thanks to our knowledge, on the world that surrounds us and of which our body, mortal and vulnerable, is a part.” The following critique

³² Peter G. Kirchschräger is Professor of Theol. Ethics at the University of Lucerne/Switzerland, prior Visiting Fellow at Yale University.

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of the term “technology” is taken into account and enriches the reflections in this book: “There is no such thing as technology in general or technology 4s such: There are always instead constellations of artefacts and techniques, actually-existing and also imagined. Technologies are in use, misused, consumed, consigned to landfill, repaired, maintained, creatively re-appropriated, under development, seeking venture capital, subject to regulation, promoted, marketed, misunderstood, repackaged, mistaken for novelties. Some artefacts and techniques seem to arrive from nowhere, dazzling us with promises and threats, usually to disappoint us soon enough, or at any rate until the next distraction fills the pop-tech press and screen.”³³ Still, “technology” is used to categorise the diversity and plurality of technologies, while being aware of the limits of this categorization in order to use this awareness fruitfully in the more specific ethical assessment focusing on concrete technologies.

The relationship between ethics and technology can be understood as an interaction of a source of ends (ethics) with a source of means (technology). After assessing this possible element of the correlation between ethics and technology, the topic of what technology brings to ethics (e.g., innovation), and what ethics brings to technology (e.g., orientation) will be elaborated. On this basis, the challenges ethics creates for technology, as well as those which technology creates for ethics, will be discussed.

2.2 Ends and Means

2.2.1 Justifying Ends

“If there is one thing the great institutions of the modern world do not do, it is to provide meaning. Science tells us how but not why. Technology gives us power but cannot guide us as to how to use that power.

³³ Carrico, Dale (2013): “Futorological Discourses and Posthuman Terrain”. In: *Existenz. An International Journal in Philosophy, Religion, Politics, and Arts* 8(2), 48.

The market gives us choices but leaves us uninstructed as to how to make those choices. The liberal democratic state gives us freedom to live as we choose but refuses, on principle, to guide us on how to choose.”³⁴ Ethics could play the role of providing meaning. It could represent a source of ends – ends as, e.g., survival and life with dignity for all humans,³⁵ peaceful coexistence, justice, and sustainability.³⁶ Ethics should play a role “in the exclusion of objectives which are not strictly necessary. There remains enough of the indispensable to occupy the technical genius of man both in perfecting and in correcting and slowing down further developments.”³⁷ This is also reflected in a statement by Wolfgang Wahlster, director of the German Research centre for Artificial Intelligence: “All we have to do is always put the benefit to humans at the centre of AI research.”³⁸

It is within the ethical dimension where questions about the ethical legitimacy of horizons of meaning and of ethical ends are discussed. Humans analyse what should be and why it should be. Humans evaluate, decide, and make an ethical judgement. It is part of ethics to act accord-

³⁴ Sacks, Jonathan (2015): “Sword Into Plowshares”. In: The Wall Street Journal Review, October 3, C1-C2. Online: <https://www.wsj.com/articles/swords-to-plowsh-ares-unlikely-any-time-soon-1444422562> RonaldLethal Autonomous Systems [08.02.2021].

³⁵ See Kirchsclaeger, Peter G. (2013a): *Wie können Menschenrechte begründet werden? Ein für religiöse und säkulare Menschenrechtskonzeptionen anschlussfähiger Ansatz*. ReligionsRecht im Dialog 15. Muenster: LIT-Verlag. 194-195.

³⁶ See Armand, Jean-Louis (2012): “The bringing together of technology, sustainability and ethics”. In: *Sustainability Science* 7(2), 113-116.

³⁷ Jonas, Hans (1984): “Warum wir heute eine Ethik der Selbstbeschränkung brauchen”. In: Stoecker, Elisabeth (Ed.): *Grenzen der Ethik. Ethik der Wissenschaften 1*. Paderborn: Wilhelm Fink / Ferdinand Schoeningh, 86.

³⁸ Brost, Marc / Hamann, Goetz (2018): “Ein autonom fahrendes Auto erkennt bei Nacht kein Wildschwein”. In: *Die Zeit*, July 26. Online: <https://www.zeit.de/2018/31/kuenstliche-intelligenz-autonomes-fahren-wolfgang-wahlster-interview> [08.02.2021]

ingly – to act ethically –³⁹which, in other words, means to follow the ethically justified ends. “Ethics, whether in the form of issuing direct enjoinders to do or not to do certain things, or in the form of defining principles for such enjoinders, or in the form of establishing the ground of obligation for obeying such principles, deals with values relating to human conduct. It is concerned with action or non-action.”⁴⁰

Finally, ethics embraces the ethical justification of ethical ends, as well as the ethical justification of ends. Because of their claim of universality as part of ethics, these justifications need to satisfy the principle of generalizability by presenting rational and plausible arguments – “good reasons”. The concept of “good reasons” means that it must be conceivable that all humans given their effective freedom and autonomy as well as their full equality would agree upon these reasons – within a model of thought and not within a real worldwide referendum – on ethical grounds. Inspiring the definition above was another way to frame these requirements of ethics: “A rational or critical ethics is one that claims for itself rational justifiability for its principles. Ethical principles are rationally justified if they are generally endorsed by, that is to say acceptable to, all affected persons, given their full equality and effective self-determination.”⁴¹

2.2.2 Providing Means

In order to achieve these ethical ends or ethically justifiable ends, humans use adequate means. These means can also be produced by

³⁹ See Pieper, Annemarie (1994): *Einführung in die Ethik*. Tübingen: UTB, 17-48.

⁴⁰ Armand, Jean-Louis (2012): “The bringing together of technology, sustainability and ethics”. In: *Sustainability Science* 7(2), 114.

⁴¹ Koller, Peter (1990): “Die Begründung von Rechten”. In: Koller, Peter / Varga, Csaba/ Weinberger, Ota (Eds.): *Theoretische Grundlagen der Rechtspolitik*. Ungarisch-Österreichisches Symposium der internationalen Vereinigung für Rechts- und Sozialphilosophie, 75.

technology – technology based on basic science and applied science leading to growth and welfare⁴² and embedded in the plan of living with nature (not so much in the sense of commanding nature)⁴³ for the benefit of humans.

Technology can serve ethically good ends. E.g., technology can be understood as a prosthesis – in the service of life and society.⁴⁴ “Continuing advances in scientific and technological innovations are essential to modern societies. Historically, such developments have improved living conditions in both developed and developing countries.”⁴⁵ Out of this understanding of the correlation between technology and ethics, the following present challenge emerges: “It is a time when technology can bring wonders to one’s life. It is a time when I ask myself whether all of these technological achievements have made us better human beings! A robot can be programmed to act good or bad, but who will demarcate human actions?”⁴⁶

⁴² See Bacon, Francis (2003): *The Advancement of Learning*. Kiernan, Michael (Ed.). The Oxford Francis Bacon 4. Oxford: Oxford Clarendon Press.

⁴³ See Bacon, Francis (2000): *The Instauration Magna: Last Writings*. Rees, Graham (Ed.). The Oxford Francis Bacon 13. Oxford: Oxford Clarendon Press.
Bacon, Francis (2004): *The Instauration Magna Part II: Novum Organum and Associated Texts*. Rees, Graham / Wakely, Maria (Eds.). The Oxford Francis Bacon

11. Oxford: Oxford Clarendon Press.
Bacon, Francis (2007): *The Instauration Magna Part III: Historia naturalis et experimentalis: Historia ventorum and Historia vitæ & mortis*. Rees, Graham / Wakely, Maria (Eds.). The Oxford Francis Bacon 12. Oxford: Oxford Clarendon Press.

⁴⁴ See Schuurman, Egbert (2010): “Responsible Ethics for Global Technology”. In: *Axiomathes* 20(1), 107-127. 107-127.

⁴⁵ Lucchi, Nicola (2016): *The Impact of Science and Technology on the Rights of the Individual*. *Law, Governance and Technology* 26. Cham: Springer 4.

⁴⁶ Bashir, Qasim (2000): “Technology vs. morality”. In: *Surgical Neurology* 54(1), 92.

It would be too reductionist though to describe technology as the instrumental pursuit of an end with a means produced to reach this end.⁴⁷ Technology also produces the conditions for the success of instrumental pursuit of an end and continues working on these conditions. Nature is transformed by technology in an environment of technological systems for the benefit of humans who try to balance the resources and dangers of nature in calculable and assessable opportunities and risks.⁴⁸

Furthermore, technology can also develop its own laws and transform from being automatic to being “autonomous”⁴⁹ Possible ends emerging out of technology could be, among others, “technology for the sake of technology”, “what can be made must be made”⁵⁰ or “efficiency”. The current digital transformation of society and the economy and the use of artificial intelligence⁵¹ can serve as concrete examples for this potential of “autonomous” technology because at their centre are self-learning-systems⁵² which no longer need any human input in order to

⁴⁷ See Ortega y Gasset, José (1949): *Betrachtungen über die Technik*. Stuttgart: Deutsche Verlags-Anstalt, 90-105; Hubig, Christoph (2007): *Die Kunst des Möglichen II, Grundlinien einer dialektischen Philosophie der Technik 2: Ethik der Technik als provisorische Moral*. Bielefeld: Transcript-Verlag, 48.

⁴⁸ See Hubig, Christoph (2011): “Technikethik”. In: Stoecker, Ralf / Neuhaeuser, Christian/ Raters, Marie-Luise (Eds.): *Handbuch Angewandte Ethik*. Stuttgart: J. B. Metzler, 170.

⁴⁹ See Ellul, Jacques (1964): *The Technological Society*. New York: Vintage Books, 125-150; Kirchsclaeger, Peter G. (2016b): “Digitalisierung und Robotisierung der Gesellschaft aus ethischer Perspektive”. In: *feinschwarz.net*, March 30. Online:<http://www.feinschwarz.net/digitalisierung-und-robotisierung-der-gesellschaft-aus-theologisch-ethischer-perspektive/> [08.02.2021].

⁵⁰ Schuurman. 2010, op. cit., 123.

⁵¹ See Kirchsclaeger 2016b, op. cit.

⁵² See Taddy, Matt (2019): “The Technological Elements of Artificial Intelligence”. In: Agrawal, Ajay / Gans, Joshua / Goldfarb, Avi (Eds.): *The Economics of Artificial Intelligence: An Agenda*. Chicago: University of Chicago Press, 61-87.; Bishop, Christopher M. (2006): *Pattern Recognition and Machine Learning*. Information Science and Statistics 1. New York: Springer; Goodfellow, Ian /

improve and to optimize their own performance. “The ethical risks posed by AI-enabled robots are (...) serious – especially since self-learning systems behave in ways that cannot always be anticipated or fully understood, even by their programmers.”⁵³

This self-learning can consist also of “intuition” as, e.g., the win of the Go-game by robots also based on “intuitive” decisions can show;⁵⁴ of strategic reasoning with imperfect information as, e.g., the win of a marathon 20-day poker competition can demonstrate;⁵⁵ or of “a system’s ability to correctly interpret external data, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation.”⁵⁶

Bengio, Yoshua / Courville, Aaron (2017): *Deep Learning. Adaptive Computation and Machine Learning*. Cambridge: MIT Press; Agrawal, Ajay / Gans, Joshua S. / Goldfarb, Avi (2018): *Prediction, Judgment and Complexity: A Theory of Decision Making and Artificial Intelligence*. Rotman School of Management. Working Paper 3103156. Online: <https://ssrn.com/abstract=3103156> [08.02.2021]; Le Cun, Yann / Bengio, Yoshua / Hinton, Geoffrey (2015): “Deep learning”. In: *Nature* 521(7553), 436-444; Jain, Sarthak (2017): “NanoNets: How to use deep learning when you have limited data: Part 2: Building object detection models with almost no hardware”. In: *Medium*, January 30. Online: <https://medium.com/nanonets/nanonets-how-to-use-deep-learning-when-you-have-limited-data-f68c0b512cab> [08.02.2021].

⁵³ Vallor, Shannon / Bekey, George A. (2017): “Artificial Intelligence and the Ethics of Self-Learning”. In: Lin, Patrick / Jenkins, Ryan / Abney, Keith (Eds.): *Robot Ethics 2.0 from Autonomous cars to Artificial Intelligence*. New York: Oxford University Press, 338.

⁵⁴ See *Nature* 2016; Kirchsclaeger, Peter G. (2017a): “Roboter und Ethik”. In: *Aktuelle Juristische Praxis* 26(2), 240-249.

⁵⁵ See Spice, Byron (2017): “Carnegie Mellon Artificial Intelligence Beats Top Poker Pros”. In: *Carnegie Mellon University*, January 31. Online: <https://www.cmu.edu/news/stories/archives/2017/january/AI-beats-poker-pros.html> [08.02.2021].

⁵⁶ Kaplan, Andreas / Haenlein, Michael (2018): “Siri, Siri in my Hand, who’s the

If the pursuit of efficiency is the exclusive scope of technology, three observations are provoked: *First*, technology striving for efficiency is neither independent from any ends or an end itself, nor ethically neutral, but serves a clear end: efficiency. Or the affirmation that technology is not a means which serves any ethical end, is in itself a normative statement assuming no end or technology as an end for technology – a normative statement which needs to be justified ethically, subject to the required criterion mentioned above.

Second, technology inherits a social and an ethical dimension. “Technology cannot be understood as an instrument for bringing about goals that are external to the contexts in which it operates, but the relational contexts in which technology functions are imbued with values which demand consideration. Thus, technology, as it actually operates in concrete situations has a contextually dependent ethical quality. Technology creates an ethical situation, and this situation should provide the context for decision making.”⁵⁷

Third, the pursuit of efficiency as the exclusive scope of technology leaves technology without any *raison d’être*. “The process of technological development hurtles ahead blindly without a normal sense of balance. As we can see from nuclear weapons and environmental degradation, the effects on human society are immense.”⁵⁸ The way it is advancing, technology runs the risk of detaching itself from any horizon of meaning and of alienating itself from humanity and nature. “The human artifice of the world separates human existence from all mere animal environments, but life itself is outside this artificial world, and through life man remains related to all other living organisms. For some time

Fairest in the Land? On the Interpretations, Illustrations and Implications of Artificial Intelligence”. In: *Business Horizons* 62(1), 17.

⁵⁷ Buchholz, Rogene A. / Rosenthal, Sandra B. (2002): “Technology and Business: Rethinking the Ethical Dilemma”. In: *Journal of Business Ethics* 41(1), 48.

⁵⁸ Shibasaki, Fumikazu (2005): “Technology and ethics”. In: *Philosophy & Criticism* 31(18), 497. 2005.

now, a great many scientific endeavours have been directed toward making life also ‘artificial’, toward cutting the last tie through which even man belongs among the children of nature (...) The question is only whether we wish to use our new scientific and technical knowledge in this direction, and this question cannot be decided by scientific means; it is a political question of the first order and therefore can hardly be left to the decision of professional scientists or professional politicians.”⁵⁹ In other words, the *raison d’être* for technology is not technology-based; it cannot be found out, defined, and justified by technology.⁶⁰

Beyond that, technology can also be abused for other ends,⁶¹ distancing itself from its original ends, striving exclusively for efficiency and disregarding any higher end or meaning.⁶²

However, ethical ends would still be distinguished from other ends. These other ends would undergo an ethical judgement on the basis of ethical ends. Ernesto Bertarelli, former CEO of Serono, states: “We never carry out research for the sake of research. (...) if there is no purpose and if there is no reason, we reject the innovation and we do not pursue it.”⁶³ The former point emphasises the orientation towards another end of research, the latter shows that the characteristics of innovation require an ethical assessment of innovations.⁶⁴

⁵⁹ Arendt, Hannah (1958): *The human condition*. Chicago: University of Chicago Press, 2-3.

⁶⁰ See Jennings, Bruce (2010): “Enlightenment and enchantment: Technology and ethical limits”. In: *Technology in Society* 32(1), 27.

⁶¹ See European Group on Ethics in Science and New Technologies to the European Commission 2014.

⁶² See Shibasaki 2005, *op. cit.*

⁶³ Bertarelli, Ernesto (2002): “Science Between Goals and Limits”. In: 32nd ISC-Symposium at the University of St. Gallen (Ed.): *Pushing Limits – Questioning Goals*. St Gallen: ISC-Symposium, 49-50.

⁶⁴ See Kirchsclaeger, Peter G. (2013b). “Human Rights as an Ethical Basis for Science”. In: *Journal of Law, Information and Science* 22(2), 1-17.

One should overcome the naïve assumption that all technological progress and every innovation is an ethically good innovation. “Given the immense ambiguities of innovations – in themselves and in their consequences, the ethical scrutiny of innovation is a dictate of reason that should not be ignored any longer.”⁶⁵

It needs to be added though that technological progress depends also on basic research, which is done for the sake of basic research. Even in this area, a decision – which can find its foundation in ethical ends – needs to be taken in which basic research is prioritised and gets funded. Facing the scarcity of financial resources for research and technology and at the same time confronted by pressing global problems, a setting of focus and priority seems to be necessary. Finally, the question must be addressed as to who is benefitting from results and successes of technology – and for that matter benefitting the most.⁶⁶

⁶⁵ Enderle, Georges (2015b): “The Theme of the Sixth World Congress of the International Society of Business, Economics, and Ethics in 2016 in Shanghai, China: ‘Ethics, Innovation, and Well-Being in Business and the Economy’”. In: ISBEE, July 22. Online: <http://isbee.org/the-theme-of-the-sixth-world-congress-of-the-international-society-of-business-economics-and-ethics-in-2016-in-shanghai-china-ethics-innovation-and-well-being-in-business-and-the-econom/> [08.02.2021].

⁶⁶ See Hunt, Paul (2008): Promotion and protection of human rights: human rights questions, including alternative approaches for improving the effective enjoyment of human rights and fundamental freedoms: The right to health. Report of the Special Rapporteur on the right of everyone to the enjoyment of the highest attainable standard of physical and mental health. UN Human Rights Council. Sixty-third Session. A/63/263. United Nations. Online: <https://undocs.org/A/63/263> [08.02.2021]; Shaver, Lea (2015): “The Right to Science: Ensuring that Everyone Benefits from Scientific and Technological Progress”. In: *European Journal of Human Rights* 4, 411-430; Donders, Yvonne (2015): “Balancing Interests: Limitations to the Right to Enjoy the Benefits of Scientific Progress and Its Applications”. In: *European Journal of Human Rights* 4, 486-503; Chapman, Audrey R. (2009): “Towards an Understanding of the

2.2.3 Way of Functioning of Technological Progress

Looking at the correlation between ethical, as well as ethically justifiable, ends and means provided by technology in a context partly created by technology, a further element needs to be taken into account. The perception of technological development and progress as a linear process pursuing a well-defined scope would probably not correspond with the present-day theory and reality of technology.⁶⁷ Technological innovations are often the result of small steps and are frequently random products.⁶⁸ “Technology is not ordinarily developed after carefully considering the various possible ramifications. In most cases a new technology is developed because it promises major short-term benefits and is judged not to cause any immediate problems.”⁶⁹ In addition, the speed of technological advancement outpacing normative considerations is another characteristic of the way of functioning of technology.

Furthermore, some ethical norms exist by dint of certain technological developments because the necessity to establish an ethical rule originates in a technology-based reality.

Beyond that, the complexity of technological development and progress should not be underestimated. “First, engineering and technology development typically take place in collective settings, in which a lot of different agents, apart from the engineers involved, eventually shape the technology developed and its social consequences. Second, engineering and technology development are complex processes, which are charac-

Right to Enjoy the Benefits of Scientific Progress and Its Applications”. In: *Journal of Human Rights* 8(1), 1-36.

⁶⁷ See Kuhn, Thomas S. (1962): *The Structure of Scientific Revolutions*. Chicago: University of Chicago Press.

⁶⁸ See Boutellier, Roman / Heinzen, Mareike / Raus, Marta (2010): “Paradigms, Science, and Technology: The Case of E-Customs”. In: Becker, S. Ann / Niebuhr, Robert E. (Eds.): *Cases on Technology Innovation: Entrepreneurial Successes and Pitfalls*. New York: Business Science Reference, 134-155.

⁶⁹ Shibasaki 2005, op. cit.

terised by long causal chains between the actions of engineers and scientists and the eventual effects that raise ethical concern. Third, social consequences of technology are often hard to predict beforehand.”⁷⁰

It is also noteworthy that the social consequences of technology are such that should a certain technology fill some social role, it inherits, by so doing, the concomitant “social requirements”.⁷¹ Furthermore, technological action should be considered distributed and collective rather than individual⁷² though without introducing categories like fate and tragedy in order not to be too harsh with technology.⁷³ Therefore, various actors should be identified as subjects of responsibility.⁷⁴ Identifying them is a complex task. The identification of subjects of responsibility should still be implemented in order to build an atmosphere of professionalism and accountability – not only out of respect for the objects of responsibility.⁷⁵ Complexity cannot serve as an excuse to neglect legal or ethical obligations and responsibilities because ethical and legal norms keep their validity even in complex situations and contexts.

⁷⁰ Doorn, Neelke / van de Poel, Ibo (2012): “Editors’ Overview: Moral Responsibility in Technology and Engineering”. In: *Science and Engineering Ethics* 18(1), 2.

⁷¹ See Bostrom, Nick / Yudkowsky, Eliezer (2014): “The ethics of artificial intelligence”. In: Ramsey, William, M. / Frankish, Keith (Eds.): *The Cambridge Handbook of Artificial Intelligence*. Cambridge: Cambridge University Press, 316-334.

⁷² See Lenk, Hans / Maring, Matthias (2001): “Responsibility and Technology”. In: Auhagen, Ann Elisabeth / Bierhoff, Hans-Werner (Eds.): *Responsibility: The many faces of a social phenomenon*. London: Routledge, 100.

⁷³ See Coeckelbergh, Mark (2012): *Growing Moral Relations: Critique of Moral Status Ascription*. New York: Palgrave Macmillan. 35-48.

⁷⁴ See Coeckelbergh, Mark / Wackers, Ger (2007): “Imagination, distributed responsibility, and vulnerability: The case of Snorre A”. In: *Science and Engineering Ethics* 13(2), 235-248.

⁷⁵ See Lenk, Hans / Maring, Matthias (2001): “Responsibility and Technology”. In: Auhagen, Ann Elisabeth / Bierhoff, Hans-Werner (Eds.): *Responsibility: The many faces of a social phenomenon*. London: Routledge, 93-107.

By overcoming the overly simplistic ends-means-framework and by considering the characteristics of technology, on the one hand, and respecting ethics as a source of ethical ends (and of the ethical legitimacy of ends), on the other hand, perhaps an attempt to grasp the reciprocal interactions and the reciprocal challenges could inform the understanding of the relationship between ethics and technology.

2.3 Reciprocal Interactions

The correlation of ethics and technology can be understood based on reciprocal interaction, as both ethics and technology contribute to each other. For example, groundbreaking ideas in technology and their successful application have a concrete impact on ethics as technology creates value, solutions for societal challenges, and innovation. “Science and technology have shaped modern society, economics, politics, law and culture. They deeply affect the lives of all people and they are now central features of our social and commercial landscape.”⁷⁶ Even specifically in the ethical dimension, technology leads to innovation and dynamics⁷⁷ because the societal and individual transformation based on technology needs to be taken into account in ethics as well.⁷⁸

⁷⁶ Lucchi, Nicola (2016): *The Impact of Science and Technology on the Rights of the Individual. Law, Governance and Technology* 26. Cham: Springer, 6.

⁷⁷ See Manzeschke, Arne (2015): “Angewandte Ethik organisieren: MEESTAR – ein Modell zur ethischen Deliberation in sozio-technischen Arrangements”. In: Maring, Matthias (Ed.): *Vom Praktischwerden der Ethik in interdisziplinärer Sicht: Ansätze und Beispiele der Institutionalisierung, Konkretisierung und Implementierung der Ethik*. Zentrum für Technik- und Wirtschaftsethik 7. Karlsruhe: KIT Scientific Publishing, 315-330.

⁷⁸ See Kernaghan, Kenneth (2014): “Digital dilemmas: Values, ethics and information technology”. In: *Canadian Public Administration* 57(2), 295-317.

Moreover, technology⁷⁹ and especially smart technology is influencing (e.g., by nudging)⁸⁰ at least individual lives – and maybe even the ethical dimension of individual lives.⁸¹ “By helping to shape human actions and experiences, technologies also participate in our ways of doing ethics.”⁸² While acknowledging the effect technology has on humans as subjects of ethics, technology – in contrast to the idea of a “non-humanist ethics of technology⁸³ – remains an object of ethics and humans subjects of ethics. Why? Humans can decide on an ethical basis or orientation towards an ethical frame of reference in the technological decisions they make: whether to create a technology or not, how and if they design, develop, produce, disseminate, and use a technology or not, if they abolish a technology or not, if – to a certain extent – they allow a technology to influence their lives or not, and how they assess a technology from an ethical perspective. All this is up to humans, not up to technology.

Finally – and linked with that – contributions by technology to human lives are ethically relevant and can be ethically evaluated.⁸⁴ The ethical relevance of “human making and using”⁸⁵ of “tools and their

⁷⁹ See Borgmann, Albert (1995): “The Moral Significance of Material Culture”. In: Feenberg, Andrew / Hannay, Alistair (Eds.): *Technology and the Politics of Knowledge*. Bloomington: Indiana University Press, 85-93.

⁸⁰ See Mathis, Klaus / Tor, Avishalom (Eds.) (2016): *‘Nudging’ – Possibilities, Limitations and Applications in European Law and Economics*. Cham: Springer.

⁸¹ See Guthrie, Clifton F. (2013): “Smart Technology and the Ethical Life”. In: *Ethics & Behavior* 23(4), 324-337.

⁸² Verbeek, Peter-Paul (2011a): *Moralizing Technology: Understanding and Designing the Morality of Things*. Chicago: Chicago University Press, 1.

⁸³ See among others Verbeek 2011a: 21-40, *ibid*.

⁸⁴ See Verbeek 2011a: 1-20, *ibid*.

⁸⁵ Mitcham, Carl (2014): “Agency in Humans and in Artifacts: A Contested Discourse”. In: Kroes, Peter / Verbeek, Peter-Paul (Eds.): *The Moral Status of Technical Artefacts. Philosophy of Engineering and Technology* 17. Dordrecht: Springer, 11-29.

deliberate use”⁸⁶ as the foundation of civilization, though, needs to be distinguished from possessing ethical subjectivity or from moral agency. For example, a self-driving car is ethically relevant because it can save human lives or cause harm to/kill humans. But a self-driving car as a material object – even though it represents a highly sophisticated technology – is not an ethical subject or a moral agent because – among other things (see for further arguments below chapter 3 Can Ethical judgement Be Delegated to Technologies?) – it cannot be held accountable for harm or killing. Humans behind this technology remain the ethical subjects or the moral agents. They make decisions about the interactivity (response to stimulus by change of state) – “autonomy” (ability to change without stimulus) and adaptability (ability to change the “transition rules” by which the state is changed) of technology; they create, design, develop, produce, disseminate, abolish, and use them and the technology itself. Behind the supposedly “political bridges”⁸⁷ behind the supposedly “missing masses of morality”⁸⁸, behind the supposedly “artificial moral agents”⁸⁹, behind the supposed “artefacts with morality”⁹⁰, behind the supposedly “moral agents and mediated subjects”⁹¹, and behind the supposed “morality in design”⁹² there are humans as ethical subjects and moral agents. Humans can decide whether or not to

⁸⁶ Bloch, Ernst (1959): *Das Prinzip Hoffnung: Kapitel 1-32*. Werkausgabe 5. Frankfurt am Main: Suhrkamp. 731.

⁸⁷ See Winner, Langdon (1980): “Do Artifacts Have Politics?” In: *Daedalus* 109(1), 121-136.

⁸⁸ See Latour, Bruno (1992): “Where Are the Missing Masses? The Sociology of a Few Mundane Artifacts”. In: Bijker, Wiebe E. / Law, John (Eds.): *Shaping Technology/ Building Society*. Cambridge: MIT Press, 151-180.

⁸⁹ See Floridi, Luciano / Sanders, Jeff W. (2004a): “On the Morality of Artificial Agents”. In: *Minds and Machines* 14(3), 349-379.

⁹⁰ See Verbeek, Peter-Paul (2011a): *Moralizing Technology: Understanding and Designing the Morality of Things*. Chicago: Chicago University Press, 41-65.

⁹¹ See Verbeek 2011a: 66-89, op. cit.

⁹² See Verbeek 2011a: 90-119.

build bridges in a way that is disadvantageous to humans – manifesting their political convictions in a lasting way. Humans can decide, for example, whether or not to build speed bumps in order to protect human life. Humans can decide to create, design, develop, build, produce, disseminate, to use or not to use a technology which can perform a “morally qualifiable action”. “An action is said to be morally qualifiable if and only if it can cause moral good or evil”⁹³. Humans can decide if a technology should perform this action, and if a technology should be able to decide by itself if it should perform this action. Just because a technology is ethically relevant, meaning it can cause ethically positive and ethically negative effects, does not mean it possesses moral agency as there is, first, a difference between performance and moral agency. Second, it is an ethical decision by humans if a technology should be entrusted with such decisions (as will be further elaborated below in chapter 3 (Can Ethical judgement be Delegated to Technologies?).

Third, even in the case of a technology being designed by humans in a way that it makes “autonomous” decisions about ethically relevant questions, a technology does not make these decisions with a knowledge, perception, or awareness of the ethical quality of these decisions (this point will be further explained below in chapter 5 The Complexity of Ethics).

Humans can make decisions about mediation by technology, its intensity, and its extent. Humans can decide to create, design, develop, build, produce, disseminate, use or not use a technology which may be able to mediate, and humans can decide if a technology should mediate or not. Humans can be aware of mediation by technology, and humans can reflect self-critically upon mediation by technology. Humans are not exposed powerlessly and heteronomously to it.

Humans can make decisions about mediation by design, its intensity and its extent. Humans can decide to create a design which mediates or

⁹³ Floridi / Sanders 2004a: 361.

does not mediate, and humans can decide if a design should mediate or not. Humans can be aware of mediation by design, and humans can reflect self-critically upon mediation by design. Again, humans are not exposed powerlessly and heteronomously to it.

In order to avoid a potential misunderstanding of what was just elaborated above, an emphasis must be put on the agreement that these societal impacts, effects, actions, influence, shaping, and mediation are possible and ethically highly relevant. There is no doubt about that. For example, design can influence the ethical dimension of human lives – illustrated by the inspiring example of “Eternally Yours”.⁹⁴ “Eternally Yours follows an unorthodox approach within eco-design. Instead of the usual emphasis on reducing pollution while maintaining beauty and economy, the company focuses on lengthening what it calls the product’s ‘psychological lifetime’. Most products are thrown away long before they are broken or obsolete, usually because of changing tastes and fashions. Eternally Yours attempts to combat this tendency of products to wind up prematurely in the landfill by designing products that invite people to become attached to them.”⁹⁵ The argument is presented, though, that behind societal impacts, effects, actions, influence, shaping, and mediation by technology and design, humans are the ethical subjects and the moral agents.

At the same time, science and technology happen, are pursued, and are in an ethically informed context. “But even the most solitary and radical reflection, as thinking with an intersubjective claim to validity, must presuppose language and thus a community of communication. But this also marks the limit of the value-free world-distance of modern natural science. As an enterprise in the search for truth in the dimension of intersubjectivity, value-free natural science must also presuppose

⁹⁴ See Verbeek, Peter-Paul (2005): *What Things Do: Philosophical Reflections on Technology, Agency, and Design*. Pennsylvania: Penn State University Press. 203-234.

⁹⁵ Verbeek 2005b: 12.

ethics. But that would, of course, only be an ethics of the enterprise science, which could not even answer the question of whether science should be. It would be different if we were to reflect on the subjective and intersubjective conditions of the possibility of thinking as argumentation; for no one can go back behind these conditions if he or she seriously raises any questions at all and thus puts them up for discussion.”⁹⁶

Moreover, ethics contributes to technology, for example, by stimulating technological innovation,⁹⁷ by recognizing technological inventions,⁹⁸ and by providing ethical guidance. “Since all technologies are expressions of the values of their makers, if we care about ethics and morality, it will show in the machines we build.”⁹⁹ Part of this value-system from an ethical perspective should be, among other things, ecological concerns. “Industrial Modernity – the greatest innovative boost to human development since the invention of letterpress printing – had one major design flaw: it passed its environmental costs on to the future generations. So a central task of the digital revolution might logically be to reverse this error. But instead, this revolution is being used to fuel the exponential growth of mass consumption. Similarly, it has failed to more fairly distribute the benefits of technological innovation. Here too everything points to an intensification of social inequality.”¹⁰⁰

⁹⁶ Apel, Karl-Otto (1986): “Verantwortung heute – nur noch Prinzip der Bewahrung und Selbstbeschränkung oder immer noch der Befreiung und Verwirklichung von Humanität”. In: Meyer, Thomas / Miller, Susanne (Eds.): *Zukunftsethik und Industriegesellschaft. Zukunftsethik 1*. Muenchen: J. Schweitzer, 27-28.

⁹⁷ See Lucchi 2016: 7, op. cit.

⁹⁸ See Lucchi 2016: 1-2.

⁹⁹ Sullins, John P. (2013): “An Ethical Analysis of the Case for Robotic Weapons Arms Control”. In: Podins, Karls / Stinissen, Jan / Maybaum, Markus (Eds.): *5th International Conference on Cyber Conflict*. Tallinn: NATO CCD COE Publications, 16.

¹⁰⁰ Thun-Hohenstein, Christoph (2017): “Sense and Sensibility in the Digital Age: Let Us Wake Up and Take Action! Introductory Essay”. In: Thun-

Ethical discourse of technology depends on the understanding that technology is “something made” and “not anything given”¹⁰¹ “Technology must be allowed to augment living where it can, but cannot be allowed arbitrarily to suppress ways of life. Thus, ethics does not presume against technological change, but must be a part of the formulation of how change is translated into advancement or repression.”¹⁰²

One needs to go even further stating that ethics belongs to technology. “The idea of scientific knowledge as value-neutral is simply incorrect. Values are intrinsic to the making of science and technology, and they both reflect and transform particular values.”¹⁰³ Horizons of meaning and ethical ends inform technology in an ethical sense. “Science and technology in their objective areas, for all their diversity of methods, are ultimately always aimed at people. That is why science and technology cannot be separated from ethical insight and decision-making in any area.”¹⁰⁴ The discussion about the difference between notions like “ethical technologies”, “technical tools”¹⁰⁵ , “intelligent computer interfac-

Hohenstein, Christoph (Ed.): Vienna Biennale 2017. Wien: Verlag für Moderne Kunst, 19.

¹⁰¹ Heesen, Jessica (2014): “Mensch und Technik. Ethische Aspekte einer Handlungspartnerschaft zwischen Personen und Robotern”. In: Hilgendorf, Eric (Ed.): Robotik im Kontext von Recht und Moral. Robotik und Recht 3. Baden-Baden: Nomos Verlagsgesellschaft, 253; 268.

¹⁰² Rainey, Stephen / Goujon, Phillipe (2011): “Toward a normative ethics for technology development”. In: Journal of Information, Communication and Ethics in Society 9(3), 174.

¹⁰³ De Melo-Martín, Immaculada (2010): “The Two Cultures: An introduction and assessment”. In: Technology in Society 32(1), 9.

¹⁰⁴ Auer, Alfons (1982): “Darf der Mensch, was er kann?”. In: Busch, Alois J. / Splett, Joerg (Eds.): Wissenschaft – Technik – Humanität. Frankfurt am Main: Verlag Josef Knecht, 18.

¹⁰⁵ Engineering and Physical Sciences Research Council 2011.

es”¹⁰⁶, or “socio-technical systems”¹⁰⁷ shows the openness of technology to ethics. At the end of the day, this discussion implies the link between technology and ethics.

Beyond that, while the technology community is aware of its legal obligations and legal compliance standards, it strives for the respect of ethical principles in its work as well, e.g., honesty, objectivity, independence, impartiality, fairness, responsibility for future generations.

At the same time, a globalised technology community faces several traditions, cultures, religions, worldviews, and value-systems that can lead to ethical challenges. Ethical guidance can support technology in overcoming these challenges and in benefitting from the opportunities of this diversity and heterogeneity.

Furthermore, ethics can critically examine the legal obligations and legal compliance standards of the technology-community on a regular basis. This should lead to a continuous optimization of the legal framework for technology.

In addition, ethics can help in the process of agenda-setting in technology, not only in defining the right priorities but also in framing adequately the sphere of influence and responsibility of technology.

Finally, while technology contributes to the progress of ethics, it is obvious that at the same time there is a need for ethics in technology in order to be able to even conduct the necessary research, discussions, and studies. Technology can be the victim of infringements of its freedom, of attempts to block innovative and creative approaches, and of oppression of ideas, concepts, and discoveries. Reasons for these transgressions can be putative “absolute truths” or the enforcement of old and existing

¹⁰⁶ Van Est, Rinie / Stemerding, Dirk (2012): *Making Perfect Life*. European Governance Challenges in 21st Century Bioengineering. STOA Science and Technology Options Assessment. Brussels: European Union.

¹⁰⁷ Manzeschke, Arne / Weber, Karsten / Rother, Elisabeth / Fangerau, Heiner (2013): *Ethische Fragen im Bereich Altersgerechter Assistenzsysteme: Ergebnisse der Studie*. Ludwigsfelde: Druckerei Thiel Gruppe.

economic or political power structures. There is still a danger of members of the technology community not being able to conduct their research freely and independently. Therefore, there is a need for legal and ethical norms that support and protect technological progress.

This reciprocal interaction between ethics and technology accommodates the “interactionist model” highlighting the contributions of technology to ethics and the contributions of ethics to technology.

2.4 Reciprocal Challenges

At the same time, ethics can limit technology as well. For example, health and safety guidelines, patents, legal ownership of intellectual property rights, competition policy, consumer protection, and ethical codes of conduct belong to this category. This impact of ethics can be perceived as blocking and hindering technological innovation.¹⁰⁸

Beyond that, technology must respect ethical principles. For example, “developers should strive at creating artificial agents whose actions are constrained in such a way that unethical outcomes can be avoided.”¹⁰⁹ Among other things, the dignity of all humans can be a limit for technology (see below sub-chapter 6.4 Human Rights as an Ethical Frame of Reference). Therefore, technology does not have the permission to treat humans as means but only as ends – e.g., on the basis of the categorical imperative by Immanuel Kant.¹¹⁰ Furthermore, technology

¹⁰⁸ Gurkaynak, Gonenc / Yilmaz, Gonenc / Haksever, Gunes (2016): “Stifling Artificial Intelligence: Human Perils”. In: *Computer Law & Security Review* 32(5), 749-758.

¹⁰⁹ Krenn, Brigitte (2016): “Multiuse Tool and Ethical Agent”. In: Trappl, Robert (Ed.): *A Construction Manual for Ethical Systems*. Cham: Springer, 25.

¹¹⁰ See Kant, Immanuel (1974): *Grundlegung zur Metaphysik der Sitten*. Weischedel, Wilhelm (Ed.). Werkausgabe 7. Frankfurt am Main: Suhrkamp, 61; Duewelling, Marcus (2010): “Menschenwürde als Grundlage der Menschenrechte”. In: Debus, Tessa / Kreide, Regina / Krennerich, Michael / Malowitz, Karsten / Pollmann, Arnd / Zwingel, Susanne (Eds.): *Zeitschrift für Menschenrechte* 4, 77.

must also respect the privacy of all humans (see below sub-chapter 7.17 Data-Protection and Privacy). In this way, technology is challenged by ethical norms.¹¹¹ Paradigmatically, in the area of digitalization, automation, mechanisation, robotization, and the use of artificial intelligence, technology can follow ethical programming by humans heteronomously.¹¹²

At the same time, ethics faces challenges from technology as well. Technological progress is speeding up. The intervals for new technologies and technological applications get smaller and smaller. Ethics and law run the risk of being constantly outpaced by technology. They struggle to keep up with technological progress. The perception of this risk is based, though, on two misconceptions: First, it understands ethics as reactive instead of proactive, and secondly, “some observers of modern culture do note disparities and tensions between contemporary doing and making, between ethics and technology. They complain that, while technology has advanced dramatically, our ethical attitude in dealing with it has not. But this complaint is as radically mistaken as the general divorce of doing from making. It fails to see that a technological accomplishment, the development and adoption of a technological device always and already constitutes an ethical decision.”¹¹³

¹¹¹ About technological progress, its ends, its foundational values, its societal importance, and its limits, using the examples of stem cell research and of research on human beings, see Kirchsclaeger et al. 2003; Kirchsclaeger et al. 2005.

¹¹² See Wallach, Wendell / Allen, Collin (2009): *Moral Machines: Teaching Robots Right from Wrong*. Oxford: Oxford University Press; Kirchsclaeger 2017b.

¹¹³ Borgman, Albert (1992): *Crossing the Postmodern Divide*. Chicago: University of Chicago, 110.

Beyond that, ethics is challenged more and more not only by human curiosity striving for new inventions and solutions but linked by substantial economic interests and power.¹¹⁴

For example, in the area of digitalization, automation, mechanisation, robotization, and the use of artificial intelligence, ethics must deal with an attitude that the legal system of a nation-state is violated as long as the economic benefits of these acts are higher than the sanctions. The defence of the ethically justifiable position that not everything, which is doable, is ethically good meets the opposition of potential benefits and economic incentives. Similar pragmatic patterns of argumentation from a perspective of technology dominate the discussion, e.g.: that closing the gate on technology is not an option at all; that the implementation of limiting technological advancement with legal and ethical norms is impossible in a globalised world; that the identification of the subjects of responsibility in the area of technology is too complex; and that the risk assessment of technology remains imprecise and ineffective.

Finally, the impression emerges that “so far, the normative regulations have merely adapted to social upheavals. The social changes triggered by technical innovations in the fields of production and exchange, communication and transport, military and health have always been at the forefront. Classical social theory has described post-traditional legal and ethical concepts as the result of cultural and social rationalisation, which has taken place in parallel with the progress of modern science and technology. Institutionalised research is regarded as the motor of these advances. From the perspective of the liberal constitutional state, the autonomy of research deserves protection. The growing scope and depth of technological access to nature is combined with both the economic promise of productivity gains and prosperity gains and the political prospect of greater individual freedom of decision. Because growing

¹¹⁴ See Buchholz, Rogene A. / Rosenthal, Sandra B. (2002): “Technology and Business: Rethinking the Ethical Dilemma”. In: *Journal of Business Ethics* 41(1), 45-50.

freedom of choice promotes the private autonomy of the individual, science and technology have so far been in an informal alliance with the liberal basic idea that all citizens should have the same opportunity to shape their own lives autonomously. (...) The desire for autonomous living is always linked to the collective goals of health and life prolongation. The medico-historical view, therefore, warns against attempts to ‘ethicalise human nature’ to scepticism (...) From this empirically sobering perspective, legislative interventions in the freedom of biological research and genetic engineering development appear as futile attempts to resist the dominant freedom tendency of social modernity. (...) Of course, a completely different picture emerges if one understands the ‘ethicalisation of human nature’ in the sense of the self-assertion of a genre-ethical self-understanding, on which it depends whether we will continue to see ourselves as undivided authors of our life history and whether we can recognize each other as autonomously acting persons.”¹¹⁵

While reciprocal challenges between technology and ethics can obviously arise, the responsibility¹¹⁶ of humans is also growing due to the constantly expanding creation of an artificial world and of “a technological simulacrum of natural life”¹¹⁷ and the corresponding power and influence of humans. What do humans have to do to live up to this responsibility? How should one deal with the above-mentioned reciprocal challenges? Is “anything goes” the solution to this situation? There is a demand for ethical guidance, which can be provided by ethical principles and ethical points of reference discussed below.

¹¹⁵ Habermas, Juergen (2001a): *Die Zukunft der menschlichen Natur. Auf dem Weg zu einer liberalen Eugenik?* Frankfurt am Main: Suhrkamp. 47-49.

¹¹⁶ See Kirchsclaeger 2014a.

¹¹⁷ Jennings, Bruce (2010): “Enlightenment and enchantment: Technology and ethical limits”. In: *Technology in Society* 32(1), 26.

2.5 Ethical Principles and Ethical Points of Reference for Technology

Ethical orientation in ethical questions, issues, and problems concerning technology can have their origin in traditions, cultures, religions, world-views, and philosophies. In a globalised world, though, technology can, on the one hand, affect the entire planet, and most on the other hand provoke an impact on all humans. Therefore, possible ethical guidance for technology gains relevance if it can claim universality and is independent from a specific tradition, culture, religion, worldview, and philosophy.

These ethical principles and ethical points of reference enrich the relation between humans and technology consisting of an “embodiment relation” (technologies as extensions of the body, e.g., glasses, hearing aids), a “hermeneutic relation” (technologies as access points to the world, e.g. thermometer), an “alterity relation” (technologies and humans interact, e.g. humans operate a computer), a “background relation” (technologies have an effect on humans and their relationship with the world without being noticed)¹¹⁸, “immersion” (technologies merge with the world and interact with humans), and “augmentation” (technologies offer a representation of the world)¹¹⁹ by expanding this set of relations with a “constructivist and deconstructivist relation” (humans create and destroy technologies), an “interplaying relation” (humans use technologies and technologies use humans, e.g. their data), an “interproductive relation” (humans create technology/technologies and technology/technologies create parts of or in humans like attempts to simulate peculiarly human thought, e.g., artificial intelligence), an “ethically guiding relation” (humans decide based on ethical principles, ethical points of reference, and ethical norms which technologies they design,

¹¹⁸ See Ihde, Don (1990): *Technology and the Lifeworld: From Garden to Earth*. Bloomington: Indiana University Press.

¹¹⁹ See Verbeek 2015a: 211-212.

produce, and use, and which they do not), and an “ethically shaping relation” (humans decide based on ethical principles, ethical points of reference, and ethical norms how they design, produce, and use technologies).

This expansion might provoke at first sight the criticism that it takes ethical reasoning back to a point where it was before and got liberated from, namely perceiving the relation between humans and technology as a conflict between the two. This is not the intention. Rather, it tries to reconcile Michel Foucault’s “critique”¹²⁰ with the subjectivity of humans distinguished from the objectivity of technologies by acknowledging “the fundamental intertwinement”¹²¹ of humans and technologies implying “that the frameworks from which we criticise technologies are always mediated by these technologies themselves”¹²², and by re-empowering the critical characteristics of ethics, embracing also the possibility of questioning fundamentally technology-based innovation, technology, and technologies as such. Both ethics from inside and from outside technologies are ethically necessary, and humans are able to strive for both – on the conceptual basis of understanding the relationship between technology/technologies and ethics as interaction. The ethical foundation for this reconciliation embraces, on the one hand, the self-critical acceptance of the boundaries of humans and human reason that makes it impossible for humans to liberate themselves completely from the intertwinement of humans and technology. On the other hand, it trusts in the subjectivity of humans allowing them rationally to distance themselves enough from technology in order to analyse, discuss, evaluate, assess, and judge the object “technology” from an ethical perspective. Without this latter aspect, humans would run the risk to being trapped again in “immaturity”, accepting authorities and following their

¹²⁰ See Foucault, Michael (1984): “What is Enlightenment?”. In: Rabinow, Paul (Ed.): *The Foucault Reader*. New York: Pantheon Books, 32-50.

¹²¹ Verbeek 2015a: 215.

¹²² Verbeek 2015a: 215

orders as criticised by Immanuel Kant – in present times, obeying immaturely the authorities of technological progress, innovation, and economic imperatives. Without this latter aspect, humans would be reduced to immature and powerless addressees, users, and consumers of powerful technology¹²³ Without this latter aspect, technology would represent an absolute and fatalistically determined reality not influenceable by humans, expressed representatively, e.g., in the following way: “Technological development will continue, and human existence will change with it.”¹²⁴ Humans are exposed to and intertwined with technology while, e.g., holding a gun – using the imagery of Bruno Latour: “You are different with a gun in hand; the gun is different with you holding it. You are another subject because you hold the gun; the gun is another object because it has entered into a relationship with you. The gun is no longer the gun in-the-armory or the gun-in-the-drawer or the gun-in-the-pocket, but the gun-in-your-hand, aimed at someone who is screaming. What is true of the subject, of the gunman, is as true of the object, of the gun that is held. A good citizen becomes a criminal, a bad guy becomes a worse guy; a silent gun becomes a fired gun, a new gun becomes a used gun, a sporting gun becomes a weapon. The twin mistake of the materialists and the sociologists is to start with essences, those of subjects or those of objects. That starting point renders impossible our measurement of the mediating role of techniques. Neither subject nor object (nor their goals) is fixed.”¹²⁵ This mediation needs to be considered because it is capable of covering the way humans interact with the world. “On the one hand, the concept of mediation helps to show that technologies actively shape the character of human-world relations. Human contact with reality is always mediated, and technologies offer one possible form of mediation. On the other hand, it means that any

¹²³ See Weizenbaum, Joseph (1976): *Computer Power and Human Reason: From Judgment to Calculation*. New York: W. H. Freeman and Company.

¹²⁴ Verbeek 2015a: 214.

¹²⁵ Latour 1994: 33.

particular mediation can only arise within specific contexts of use and interpretation. Technologies do not control processes of mediation all by themselves, for the forms of mediation are always context-dependent”¹²⁶ This mediation offers an alternative to an “instrumentalist” understanding of technology (neutral means for humans to reach their aims) and to a “substantivist” understanding of technology (determining and controlling influence on the individual, the society, and culture).¹²⁷ The interactionist understanding of the relation between technology/technologies and ethics though coins this rapport as dynamic – knowing different grades of intensity concerning how humans, technology/technologies, and the world interact with each other, and embracing different kinds of compositions, how much each of them contribute to creating an ever-new reality from a human perspective. For example, understanding the shovel as a mediator between humans and the ground like the artist Tomi Ungerer.¹²⁸

The interactionist model comprises the possibilities of mediation, of an instrumentalist narrowing of technology/technologies, of a substantivist elevation of technology/technologies, of ideological human self-image defined by technology/technologies to the point of self-abandonment in favour of technology/technologies under the illusion of technology/technologies as an end in itself, and techno-critical reluctance of technology/technologies as well as their dynamic combination in manifold compositions. The interactionist approach situates ethics in dialogue with and under influence of this dynamic and of these possibilities. It understands ethics with the ability to distance itself to a certain extent – enough for an ethical analysis, discussion, evaluation, assessment, and judgement of technology/ technologies. This interactionist

¹²⁶ Verbeek 2015b: 11.

¹²⁷ See Verbeek 2015b: 1-12.

¹²⁸ See Ungerer, Aria (2019): “Als Vater war er gleichermassen grossartig und furchtbar”. In: Die Zeit Magazin, October 16. Online: <https://www.zeit.de/zeit-magazin/2019/43/aria-ungerer-tomi-ungerer-tochter-literatur> [08.02.2021]. 18.

understanding of technology/technologies and ethics trusts in humans remaining, at the end of the day, able as subjects to put the gun as an object down and to reflect upon this tangible gun in this specific context as technology, to discuss in a democratic process the production, the accessibility, the sale, and the use of guns, to form a political opinion and make a political decision about it, to reflect upon guns in general as technology from an ethical standpoint, as well as technology/technologies in general from an ethical perspective. This interactionist understanding of technology/technologies and ethics trusts in humans to be capable to create and destroy technology/technologies under ethical guidance.

Ethics should focus on identifying technologies that open the door to ethical opportunities and therefore should be allowed depending on the ethical quality of the interaction between humans and technologies. Ethics should start from the fundamental paradigm that “artificial intelligences (*machinae sapientes*) are not evolutionary adversaries of *homo sapiens* but instruments (*artefacts*) that must be thought of as cooperative to the person.”¹²⁹

¹²⁹ Benanti, Paolo (2018): *Le Macchine Sapienti: Intelligenze artificiali e decisioni umane*. Bologna: Marietti. 114.