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# From Biodiversity to Technodiversity

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Bad news, the extinction of humanity is inevitable. We don’t have to feel particularly guilty about this, it stems from a general evolutionary trend: 99,9% of species that have ever existed have now disappeared (see e.g. Prothero 2003, 83). Put another way, there is 0.1% chance that humanity as a species will continue into the far future.

The good news is that we also have the potential to shape the future of life. Technology is transforming our planet and we are on the verge of triggering the first *technodiversity explosion*. Let us have a closer look at this idea.

The problem is that we are more certain of the current destruction of biodiversity than the construction of technodiversity. On the one hand, biodiversity is in decline (World Wildlife Fund 2014). On the other hand, technological evolution is accelerating superexponentially (Nagy et al. 2011). For example, the internet of things revolution projects that 28 billion devices will be connected to the internet by 2020 (International Data Corporation 2014). How will this transition from biodiversity to technodiversity happen? Harvard roboticist Hans Moravec (1988, 5) argued that we are currently witnessing an evolutionary transition comparable only to the emergence of life itself! However, simply replacing biodiversity with technodiversity is clearly presumptuous in our present state of knowledge and know-how. I’d like to propose another scenario where biodiversity and technodiversity coevolve and synergize.

The core problem is that technoecosystems and natural ecosystems function as a parasite-host system (Odum 2001). In nature, parasites and hosts can co-exist, but if the parasite takes everything from its host, both will die. The challenge is thus to integrate ecosystems and technoecosystems, by including reward feedback from technoecosystems to natural ecosystems. In order for this to happen, we need to reconstruct economics by including natural ecosystems in the equation, instead of assuming that everything from nature comes for free (Boulding 1950).

Let's start with a concrete example. Since 1999, in Australia, the use of Radio Frequency Identification (RFID) is mandatory to identify and trace livestock. As technology becomes cheaper such tagging could be deployed on a much greater scale. Imagine a world where every single plant, every single animal is equipped with a GPS receiver and connected to the Internet. Such distributed sensors would lead to a kind of planetary nervous system (Helbing et al. 2012; Vidal 2015). We would know the position, state and health of every living thing on this planet. Instead of a blunt destruction and replacement of biodiversity, such technologies would on the contrary give us an unprecedented awareness of the whole ecosystem. We would then be able to propose solutions to complex biological and ecological issues, ideally by integrating ecosystems and technoecosystems.

Further in the future, we could also intentionally augment, modify and engineer biodiversity. Genetic engineering could make us sorcerer's apprentices on a global scale. Of course, we would need to be careful before implementing such plans, as they could impact both the bio- and techno- spheres.

Finally we can't escape ethical questions. Is such a transition from bio- to techno- diversity a good thing? How do we evaluate "goodness" in such changing circumstances? I have argued that evolutionary, developmental, complexity preserving values have the potential to be valid through millions of years, in contrast to the limited validity of most human-centered value systems (Vidal 2014, chap. 10). As long as biological systems constitute the most complex, diversified and versatile products of evolution, we have a responsibility to take the best care of them. The integration of bio- and techno- spheres will surely result in a richer, more complex world. The emergence of a new technological life and ecosystem would thus be a glorious event, even if the human species disappears in the process (Last 2017).

## References


Boulding, K. E. 1950. *A Reconstruction of Economics*. John Wiley and Sons.

Helbing, D., S. Bishop, R. Conte, P. Lukowicz, and J. B. McCarthy. 2012. "FuturICT: Participatory Computing to Understand and Manage Our Complex World in a More Sustainable and Resilient Way." *The European Physical Journal Special Topics* 214 (1): 11–39. doi:10.1140/epjst/e2012-01686-y. http://link.springer.com/content/pdf/10.1140%2Fepjst%2Fe2012-01686-y.pdf.

International Data Corporation. 2014. "Worldwide and Regional Internet of Things (IoT) 2014–2020 Forecast: A Virtuous Circle of Proven Value and Demand."

Last, Cadell. 2017. "Big Historical Foundations for Deep Future Speculations: Cosmic Evolution, Atechnogenesis, and Technocultural Civilization." *Foundations of Science* 22 (1): 39–124. doi:10.1007/s10699-015-9434-y. https://cadelllast.files.wordpress.com/2012/12/last-c-2015-big-historical-foundations-for-deep-future-speculations5.pdf.

Moravec, Hans P. 1988. *Mind Children: The Future of Robot and Human Intelligence*. Cambridge, Mass: Harvard University Press.

Nagy, Béla, J. Doyne Farmer, Jessika E. Trancik, and John Paul Gonzales. 2011. "Superexponential Long-Term Trends in Information Technology." *Technological Forecasting and Social Change* 78 (8): 1356–64. doi:10.1016/j.techfore.2011.07.006. http://www.santafe.edu/media/workingpapers/10-11-030.pdf.

Odum, Eugene P. 2001. "The 'Techno-Ecosystem.'" *Bulletin of the Ecological Society of America* 82 (2): 137–38.

Prothero, Donald R. 2003. *Bringing Fossils to Life: An Introduction to Paleobiology*. 2nd ed. Boston: McGraw-Hill.

Vidal, C. 2014. *The Beginning and the End: The Meaning of Life in a Cosmological Perspective*. New York: Springer. http://arxiv.org/abs/1301.1648.

———. 2015. "Distributing Cognition: From Local Brains to the Global Brain." In *The End of the Beginning: Life, Society and Economy on the Brink of the Singularity*, edited by B. Goertzel and T. Goertzel, 325–72. Humanity+ Press. http://tinyurl.com/vidal2015.

World Wildlife Fund. 2014. "Living Planet Report." http://wwf.panda.org/about_our_earth/all_publications/living_planet_report/.