Foreword:
The digital and environmental transitions

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The environmental and digital transitions have a common point: both describe a process of *"transformation during which a system passes from one state of equilibrium to another"* (BOULANGER *et al*. 2015). Each of these transitions is, in its ecosystem, deeply changing the forms of action and the infrastructure that organizes relations, thus disrupting the complex systems where the transition is occurring.[1]

The environmental transition is underlaid by an awareness both of the finitude of the resources for sustaining economic growth worldwide and of the environmental footprint left by our consumption of energy. The digital transition stems from technical innovations with an essential consequence, namely: the creation of value depends more on producing and analyzing data than on producing goods and services. Beyond the traits which, shared by these two transitions, derive from their disruptive nature and upend the whole chain of value production, it is worthwhile trying to see what we can learn from each of them.

Not only do these transitions bear consequences for our modes of production and consumption, they also stoke each other. The digital transition bears values that give rise to expectations and practices on which the environmental transition relies. In turn, the environmental transition copes with constraints that demand a keen recognition by all players in the digital realm. Neither transition will happen without the other. The society for tomorrow must be invented at the junction of these two revolutions. Otherwise, we are headed not only into a contradiction but also toward a deeply unequal world, rife with conflict and marked by irreversibly deteriorating living conditions.

The environmental transition: Which fundamentals from the digital transition must it take under consideration?

The intent of this issue is not so much to insist on innovations and the socioeconomic upheaval induced by the use of digital technology in all human activities as to draw attention to "digital culture" as a set of values, behaviors and practices. Without adopting a deterministic approach, which places the origin of these values and practices in the technology itself, several studies have shed light on the congruence between the development of new uses (cultural, journalistic, musical…) and digital technology (MANOVITCH 2001, JENKINS 2004, DEUZE 2006). These two developments reinforce each other, diffusing their associated value systems in all private and public spheres of action where this technology is deployed (in line with the "models of translation" described by the philosopher Bruno Latour).

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[1] This article has been translated from French by Noal Mellott (Omaha Beach, France).

Mark Deuze has distinguished three dimensions of a digital culture. The first is BRICOLAGE, a concept borrowed from Michel de Certeau (1980), namely: the possibility of constantly mixing contents from very different origins (MAIGRET 2000). The manipulability of digital contents allows for assembling and reassembling them in line with the requirements of diverse media. The millennial generation's expressive output on social media is a striking illustration thereof. The second dimension, RE-MEDIATION, describes the evolution of digital objets as a mixture of old and new media before the elaboration of a semiotics specific to the new media. Before entirely new interfaces for the new digital news media were invented, the switch, for example, from printed newspapers to electronic news was "translated" at first as merely converting the printed version into a digital format. We understand why maintaining former "affordances" makes it possible to use a new medium faster. The third dimension (of special interest to us) is PARTICIPATION. Any form of digital technology necessitates an active involvement in producing contents, bringing people into relation and creating value — a value (not necessarily commercial) is generated by the growing number of persons active in the network. This participatory activity helps construct the sociotechnical environment. It has several political consequences, especially when it resonates with radical forms of criticism, in particular from environmentalists (MONNOYER-SMITH 2011).

The environmental transition must reckon with these three dimensions of digital culture, conveyed by both the technology and social practices. The subsequent customization of energy consumption and the social critique of the centralized model for producing energy definitely reflect the determination to reappropriate individual autonomy from established monopolies. This is attested by crowdfunding platforms for all types of projects, ranging from the most individual to the most social. Is it necessary to recall the case of transportation, a branch of the economy that, for nearly a decade now, has experienced a disruption at least as suddenly as the culture and entertainment businesses at the end of the 1990s? The three rationales of *bricolage*, re-mediation and participation have led to new ways of sharing transportation and to the invention of a new model of "connected autonomy" via a larger social network.

In reverse, imposing new environmental practices while ignoring the digital context runs the risk of, at best, encountering indifference or, at worst, arousing anger. The handling of wastes serves as a good example. The introduction of procedures for sorting trash has proven to be incommensurably complicated given the intensity of the efforts demanded of citizens. I hypothesize that we probably would have advanced faster by adopting a policy based on local practices (*bricolage*) for sorting wastes, organized between professionals or private parties (participation) in a delimited area and then gradually expanded by using the usual means of trash collection (trucks) before establishing a genuine recycling industry (re-mediation). Such a policy would not have resulted in the current situation, where big urban centers still do not sort their wastes.

Questions arise, of course, about the limits of the values borne by digital technology (the latter's ubiquity, its virtual nature, the individualization of practices, immediate gratification… for free) and their compatibility with the exigencies of the environmental transition. This interrogation brings to mind Bruno Latour's concept of Gaia (but this extends far beyond the bounds of this foreword…).

The digital transition: What connections are to be made with the environmental transition?

The digital revolution is incompatible with the environmental transition in many respects. The business rationales underlying the development of information and communications technology (henceforth ICT) lead us to suspect that a fig leaf is prudishly being laid over the digital sector's environmental footprint.

For one thing, we know that enormous quantities of energy are needed to make and run digital equipment and to process the data circulating on high-speed networks in an ever larger mass. According to a report by Greenpeace released in January 2017, the information industry accounts for approximately 7% of electricity consumption worldwide. One wage-earner in France accounts for 50% of a private citizen's annual electricity consumption, the equivalent of 80 low-consumption light bulbs burning for 2000 hours.[2] The digital industry's consumption of electricity has never stopped growing and has now reached a level comparable with that of certain major countries. If the issue of our compulsive consumption of energy in ever larger quantities is to be addressed, much more is needed than commitments from big firms, such as Apple, to run their factories 100% on energy from renewable sources. It is crucial to muster all stakeholders in digital technology to address the issue of climate change. Our choices about the sources of energy for the digital infrastructure condition our ability to fulfil the commitments made by adopting the Paris Climate Agreement.

For another thing, the digital industry's environmental footprint has implications, far beyond energy issues as such, about certain types of resources (metals, water), which, in the absence of any organized industrial chain for recycling wastes, cause pollution of various sorts. The digital infrastructure's explosive growth has doubled the production of aluminum since 2000. Meanwhile, the mining of the rare earths necessary for making computers, batteries, screens, LEDs, etc. is growing exponentially.[3] Whereas a dozen metals went into making a computer in the 1980s, we are now at more than fifty. These elements cover a large part of the periodic table, and many of them (for instance: silver, cobalt, copper, indium, gallium, germanium, lithium, and tantalum) are critical. The reserves of some of them (*e.g.,* indium) are very low. Furthermore, these metals are seldom recycled; and there are hardly any substitutes available. The cost of producing certain elements is rising steeply as reserves dwindle, and this increases even more the quantity of energy needed to produce them. Besides, competition for these resources is strong between ICT and the renewable energy sector, also a big consumer of rare earths (indium, gallium, selenium and tellurium). The latter's demand for these elements is increasing from 5% to 10% per year to help meet France's commitment to a low-carbon strategy.

A final point: digital technology's business model is ultimately linear. It is based on the technical obsolescence of equipment without any serious work having been done on product life cycles. The life cycle of computers has been divided by three in thirty years, and 100 times more bytes are needed to run Windows Office than twenty years ago, not to mention the proliferation of versions of mobile telephones (six Iphones in five years). As we know, this business model, centered on marketing new products, is not sustainable. It is part of a process that drives consumption and thus produces wastes in excess — a significant part of them evaporating, as they slip through informal channels, especially in Africa.[4]

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[2] Available via https://club.greenit.fr/benchmark2017.html.

[3] Cf. Olivier Vidal's video, "Ressources minérales pour les TIC: besoins, modélisation de la production et des réserves", 43 minutes (accessible at http://ecoinfo.cnrs.fr/IMG/mp4/ecoinfo-3-olivier_vidal___questions.mp4).

[4] Secretariat of the Basel Convention (December 2011) *Where are WEEE in Africa? Findings from the Basel Convention, E-wastes Africa Programme* (available at
http://www.basel.int/Portals/4/download.aspx?d=UNEP-CHW-EWASTE-PUB-WeeAfricaReport.English.pdf)

Apart from a few exceptions, the digital transition has refused to devote serious thought to the conditions underlying its very existence. There is something surprising about this industry: ICT disrupts so many practices and patterns while following in the footsteps of the 20th century — a productivism that preys on the environment.

Toward creating a commons

A new category of goods must be imagined if the digital and environmental transitions are to manage to work together harmoniously and if the first does not sacrifice the second on the altar of short-sighted profit-making. Elinor Ostrom has referred to *"common pool resources"*, in short, a commons. This concept has been at the center of much research by scientists concerned with economic and social models for the environmental transition (for example, GIRAUD 2014). The commons is defined by its access, which is universal but might become exclusive, and by the fact that its disappearance or appropriation would directly or indirectly menace human communities by endangering the ecosystems that sustain them. This holds for most natural resources, whether ocean fisheries or pollinating insects. But it also holds for digital resources such as free software or knowledge.

Organizing a governance of resources with the help of the concept of a commons opens a possibility, worthy of investigation, for better articulating the digital and environmental transitions. This would mean ranking at the top of the hierarchy of values a key element from the environmental transition — the conservation of ecosystems and resources — while prodding stakeholders in digital technology to switch paradigms so as to see themselves as full-fledged players in the environmental transition. The Paris Agreement, the Cartagena Protocol on Biosafety, and the UN's sustainable development goals adopted in 2015 have (timidly) suggested doing this. These changes not only call for an urgent awareness of the issues to be addressed but also for a program about the type of society to which many people are now aspiring.

References

BOULANGER P.M., GRANDJEAN A. & LE TENO H., articles "Transition" in D. BOURG & A. PAPAUX (eds.), *Dictionnaire de la pensée écologique* (Paris: Presses Universitaires de France, 2015).

CERTEAU M., *L'Invention du quotidien* (Paris: Gallimard, 1980).

DEUZE M., "Participation, remediation, *bricolage*: Considering principal components of a digital culture", *The Information Society*, 22(2), pp. 63-75, 2006.

GIRAUD G., *Illusion financière. Des subprimes à la transition écologique* (Ivry-sur-Seine: Les Éditions de l'Atelier, 2014).

JENKINS R., "The cultural logic of media convergence", *International Journal of Cultural Studies*, 7(1), pp. 33-43, 2004.

MAIGRET E., "Les Trois héritages de Michel de Certeau. Un projet éclaté d'analyse de la modernité", *Annales. Histoire, Sciences Sociales*, 55(3), pp. 511-549, 2000.

MANOVITCH L., *The Language of New Media* (Cambridge, MA: MIT Press; 2001).

MONNOYER-SMITH L., "La Participation en ligne, révélateur d'une évolution des pratiques politiques?", *Participations* 1(1), pp. 156-185, 2011.