

DIGITAL TECHNOLOGY: CONCEPTS AND DEFINITIONS TO MAKE IT MORE ECOLOGICAL

Authors and date

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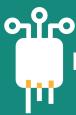
INTRODUCTION

Digital technology currently accounts for more than 4% of greenhouse gas emissions for its direct effects alone, and its accelerated deployment may lead us to fear a drastic increase in these emissions by the next decade¹. An economy based on the unreasonable deployment of this sector would add to climate change many other problems that could lead to the failure of our societal model:

- Conflicts over water use, armed conflicts, unsustainable geopolitical tensions over key resources (certain metals) needed to manufacture electronic equipment are already taking place or are to be expected in the nearest future.
- Soil, water and air pollution are unfortunately already widely observed in many mining and "informal recycling" sites.

Moreover, this industrial sector is not immune to the need to drastically reduce its environmental impact, as imposed by the global environmental crisis. The increasing dependence of other sectors (energy, logistics, agriculture, transport, education, health, etc.) on digital technology puts additional pressure on this sector to be robust and resilient. This tension is not without impact on the solutions being considered, even though the improvement in the energy efficiency of digital technology is offset by its strong growth.

Digital sobriety, digital low-tech, responsible or eco-responsible digital technology, digital ecology, etc. are all concepts, with more or less vague outlines, that were born in this context, pushed by one actor or another, taken up or not by other actors or by the media, and therefore more or less grasped by the population, the industrial sphere and the political sphere. Generally speaking, these concepts address the perimeter of digital equipment itself



and associated software/applications. Sometimes, the perimeter extends to other sectors when the latter can benefit from a reduction in their environmental footprint thanks to digital technology. But let's note that, in their current use, these concepts do not address, for example, the reduction of the environmental footprint of another sector that would be made possible by a lesser use of digital technology.

EFFICIENCY VS SOBRIETY

Efficiency consists in maintaining identical uses while reducing their impact (energy, material intensity, etc.). It is often concomitant with the increase of these uses via direct rebound effects. It can be summarized as "doing more with less".

Sobriety consists in decreasing or even disappearing uses, values or behaviors. It does not require the development of new techniques or technologies. It refers to the sufficiency of needs and the stakes of ecological balance and equity². We could talk about "doing less with less".

DIGITAL SOBRIETY?

In the digital world, sobriety applies to equipment and applications.

From the user's point of view: digital sobriety is an approach that consists in moderating one's digital acquisitions and uses.

From the company's point of view: digital sobriety consists in designing more frugal digital services sized according to the need and not according to the technical possibilities³. Indeed, the challenge is to install sobriety at the scale of our lifestyles, that is to say at the level of users, prescribers and service providers.

*"Adopt digital sobriety as a principle of action. Reducing the energy and environmental footprint of digital technology requires a return to an individual and collective ability to question the social and economic utility of our purchasing and consumption behaviors of digital objects and services, and to adapt them accordingly."*⁴

Thus, the idea is to reserve the digital for uses said to be sufficient and fair, thus allowing everyone to benefit from the advantages offered by technology without harming his neighbor, destroying our ecosystem and our common future. It is about consuming digital technology within the limits of planetary resources.

Implementing sobriety means fighting against over-equipment, over-consumption, cognitive over-solicitation and the reduction of technical equipment lifetimes. It is therefore a question of questioning and reasoning about uses and practices.

It should be noted, however, that this approach only makes sense if it is part of a general sobriety approach, otherwise it can lead to pollution transfers, just like eco-design.

LOW-TECH

Low-tech or low technologies, or "appropriate" technologies are a set of technologies and logics aiming at energy and material sobriety, strong sustainability and collective resilience. The approach encourages techno-discrimination⁵.

The concept of low-tech applies to a set of technologies designed to be useful, sustainable, accessible to all and that meet basic needs. Contrary to a widespread prejudice, low-tech does not refer to a retrograde movement implying a form of regression that would push us to cut ourselves off from any form of technological comfort: low-tech technologies are robust, repairable and thus help fight against programmed obsolescence.

To be accessible to the greatest number, they are inexpensive. To have the least negative ecological and social impact possible, they simplify the manufacturing process and try to do the most useful with less. Low-tech approaches are thus often found in "frugal" innovation.

Arthur Keller defines the low-tech approach as an approach, a method, a vision, a philosophy, almost a culture, that goes far beyond the strict technological question. It is an overall approach that allows us to comply with planetary limits, i.e. not to consume more energy, materials and resources than the Earth can sustainably provide⁶.

There is a form of digital low-tech. For example, sending an SMS to confirm a passenger's seat on the TGV. An SMS is based on basic technology, works with all communication protocols from 2G to 5G, requires only a few bytes to transmit a message, and works on a cell phone. In contrast, downloading a mobile application that is millions of times heavier to access the same information on a 4G smartphone (thus requiring the deployment of the appropriate antennas) seems disproportionate to the service offered by SMS. Of course this application provides other services, but how many users for these services?

In the same register, e-mail can be considered as digital low-tech compared to last generation applications designed with the latest development tools, keeping in mind only users with an excellent internet connection and a recent smartphone. Email is a basic solution: text in text format, transmitted using widely used communication protocols: POP3, SMTP and IMAP.

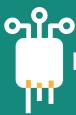
But if we go a little further on the perimeter taken into account, we can consider that the machines and infrastructures necessary to manufacture a computer, a smartphone or even a simple cell phone, to extract the necessary metals are very far from the low-tech spirit. And that these forms of digital low-tech are not very significant with regard to the technicality required upstream.

RESPONSIBLE OR ECO-RESPONSIBLE DIGITAL TECHNOLOGY

Responsible digital is a continuous improvement approach that aims to improve the ecological and social footprint of digital technology.

Responsible digital covers:

- Green IT, which aims to reduce the direct environmental footprint of digital equipment, applications and services



- IT for Green and IT for Good, both of which put digital technology at the service of sustainable development, one through the environmental dimension and the other through the social dimension
- digital accessibility
- responsible purchasing

CONCLUSION

Adopting one of these approaches as an individual, as a consumer, as a producer of software, services or equipment, as a legislator, etc. is today an imperative to reduce one's environmental footprint, and it would be at least as important to also turn to the indirect and systemic impacts of digital technology by thinking of low tech end-to-end solutions that lead to slowing down the generalized acceleration of resource extraction and pollutant emissions: a new concept to be invented?

TO GO FURTHER

- Low-techs for a sustainable and desirable society. Low-tech Lab. [Site](#).
- Sofia Benqassem, Frédéric Bordage, Lorraine de Montenay, Julie Delmas-Orgelet, Firmin Domon, Étienne Lees Perasso, Damien Prunel, Caroline Vateau. Behind the figures: understanding the environmental impacts of ICT and taking action. GreenIT, 12/2021. Available on [GreenIT.fr](#) [consulted on 14/04/2022]

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2. Fabrice Flipo. L'impératif de la sobriété numérique, 2020 ↵
3. Frédéric Bordage. Sobriété numérique : Les clés pour agir, 09/2019 ↵
4. The Shift Project, For Digital Sobriety, 2018 ↵
5. Low-technology. [Wikipedia](#) ↵
6. Vers des technologies sobres et résilientes – Pourquoi et comment développer l'innovation « low-tech » ? La Fabrique Ecologique, 14/09/2019. Available on [lafabriqueecologique.fr](#) ↵