

Can digital technology and the environment coexist?

A contribution from three different perspectives.



*Illustrations
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Executive summary

When it comes to digital technology, polarisation is often the watchword. When the term is used in conjunction with the environment, debates become heated. Some see digital technologies as a universal solution that will reduce energy costs. Others call for radical digital sobriety to protect the environment. When discussions go beyond simply stating positions, they invoke a jumble of industrial strategies, expert reports and scientific contributions. It's not always easy to find one's way through these often impassioned discussions, full of multiple interests, or to get a clear idea of the terms of the debate.

Be that as it may, there is a growing sense of urgency about the way in which digital technology and the environment should coexist. The European Union has set itself the target of reducing emissions by at least 55% by 2030, compared with 1990 levels.¹ These commitments, coupled with the adoption of strategies to accelerate digitisation, should force public authorities to clarify the terms of the interactions between digital technology and the environment. Secondly, other environmental issues can no longer be ignored: think of the pollution generated by the extraction of the rare metals needed to manufacture equipment, or the pollution linked to electronic waste.

Public awareness is growing: "85% of French people believe that reducing the impact of digital technology on the environment should be a priority in the years to come (...) with, once again, a relatively homogenous judgement across all generations".² For manufacturers in the sector, the economic and financial impact of the energy challenge and environmental tensions are forcing them to react: in the rare metals sector, for example, supply problems are likely to multiply and put pressure on globalised production chains.³

The digital and environmental pairing combines two joint impulses of our modern societies, each running their own course, two concomitant "transitions" still too often described as separate issues. The question of their compatibility is now being openly and urgently raised: do these two issues reinforce or contradict each other? Are they compatible? Should they be linked, and if so, in what way and on what terms?

These questions require us to adopt different perspectives: **expert** (what do we know about the interactions between digital technology and the environment, and how is this knowledge structured?), **political** (how can we link the digital and environmental transitions to the social projects we consider desirable?) and **citizen** (how can we understand and position ourselves with regard to the information circulating on the subject in the public arena?). It is from these three perspectives that this report discusses the sometimes difficult cohabitation between digital technology and the environment.



The **first perspective, the expert perspective**, should make it possible to objectify the state of knowledge about the links between digital technology and the environment. It has to be said that the research and knowledge produced on the effects of digital technology on the environment is still in its infancy and varies in content. Delving into it will help to establish what is currently considered to be known, and will also highlight the coexistence of reports offering digital technology as a solution - therefore suggesting the acceleration of digitisation to the benefit of the environment - and reports putting forward digital technology as an uncontrolled source of environmental footprint - and therefore the essential need to control its use.



The **second perspective, the political perspective**, aims to reposition the relationship between the environment and digital technology in terms of a political issue. In a previous report, we highlighted the social imaginations underlying the technical debates and controversies surrounding 5G. Here, on the basis of existing work, we will look at scenarios for linking the digital and environmental transitions. These scenarios are associated with a range of possible futures.



The **third perspective, the citizen perspective**, involves both deconstructing the underlying mechanics of digital environmental impact assessments and understanding how they are formed. Figures are frequently circulated in the public arena, accompanied by analyses based on this type of assessment. How can we, as citizens, position ourselves when faced with such seemingly technical information? This third look offers a framework for forming a position on studies of this kind. To illustrate this approach, the *Digital4Climate* report, published in Belgium in 2022, provides an opportunity to put this framework into practice.

The expert perspective, in a nutshell

What is the state of knowledge on the interactions between digital technology and the environment? Publications on this complex issue vary in quality, methodology and transparency. Some assess the impact of digital technology on a global scale, while others focus on a specific territory (e.g. Europe, France, Wallonia). Some assess the environmental challenges of digital technology in the broadest sense, while others focus on greenhouse gas emissions or electricity consumption.

Despite these disparities, there are some areas of convergence:

* Studies show that the digital sector produces between 2% and 4% of the world's **greenhouse gases** (2018): that's the equivalent of the world's truck fleet at the same time, and more than civil aviation, which is often singled out for criticism.

Forecasts indicate a rapid increase in these emissions (from 4% to 6% per year).

* The sector's **electricity consumption** during digital usage phase represents 5 to 8% of global electricity consumption (between 2019 and 2021). Put another way, if "digital usage" were a country, it would be the 3rd largest consumer of electricity in the world, just after China and the USA.

With no limits on usage, significant growth in this consumption is expected as a result of the explosion in data volumes.

In addition to scientific studies, a series of publications commissioned by representatives of the **industrial sector** do not refute the above-mentioned upward trends, but justify this increase in direct impacts by greater indirect gains: structural effects in other sectors would enable savings to be made in energy and greenhouse gas emissions. As detailed in our analysis, these studies only look at positive indirect effects, not negative indirect effects, so they are **biased**.

Finally, reports from major institutions (UN, WHO, EU, etc.) highlight the environmental pollution (soil, air, water) associated with electronic waste and the extraction of materials needed for the digital and energy transition.

This first perspective leads to three observations:

- Firstly, the **undisputed negative direct impact of digital technology on the environment**. The extraction, production, use and end-of-life of the physical equipment that enables digital services have a considerable direct negative impact on the planet. The digital-environment nexus must therefore finally be recognised as a problem of general interest.
- Secondly, it is clear that **the digital-environment** relationship is being **debated** and that various players are mobilising (with figures and reports to back them up) to frame the way in which the two transitions should be linked.
- Lastly, **the contradictory reports** (between those produced by industry pushing for an acceleration of digitisation, and those from think tanks urging its rapid reduction) leave room for uncertainty and **sow doubt** as to the overall impact of digital technology on the environment.

Finally, this initial overview leads us to conclude that the digital and ecological transitions do not have a natural tendency to reinforce each other. The youth and scarcity of existing studies means that we need to be cautious and use precaution before concluding that digitisation is necessary at every level.

The political perspective, in a nutshell

Various scenarios emerge in response to the question "how can we reconcile the digital and environmental transitions?" Each scenario reflects a particular 'way of life' in terms of our habits of mobility, production, consumption, housing, our relationship with time and each other, and our involvement in community life. Digital technology is no exception: its place and role, how it is distributed and controlled, its link to innovation and its uses are distinct depending on the scenario. Thinking about how these transitions fit together leads to a number of observations:

- **A digital policy cannot be separated from its environmental dimension.**
All too often, the digital transition is discussed in isolation, by sector, linked to a particular use and decoupled from the environmental transition. The presented scenarios put an end to this dissociation. They place the digital age within a vision of the future that clarifies attitudes and sheds light on the consequences - explicit or otherwise - of the digitisation of society.
- **A digital policy is built around the categories of sobriety and efficiency.**
The scenarios - and the political positions they represent - are permeated by doses and articulations of the two poles of sobriety and efficiency. We need to recognise the need to scale up these two dimensions collectively.
- **A digital policy is based on a public action programme.**
The public action programmes on which digital policies are based must be identified: techno-capitalism, social democracy and radical sobriety.

The citizen perspective, in a nutshell

Taking a citizen's view of a publication on the environmental impact of the digital sector can be complex, and even confusing. How much trust should be placed in studies on the subject? What assessment criteria should be applied? How do you distinguish between alarmist conclusions and those encouraging more and more digital technology?

This document provides the general public with a framework for reading the various reports published in a critical way. This reading grid is based on **four main axes**, through which the flaws and intrinsic qualities of a publication are revealed. These assessment axes lead to **nine confidence indicators** (green/orange/red) producing a dashboard that can be consulted at a glance, as illustrated opposite.

By way of illustration, the latest *Digital4Climate* study by a Belgian lobby will be analysed. Our analysis reveals a single positive indicator encouraging confidence, two mixed indicators and six indicators encouraging distrust. **This assessment suggests that the use of the *Digital4Climate* report in a political decision-making context would be inappropriate, or even counter-productive for the environment.**

		Digital4Climate
1. What is the production process ?	Scientific literature or grey literature ?	
2. What is the scope ?	... of the environment ?	
	... of digital ?	
	Which equipment ?	
	Which phases of the life cycle?	
	... of the impact ?	
	Direct, indirect et structural effects ?	
3. What is the level of transparency and methodological relevance?	... about databases ?	
	...about working assumptions ?	
	... about limitations ?	
4. Which conclusions and recommendations ?		

Légende :				Trust is granted
				Caution
				Trust is not granted

Conclusion and recommendations

Do the ecological transition and the digital transition reinforce or contradict each other? Are they compatible? Can they coexist, and if so, how?

The expert perspective, which objectively reviews the state of knowledge, leads to the conclusion that these two transitions are indeed linked, but that their relationship is subject to debate - leaving us to wonder about the impact of digital technology on the environment. It is therefore unfounded to assert that these two transitions naturally reinforce each other. The scarcity of existing studies and the fact that they are so recent mean that we need to be cautious and use precaution before concluding that digitisation is necessary at every level.

The political perspective invites us to broaden our field of vision: there are several possible scenarios for this dual transition, each embodying a certain political imagination and a certain way of life. Each discourse must therefore be analysed in the light of the imagination it conveys and the lifestyles it underpins.

The citizen perspective provides a framework for critically reading the various studies published on the impact of digital technology on the environment - and for taking a stand on the issue. The latest '*Digital4Climate*' report by a Belgian lobby (used as a case study in this analytical framework) has a number of significant pitfalls that call for the utmost caution when its conclusions are taken up in the public and political spheres.

In light of these conclusions, the following recommendations can be made:

1. Adopt the three-perspective reflection (expert, politician, citizen) as soon as new knowledge is produced.

We can only be astonished at the way new knowledge is treated by certain politicians, particularly when it is produced by industrial interest groups.

Indeed, the application of the three perspectives to the latest Belgian study (*Digital4Climate*) suggests that the use of this study in a political decision-making context would be inappropriate, and even counter-productive for the environment.

Yet ministers⁴ have used the study as a reference.

2. When in doubt, use precaution.

Given the difficulty of determining whether or not the rise of digitisation is leading to a net reduction in the global ecological footprint, and given the increasingly urgent need to reduce it, the simple application of the precautionary principle would lead to the following conclusion: every economic sector must work to reduce its ecological footprint, with no exception being made for digital technology.

Executive summary extracted from the dossier "Can digital technology and the environment coexist?" by the AlterNumeris Collective, in collaboration with 10 academics and experts.

More information at www.alternumeris.be

Introducing the team



Steve TUMSON is a mechatronics engineer from UCLouvain and an expert in robotics. Now a consultant, lecturer and teacher, he is involved in a number of projects on the themes of new technologies, education, change management and sustainable development.

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Julien RAONE holds a Master's degree in Public Management from King's College London and a PhD in Political Science from UCLouvain. He has published articles in the fields of public management and public policy analysis.



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David BOL is Professor of Electronic Circuits and Systems at UCLouvain. He is the author or co-author of more than 150 technical articles and conference contributions, and is actively involved in the socio-ecological transition of ICTs.



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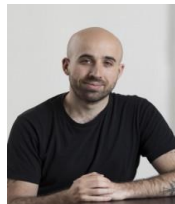
Hugues FERREBOEUF is an engineer from Télécom ParisTech. He has spent most of his professional career in the ICT sector, including more than 15 years in senior management positions. He joined the think tank The Shift Project, where he has since directed the Lean ICT project (or how to make the digital transition respectful of the environment).



Jean-Pierre RASKIN is Professor of Microelectronics at UCLouvain. He is the author of hundreds of articles in scientific journals. Winner of several medals and prizes for his work, he has launched a European consortium to promote sustainable electronics in universities, research centres and industry.



Jérémy GROSMAN is pursuing a doctorate in philosophy at UNamur, at the Research Centre in Information, Law and Society. His area of expertise is the ethics of technology. He was one of the experts appointed by the Walloon government to advise it on the potential impact of the roll-out of 5G.



Gauthier ROUSSILHE is a digital designer and researcher specialising in the environmental challenges of digitisation, and a doctoral student at RMIT. He is interested in alternative forms of development for the digital sector that would be compatible with planetary limits and an increasingly uncertain world.



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