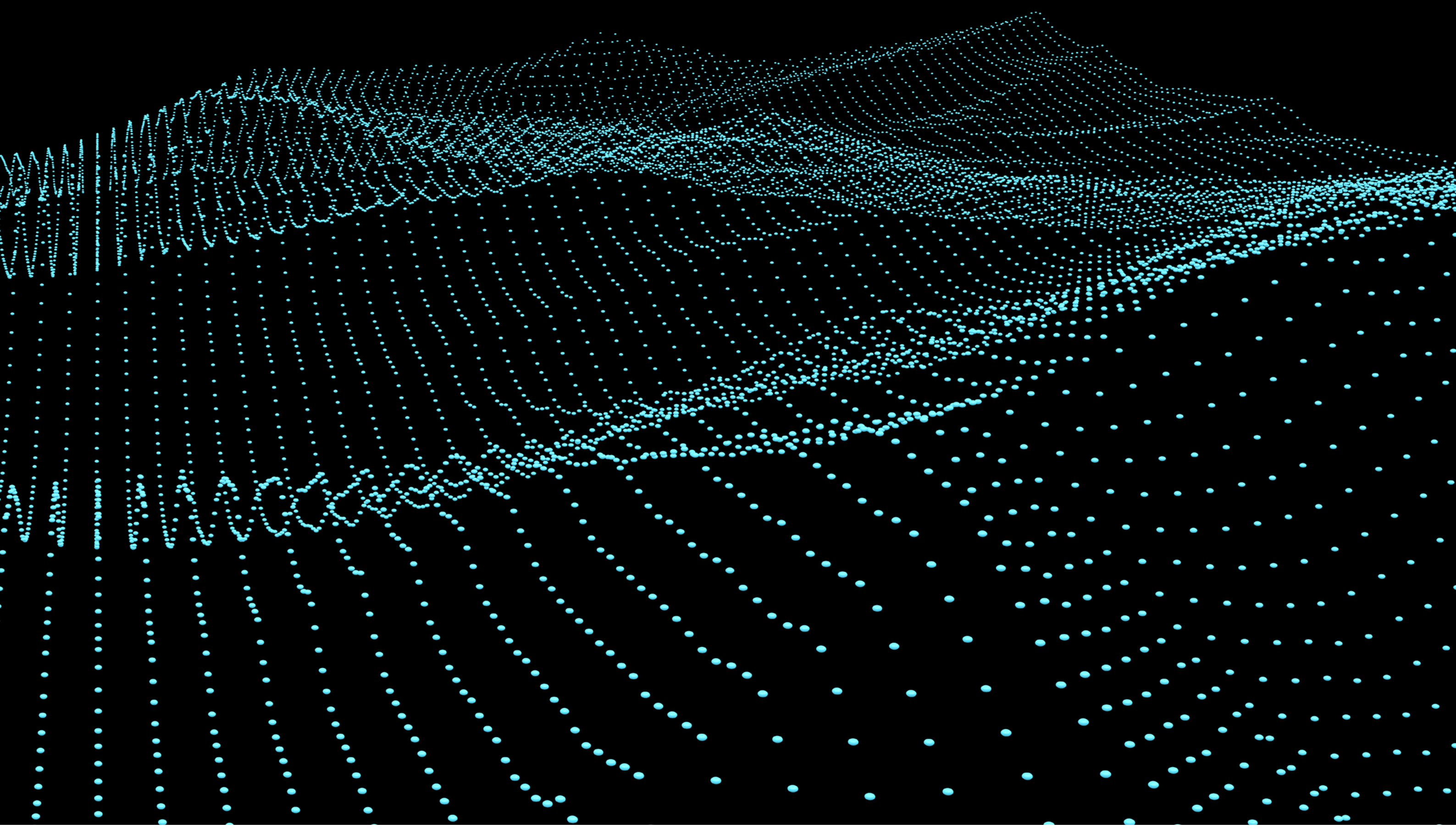
Implementing digital sufficiency

EXECUTIVE SUMMARY

OCTOBER 2020

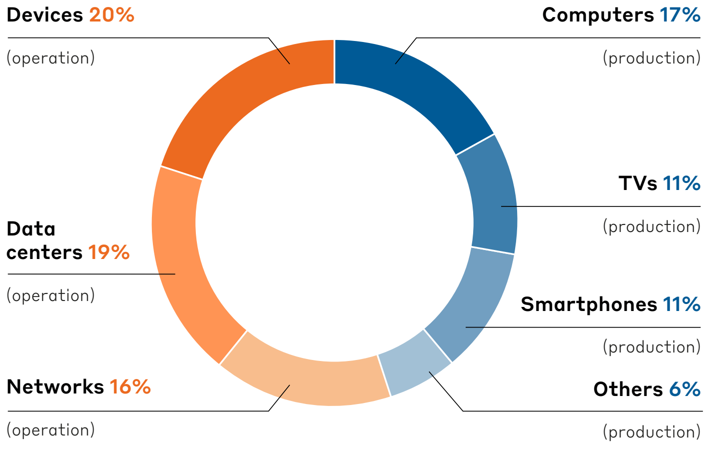


THE SHIFT PROJECT
THE CARBON TRANSITION THINK TANK

Avec la participation de

Rethinking the digitalisation for low carbon transition

- Meeting the challenges of the 21st century requires a better understanding of the physical constraints limiting our systems. Global warming and the gradual depletion of our fossil fuel resources combine into the "twin constraints of energy".
- In order to comply with commitments to ensure the survival of our planet (such as the Paris Agreement), we need a drastic reduction of energy consumption as well as associated emissions of greenhouse gases. Since we have limited resources, each physical process, including information transfer, process or storage as well as the relevant Information and Communication Technology (ICT) device production, is energy consuming.
- **As a result, digital technologies appear as both a tool and a challenge to shift towards a low carbon economy: while digital technologies do provide tangible opportunities, they are subject to the same constraints as any global system. Therefore, we ought to design digital practices and infrastructures that are resilient and sustainable.**
- The innovation challenge we are currently facing requires measuring the energetic costs and environmental footprint associated to the expansion of digital technologies. The digitalisation of our economy ought to be sustainable from an environmental standpoint.
- At this point, our digital growth is unsustainable: there is a 9% annual increase in energy consumption due to digitalization. Most business models behind mass digitalization require a constant increase of content and data consumption and of the associated infrastructure to be profitable on the long run. A phenomenon fueled by the "attention economy."
- **Digital sufficiency** means moving from an instinctive or compulsive use of digital systems to a more controlled use of digital technologies, constructed by measuring both the associated risks and opportunities.



Final energy consumption of digital technologies by item for production (45%) and operation (55%) in 2017

Source: Lean ICT, The Shift Project 2018

- Implementing digital sufficiency means steering our technology choices, considering both the deployment of ICT infrastructures and their associated uses, that preserve the essential contribution of digital.
- **In this report, *The Shift Project* provides the tools to assess the energy suitability of connected technologies, in order to help organisations adopt greater environmental considerations in their information systems and take back control over their digital practices.**
- **Without such thoughtful considerations, our policies and strategies for digital expansion would be pointless; the digital transition, although pervasive, would then fail to be part of the solution to the current physical and societal challenges.**

Main conclusions

Environmental impact should be measured systematically

- Some tech innovations bring a potential environmental gain while others don't have that innate capacity : **therefore, we should neither dismiss these innovations as a whole, nor accept them with blind faith.**
- Designing a resilient system involves identifying under which conditions it is appropriate to develop a precise digital solution. These conditions are case-specific: so-called "smart" projects should not be **simply** taken at face value, but should be assessed based on **environmental scenarios balancing risks and benefits.**
- Total energy consumption (embodied energy & energy released through operations) of a digital layer may outweigh the saving from a gain in energy efficiency.
- The net energy balance is usually only positive provided that users follow the energy saving guidelines defined by decision makers.

Organisations can and should manage their Information Systems

- For organisational Information Systems (IS) – **businesses, public bodies, community groups** – to become resilient, digital projects must be conducted in rational way from an environmental standpoint.

- Taking account of the ubiquity of digital, we've set out a **systemic approach** that allows organisations **to integrate the environmental factors into the strategic and operational management** of their digital projects.

- This integration requires a **company-wide approach** conducted under the auspices of General Management and with the support of IT Departments executives.

- Organisations, **whatever their size**, need to adopt a drastically new approach to digital technologies instead of solely limiting themselves to buying new (potentially useful) optimisation tools and operating them within otherwise unchanged strategies and policies.

Managing digital use needs public policy

- **The current digital overconsumption** is the result of well-identified psychological and social trends. This goes beyond individual "good practice": there is an urgent need to firmly recover and **maintain control over our digital interactions on a collective scale.**
- A better **understanding of the structure and impacts of our current digital practices** is essential to ensure that digital technologies fit with our collective goals and address the challenges of the century.

- **A whole range of public actions should be implemented,** from basic digital education, to the regulation of design techniques, and to prevention campaigns against "digital obesity".

Starting the discussion on digital sobriety

- The discussions and possible solutions in favour of digital sufficiency can also be applied in the developing world: while the baseline contexts and reference pathways are different, the dynamics governing both uses and supply are roughly similar.

- It is essential to nurture social debates on collective technological choices with objective facts. Keeping this in mind, *The Shift Project* plans to update the prospective scenarios elaborated in 2018, in order to shed light on the potential impacts of the technological innovations currently being implemented (IoT, Artificial Intelligence, edge computing, 5G etc.).

A methodology to assess the energy relevance of connected projects

The impact of online technologies

- At the local level, **technological choices are intertwined with societal decisions.** The emergence of new practices, the influence on other activities (mobility, consumption channels etc.), the interdependence between local governments and private actors in service or maintenance... are dynamics that involve trade-offs that must be understood by local actors.

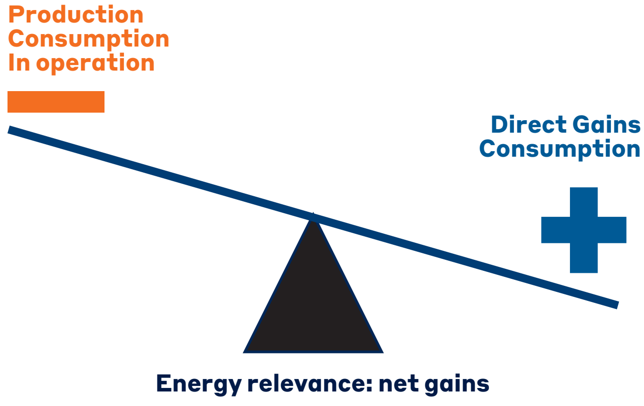
- Connected solutions, commonly referred to as "smart", are no longer self-contained ("standalone") solutions; they are components of a whole "digital system". **They should be implemented in a fully informed manner**, i.e. by computing all relevant factors: technology costs (mostly energy costs and resource consumption), their actual benefits as compared to non-connected technologies, and the indirect effects of their implementation (maintenance costs, the need to create new infrastructure, etc.). Besides, the "need" they are supposed to address should be reappraised and compared to the importance of other unfulfilled "needs".

- Assessing the energy relevance of a new connected layer means being able to measure the net decrease or increase in energy consumption allowed by this layer (taking into account both the energy cost of the production phase and the consumption of the connected equipment in operation).

A methodology and a collection of case studies

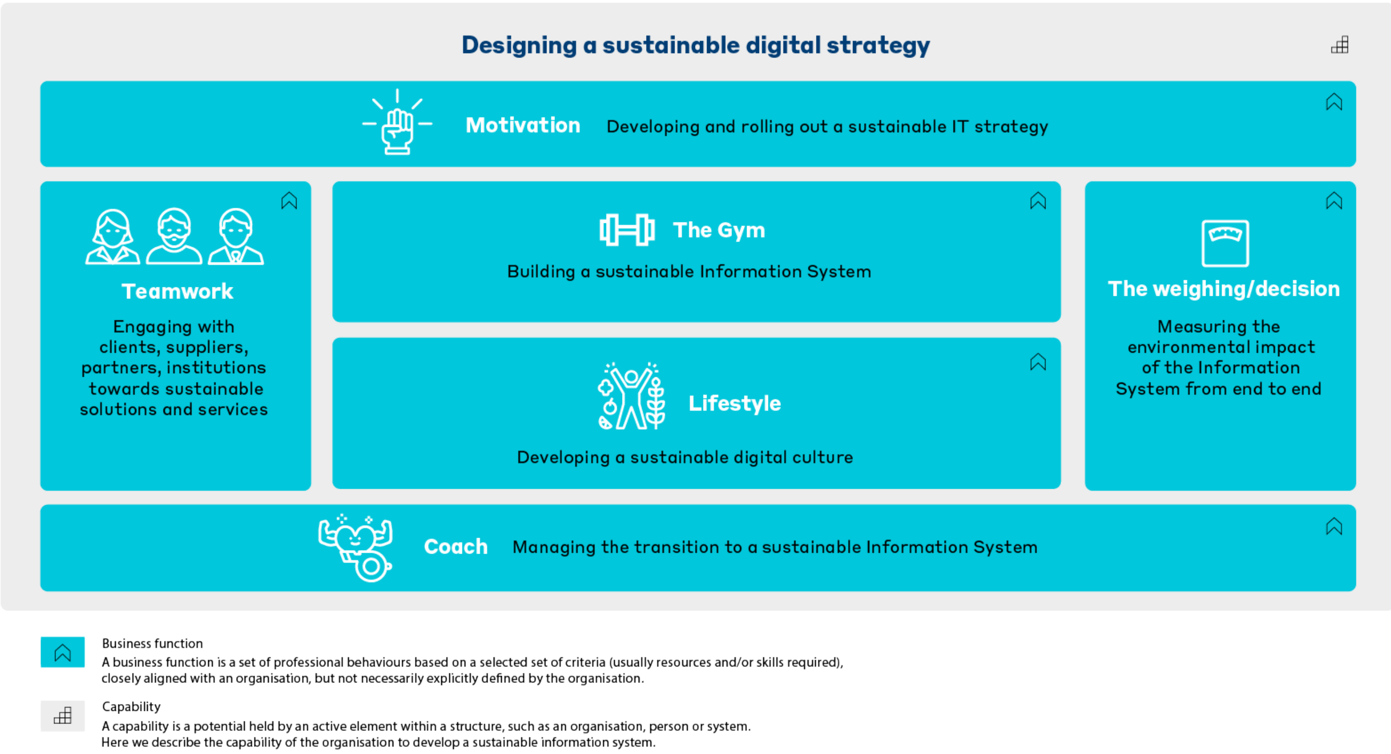
- The Smart Technologies Energy Relevance Model (STERM), developed by *The Shift Project* working group, makes it possible to assess the net energy-saving contribution of connected solutions for specific case studies.

- This model is only the embryonic version of a tool, and is intended to be used by both private and public actors to develop genuine operational tools, appropriate for their policies. At *The Shift Project* we decided to implement this mathematical model under Python and to make the code freely available.



- **Three case studies** provide an illustration of the practical application of this tool and of the required methodology: two of these case studies are focused on connected lighting (private residence and tertiary office buildings); the third one presents a communicating power meter.
- These studies reveal that **a system may be "smart" even though it is not connected**. This feature should be assessed, considering the additional services it provides, the transversal gains it can generate, and the situations in which these gains can materialise.
- Often, a connected technology may only become a relevant solution provided that it is part of a broader program. For example it can be aimed at supporting a change in consumption behaviour.
- **The relevance of a technology should not be assumed according to general rules, but assessed for each type of operational case.** Only then will be able to deploy solely those tools that we have deemed to be truly useful in view of their environmental cost.

A Guide for the environmental management of Information System



Reference model - high level view - "Get the Information System back in Shape". [Source: The Shift Project, production of the working group]

- **Considering the increasing environmental impact of digital technology, organisations should implement sustainable digital policies.**
- Many digital service providers have **greatly optimised their electricity consumption.** In particular, the earliest initiatives focused on the direct costs of power consumption in server rooms: introduction of more efficient hardware, intervention of energy experts…
- **Maximising the digital sector's contribution to carbon neutrality requires** not only **to optimise the use of energy and natural resources,** but also **to reduce the turnover of equipment and to dedicate resources to the uses which have the greatest value to society.**
- Up to now, few organisations have taken a **holistic view of information systems**, which should include, among other things, outsourced services, the impact of manufacturing the hardware that makes up the digital infrastructure, the performance of the electrical mix of the manufacturing and operating sites, training and management of sustainable digital skills, and choices in software architecture and development. **For lack of such a comprehensive viewpoint**, decisions and trade-offs concerning the various options will suffer from **blind spots** that may hide highly significant impacts.
- The digital sector is currently experiencing a **growth dynamic** that is incompatible with physical limitations. As in the case of

managing worsening obesity, organizations need to embark on **a program to get their information systems "back in shape."** Hence, the aim of this report is to establish **a common language across industrial sectors** that will enable this steering based on the organizations' knowledge of their information systems.

- The proposed framework classifies activities already in progress, evaluates their maturity, strengths and development areas, allowing comparison with the market. This framework, inspired from the practices of a major insurance group and the Open Group standardisation consortium, needs to be adapted to the specific context of each organisation.

A study of our digital practices: improving our understanding in order to make wiser decisions

We need to regain control of our digital practices

- Implementing digital sufficiency requires a better understanding of how our technological choices involve genuine societal choices. **The choice of specific infrastructures and their relevant technologies favours, if only by default, certain types of uses** (whether already existing or emerging).
- **Today, our digital uses rely on automatic behaviours, attention-grabbing designs and business models that make a profit from the continuous consumption of pervasive contents.**
- Technologies are not mere tools: they are an additional, structuring dimension of our daily lives, in our professional, academic, family, individual and even intimate spheres, and in public spaces.
- **The solution has to be elaborated on the collective scale.** The individual scale is useful to understand the practical impacts and effects (both positive and harmful) of our practices. Individual understanding will fuel collective debate, which will in turn make it possible to implement actions with a real, large-scale systemic effect.

Public policy to be developed

- **Our digital practices must be addressed in terms of public health policy since they involve health-related risks** (on child development, school and academic performance, information overload, etc.). It is crucial that we build coherent tool-sets adapted to each specific field of our lives (educational, academic, professional, private etc.).
- Several key stakeholders should be involved: public authorities, private actors, national and European regulators, communities of designers and consumers, and experts studying the health and sociological consequences of our chosen practices. Working with them, we need to build:

– **Training tools for collective actors** (in education and public administrations) for the evaluation of the consequences (both positive and harmful) of technological choices.
– **Teaching aids for those delivering education** (parents and other educational roles).
– **Levers to regulate attention-grabbing designs** (autoplay, etc) and schemes that take advantage of automatic/impulsive consumption behaviours.
– **Proposals for changes to the economic models for providing digital services and products.**

This report has benefited from the contribution of a number of experts, brought together in a working group led by Hugues Ferreboeuf.

A list of the working group members and the methodology are available in the foreword of the long version of the report.

Press contact: Jean-Noël Geist, Head of Public Affairs
06 95 10 81 91 / jean-noel.geist@theshiftproject.org