SUSTAINABLE IT: WEARING SUSTAINABILITY GLASSES WHEN LOOKING INTO IT

WHAT IS THE ENVIRONMENTAL IMPACT OF IT? HOW CAN ORGANIZATIONS REDUCE THEIR ENTERPRISE IT CARBON FOOTPRINT AND BENEFIT FROM IT?

This article is part of Capgemini's Applications Unleashed 2022 Report which can be downloaded here.

HIGHLIGHTS

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- The carbon footprint of worldwide IT already represents 1,5x of civil aviation and it is expected to increase in the upcoming years.

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- The lack of awareness and domain knowledge are the two main blockers of Sustainable IT adoption.

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- Sustainable IT is an environment-focused approach to design, use, optimize and dispose hardware, networks, applications, and cloud computing.

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- Organizations embedding Sustainable IT initiatives are benefiting from lower energy bills, hardware footprint reduction, brand recognition, and employee engagement.

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- We recommend a three-stage roadmap to assess, strategize and operationalize Sustainable IT initiatives.

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Sustainable IT is not yet a common topic among leaders and IT professionals. However, the awareness of its carbon footprint and knowledge about simple measures to reduce it can promote an avenue of benefits to organizations, individuals, and our planet.

The environmental impact of IT is a growing area of concern, but not yet addressed by many organizations. IT already poses a significant environmental impact, and it is expected to increase dramatically in the upcoming years due to the accelerated pace of digitalization. However, recent research pointed out that IT has not been considered yet in the sustainability agenda of more than 92% of organizations [1], mainly due to the lack of awareness about its environmental impact and domain knowledge to identify levers to measure and reduce it. This article aims to close this gap, exploring some key aspects of why organizations should consider adopting Sustainable IT practices, the expected benefits, and practical mechanisms an organization should consider reducing the environmental impact of their IT enterprise.

THE ENVIRONMENTAL IMPACT OF IT

If IT would be a country, it would rank in 3rd place as the biggest energy consumer worldwide, representing 3.3% of global energy consumption. Greenhouse gas (GHG) [2] emissions from IT already represent 3.8% of worldwide emissions summing up to 11 MtCO2eq, which is equivalent to 1.5 times the emissions from civil aviation.

A recent Capgemini Research Institute report [3] points out that data centers across both the public and private sectors represent nearly 1% of the world's energy demand. The report forecasts that the growth rate of enterprise IT's contribution to global CO2 emissions could grow from 8.4% in 2020 to 20.5% in 2025. That's not all. There's a distinct lack of recycling, with 89% of organizations recycling less than 10% of their IT hardware. E-waste is a growing sustainability issue and is expected to grow globally from 53.6 million tons in 2019 to 74 million tons in 2030. In fact, the most polluting layer of an IT service is the user device (60%), followed by the network (23%), and the data center (17%). [4] Due to trends in digitalization and increasing use and transfer of data, IT environmental footprint is expected to increase drastically in a couple of years. Industries and sectors are more than ever considering applying digital technology to transform their business and operating models, increase efficiency in operations and reduce costs. One estimate suggests that training an AI language processing system produced 635kg of emissions, which is equivalent to the amount produced by one person taking a round trip flight between New York and San Francisco. Digitalization is also changing consumer behavior, from ordering groceries via a smartphone to switching from conventional television to digital streaming. Streaming 1gb of data produces and an average of 30kg of CO2eq, like driving 25Km in a conventional passenger vehicle.

1 https://www.capgemini.com/insights/research-library/sustainable-it/
2 Greenhouse gases (GHGs) warm the Earth by absorbing energy and slowing the rate at which the energy escapes to space; The main type of GHG gases are carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O) and industrial gases – hydrofluorocarbons (HFCs)
3 https://www.capgemini.com/insights/research-library/sustainable-it/
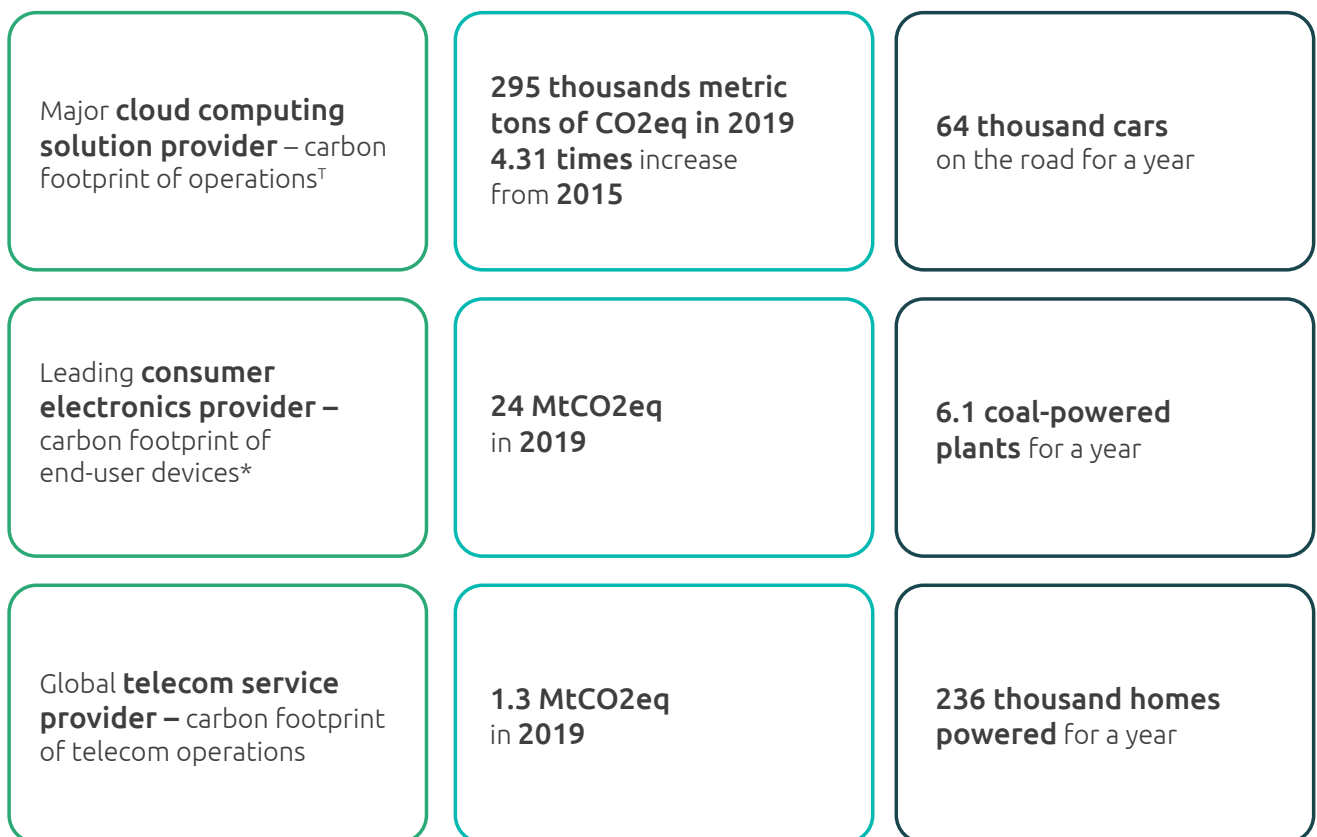4 The shift project report: https://theshiftproject.org/en/article/lean-ict-our-new-report/

The benefits and comfort of digitalization trends for organizations and individuals are clear and tangible. However, this is not yet the case its environmental impact and knowledge of how to reduce it. Research [5] among 1000 organizations worldwide shows that while 50% have a wider sustainability strategy, only 18% have at least an intermediate maturity in terms of Sustainable IT strategy. Moreover, 49% lack the tools to adopt and deploy solutions, and 53% lack the expertise.

From our experience, awareness is key to starting any transformation. We believe that the environmental impact of IT should be made transparent and communicated effectively among businesses, individuals, and the entire society. In the end, "you can't manage what you can't measure".[6]

LOW-HANGING FRUIT TO DRIVE VALUE AND POSITIVE ENVIRONMENTAL IMPACT

This increased environmental footprint of IT also makes certain aspects of Sustainable IT packed with easy opportunities to drive positive impact in sustainability. Reducing the environmental impact of IT can be considered the next low-hanging fruit for organizations seeking to reach high sustainability targets and reduce IT costs. Companies seeking to digitize their business value chain should start thinking of applying simple measures, to future-proof their IT infrastructure.

Figure 1: The enterprise carbon footprint of leading firms

Major **cloud computing solution provider** – carbon footprint of operations[T]	**295 thousands metric tons of CO2eq in 2019 4.31 times** increase from **2015**	**64 thousand cars** on the road for a year
Leading **consumer electronics provider** – carbon footprint of end-user devices*	**24 MtCO2eq** in **2019**	**6.1 coal-powered plants** for a year
Global **telecom service provider –** carbon footprint of telecom operations	**1.3 MtCO2eq** in **2019**	**236 thousand homes powered** for a year

*Covers assembly, transportation, utilization and refurbishment of end-user devices[T] Including Scope 1 and Scope 2 emissions, market-based

Source: Carbon Disclosure Projects and the United States Environmetal Protection Agency.

5   https://www.capgemini.com/insights/research-library/sustainable-it/
6   Peter Drucker

Some of the benefits the front runners of Sustainable IT are achieving span from up to 40% savings on IT energy bills to increasing brand image, employer attractiveness and engagement. From our experience, organizations with high maturity in terms of Sustainable IT deliver significantly more benefits across multiple parameters compared to other organizations:

44%
say green practices deliver tax savings

19%
Switching to green cloud architecture and framework has delivered 19% cost savings among organizations that have been able to scale the solution organization-wide.

61%
have improved their ESG (environmental, social, and governance) score and brand image,

56%
have improved customer satisfaction.

11%
Developing sustainable architectures to rationalize applications and identify and decouple energy-intensive applications offers 11% cost savings.

8%
Using machine learning to optimize data centers' cooling systems delivers 8% cost savings.

14%
The auto switch-off hardware/features can deliver 14% of cost savings on average from power reduction

9%
Using AI/ML to optimize data center utilization delivers cost savings of 9%.

IT IS TIME FOR A GREEN REVOLUTION FOR YOUR ORGANIZATION'S IT

Sustainable IT is an umbrella term that describes an environment-focused approach to the design, use, and disposal of computer hardware and software applications and the design of accompanying business processes [7]. Sustainable IT initiative spans across all areas of enterprise IT, including user hardware and devices, networks and communications systems, applications and data, and cloud computing. The overview below shows some examples of initiatives that IT professionals should consider applying when designing or improving an IT landscape:

Sustainable IT initiatives span across all areas of enterprise IT, including user hardware and devices, networks and communications systems, applications and data, and cloud computing.

SUSTAINABLE IT

USER HARDWARE AND DEVICES
1. Procure hardware and user devices with minimum lifecycle carbon cost
2. Improve employee awareness of device utilization and sustainability
3. Ensure proper disposal, recycling and refurbishment of hardware
4. Utilize energy certified and auto-off hardware
5. Prolong the lifespan of devices

NETWORKS AND COMMUNICATION SYSTEMS
1. Deploy edge computing to reduce network transfers
2. Use efficient data transfer mechanisms

CLOUD COMPUTING
1. Adopt enterprise cloud solutions
2. Switch to a green cloud architecture and framework
3. Use AI/ML to optimize data center utilization and improve cooling solutions
4. Utilize or shift to public cloud utilizing low carbon grids

APPLICATIONS AND DATA
1. Ecodesign applications to minimize resource utilization
2. Develop sustainable architectures to rationalize applications, and identify and decouple energy intensive applications
3. Streamline data architecture and optimize the data lifecycle
4. Design efficient and sustainable AI applications

Reducing the environmental impact of IT is not only a curative one-shot action, but also a proactive end-to-end approach. Sustainable IT will not only promote a greener footprint but will also unleash the potential of smart technologies to drive environmental innovations and improvements in sustainability performance. The following recommendations form a roadmap for achieving this:

- Assess: Create a baseline for Sustainable IT maturity and IT enterprise emissions with a qualitative and quantitative diagnostic assessment (please also read the eAPM article for reference on how to measure the environmental footprint of an IT enterprise). This should involve the assessment of key sustainability and IT performance indicators, targets, and frameworks. The outcome of these assessments will equip the organization with a common understanding of the current IT footprint and the identification of levers to reduce it.

- Define a Sustainable IT vision, strategy, and roadmap: Align the organization around the vision of how the reduction of IT footprint can support the broader sustainability and strategic goals. Empower teams to define the trajectory to apply the Sustainable IT leavers and identify innovative ways to achieve the vision.

- Set up a Sustainable IT governance plan: Establish common rules, with support from the top leadership team, to ensure all stakeholders and employees are committed to implementing Sustainable IT initiatives. Governance should also cover activities such as sustainable procurement and sustainable architecture design (please refer to the IAF article).

- Implement: Operationalize Sustainable IT initiatives, with sustainability as a key pillar for activities such as software architecture, IT vendor selection, scope and deployment of IT use cases, and usage of IT hardware and devices.

Sustainable IT can be considered as an important path for organizations to achieve broader sustainability goals, reduce the enterprise footprint, and benefit from cost reduction. Our simple recommendation to leaders, employees, and society is to start wearing sustainability glasses when designing, using, disposing, and recycling IT.

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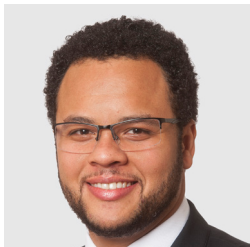
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