
A Sustainable Digital Growth? Labour, Energy and Environmental Challenges in the Data Center Sector

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Abstract

This contribution presents initial reflections drawn from a recently launched research project investigating sustainable digital growth in Italy. It seeks to establish an analytical framework for examining the material underpinnings of this growth, advancing the argument that the digital infrastructure upon which it is based exhibits characteristics of 'nocività' (noxiousness), particularly as theorised within Italian operaismo from the 1970s onwards. The proposed analysis centres on the supply chain of a critical digital infrastructure, pivotal to the expansion of the platform economy's organisational and production models and to broader processes of digitalisation: data centres. The analytical strategy employed involves a conceptual disaggregation of the data centre into key constituent elements, focusing particularly on semiconductor chips. This serves to highlight the significance of a technology central to the virtualisation of digital operations and the processing of the vast datasets required for, for instance, the computational capabilities of Artificial Intelligence systems. Tracing this supply chain allows for a critical reconstruction of the dynamics of labour and natural resource exploitation across various stages of production – from mineral extraction and the manufacturing of chips and their associated environmental footprints, through to the substantial energy and water consumption necessitated by the operational phase of data centres.

The salience of this inquiry is underscored by contemporary European and global challenges, notably climate change and its mitigation, alongside questions of digital sovereignty. Within this conjuncture, the EU's aspirations for climate neutrality by 2050 and the cultivation of a sustainable digital future are intrinsically linked to the (supposed) responsible production of semiconductors (such as chips and wafers) and Critical Raw Materials (CRMs) – crucial for the twin digital-green transitions. The semiconductor industry, encompassing both fabrication facilities (fabs) and design firms (fabless), occupies a pivotal position in this transitional landscape. These infrastructures are indispensable for the development of cutting-edge technologies spanning AI, IoT, data centres, and 5G networks. Concurrently, EU policy initiatives, such as the European Chips Act and the Critical Raw Materials Act, are designed to bolster the European semiconductor and CRMs value chain and mitigate dependencies on external actors. However, realising these ambitions necessitates involves highly energy-intensive processes, thereby generating significant concerns regarding resource depletion, labour conditions, and environmental impact.

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