
That technological future does not exist
Overview of the latest IPCC report and the role of digitalization in mitigating the climate crisis

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Executive Summary

The Intergovernmental Panel on Climate Change (IPCC) report called "Climate Change 2022. Mitigation of Climate Change" recognizes that the lack of adequate governance of the digital revolution may hinder the role that digitization could play in supporting the achievement of stringent mitigation target goals.

This regard calls for the coordinated implementation of policy instruments that can help accelerate change in the desired direction. Targeted technological change, regulation, and public policy can help steer digitalization, the sharing economy, and the circular economy towards climate change mitigation.

It also understands that digitalization must be deployed in the context of decreasing consumer demand to lower energy consumption.

For the Latin American Institute of Terraforming, the report is a breakthrough in understanding that digitalization cannot be sustained only on the hegemonic technological promise of a sustainable future and needs bold public policies based on independent and multidisciplinary evidence.

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I. Introduction

One of the objectives of the Latin American Institute of Terraforming[1] is to achieve a deeper understanding among the public, people who design digital technological systems, and decision-makers, about the role of digitization[2] in the climate and ecological crisis we face and, in particular, to reflect on the fundamental role of governance. The main reason for this is the absolute certainty that an essential part of the crisis we face is, above all, a political crisis in which the interests of a few simply prevail over the multi-species common good. For example, there has been a worldwide scientific consensus on the urgent need to decarbonize our economy for decades, yet the fundamental political sense to achieve this has failed.

In public interventions, the institute has repeatedly stated that, in the particular role of digitalization in the climate and ecological crisis, there is also a worrying lack of political vision of governance in technologies captured by technological promises rather than scientific evidence.[3] It is not that digital technologies are not essential for our world in energy transition, but rather, to weigh multidisciplinary and independent scientific evidence for action before relying on potential business promises in a world on fire. That technological future that digitization magically makes us just reduce global warming does not exist, and there is no more time to wait for that fix. It is imperative that true innovation shakes us up and that all stakeholders in the governance of digital technology, once and for all, and to paraphrase Silvia Rivera Cusicanqui, walk with the past in front of them.

In this regard, the long-awaited report of the Intergovernmental Panel on Climate Change (IPCC) called "Climate Change 2022. Mitigation of Climate Change" is remarkably

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[1] The Latin American Institute of Terraforming (terraforminglatam.net) is a space for feminist reflection to critically consider how digital technologies are connected to the climate and ecological crisis and how this impacts our continent. General Coordinator: Paz Peña. Contact: info@terraforminglatam.net

[2] We understand digitization as the use of digital technologies to change a business model and provide new revenue opportunities and value production.

[3] See:

a) Latin American Institute of Terraforming submission: Comments on the Action Plan for a Sustainable Planet in the Digital Age (draft version) by the Coalition for Digital Environmental Sustainability (CODES). Santiago of Chile, March 09, 2022. https://acortar.link/yAppsY

b) Fight Against Extinction: The Critical Role of the ITU in a World Failing to Address Climate Commitments. A submission by the "Latin American Institute of Terraforming" for the special consultation called "The Environmental Impacts and Benefits of the Internet," launched by the ITU Council Working Group on International Internet-related Public Policy Issues (CWG-Internet) in October 2021. Santiago of Chile, December 2021. https://acortar.link/OmFEAz

revealing.[4] On the one hand, because it reiterates what the political world knows but somehow continues to ignore: if global emissions do not start to decrease in three years at the latest -by 2025- it will be exceptionally hard to avoid a climate catastrophe. And on the other, the research review made by the IPCC also reflects on the role of digitalization in climate mitigation. And here, the consensus is clear: if we want digitalization to help reduce energy consumption and thus increase GHG reduction, we need bold and evidence-based public policy measures.

To get to the point, here is an analysis of how the IPCC 2022 report refers to digitalization for mitigation and the challenges of digital technologies governance.

II. Digitization and SDGs: a nuanced game

For this report, the long-term sustainability of digitized services depends on four factors: (1) the direct energy demand of the connected devices and digital infrastructures (i.e., data centers and communication networks) that provide the required computing, storage, and communication services; (2) the system-level energy and resource efficiency that can be achieved through the provision of digital services; (3) the resource, material, and waste management requirements of the billions of ICT devices that make up the world's digital systems; and, (4) the magnitude of potential rebound effects or induced energy demands that could trigger unintended and unsustainable demand growth.

In this context, the IPCC recognizes that digital technologies can contribute to climate change mitigation and the achievement of several Sustainable Development Goals (SDGs), although, it warns, some of these benefits may be reduced or offset by the growth in demand for goods and services due to the use of digital devices. Thus, on the one hand, sensors, the Internet of Things, robotics, and Artificial Intelligence can improve energy management in all sectors, increase energy efficiency and promote the adoption of many low-emission technologies while creating economic opportunities. But, as a flip side to the SDGs, digitization can mean increased e-waste, negative impacts on labor markets, and widening the existing digital divide.

[4] The report can be found here:
https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_FinalDraft_FullReport.pdf

III. Potential of digitization in mitigation

Among the potentialities in the report are:

a) Enabler of a service economy:

Digital technologies are fundamental to the dematerialization of the economy and the shift to a service economy so that it can promote a significant increase in energy efficiency.

b) Enabler for the decarbonization of transport and construction:

In particular, it indicates that they have significant potential to contribute to decarbonization due to their ability to increase energy and material efficiency, make transport and building systems less wasteful, and improve access to services for consumers and citizens.

For the report, the collaborative economy, digitization, and the circular economy can contribute to ASI (Avoid-Shift-Improve) strategies.[5] However, the circular economy focuses more on the supply side and the collaborative economy and digitization on the demand side. These new service delivery models go beyond sectoral boundaries and leverage technological innovations, design concepts, and innovative forms of cooperation that cut across sectors to contribute to systemic changes worldwide.

The combination of points a and b, i.e., systemic changes such as telework, digitalization, dematerialization, supply chain management, and smart and shared mobility, can reduce the demand for passenger and freight services by land, air, and sea. Nevertheless, some of these changes could potentially result in induced demand for transport and energy services, decreasing their GHG emission reduction potential.[6]

c) Efficiency in the energy system:

A digitized energy system can significantly reduce investments in energy infrastructure while improving the security and resilience of supply.

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[5] The Avoid-Shift-Improve (ASI) model was born as an alternative to the traditional way of planning traffic. It aims to achieve transport system performance targets by balancing supply and demand with low GHG emissions and is based on three principles: avoiding unnecessary trips, shifting trips from less efficient modes to more efficient ones, and improving the efficiency of the activity.

[6] See section IV of this document.

d) Accompanying downscaling of consumption:

In line with the entire 2022 report that goes around downscaling economies through consumption and thus energy downscaling, it is posited that digitization can accompany the fundamental social and institutional transformation of current consumption patterns. A low energy demand scenario includes decentralized services and increased granularity (small-scale, low-cost technologies to provide decentralized services), the increased value of the use of services (multiple uses versus single use), shared economies, and a rapid transformation that is driven by end-user demand, all of which can be led by digitization.

IV. Challenges of digitization for mitigation

The most pressing problem of digitization for mitigation is the increase in energy demand it means and, therefore, the danger of emitting more GHGs into the atmosphere, considering the planet's urgent goals to avoid catastrophe.[7] The increase in energy consumption occurs for two main reasons:

- Direct effects:

Increased energy demand due to the energy used in digital devices. Digital technologies, analytics, and connectivity consume large amounts of energy, implying higher direct energy demand and associated carbon emissions. However, the report notes that, due to efficiency improvements, energy demand associated with the digital technologies sector increased only modestly, by around 6% between 2000 and 2018. It also acknowledges that the energy requirements of cryptocurrencies are a growing concern because there is considerable uncertainty around the energy use of their underlying blockchain infrastructure. In addition, initial estimates of the computational intensity of AI algorithms suggest that energy requirements may be enormous without a concerted effort to improve efficiency, especially on the computational side.

- Indirect effects:

The report indicates that the effects of digitization on the entire economic system put energy savings and GHG emissions at risk. Digitalization, automation, and AI, as mainstream technologies, can lead to a plethora of new products and applications that are likely to be

[7] The IPCC report indicates that digital devices, including servers, increase pressure on the environment mainly due to the demand for rare metals and e-waste. However, it does not elaborate on these issues, understanding the report's scope.

efficient in their own right but can also lead to unintended changes or absolute increases in product demand.

V. The main obstacle: the knowledge gap

As we at our institute have repeatedly stated to digital technology governance bodies, the IPCC report asserts that, at present, understanding of the direct and indirect impacts of digitization on energy use, carbon emissions, and potential mitigation is limited. Moreover, conclusive evidence is lacking in several respects.

For example, it is recognized that the indirect or systemic effects caused by digitalization on energy demand in various sectors of the economy involve more extensive studies and are more difficult to quantify and investigate but are nonetheless highly relevant. Notably, it is recognized that research needs to gauge better the energy trends of rapidly evolving systems, such as data centers, increased social media usage and consumption influence, Artificial Intelligence, blockchain, but also how what touting digitization means for mitigation in the context of the digital divide between social groups and countries. In addition, adequate integration of mitigation models and consequential life cycle analysis is needed to assess how digitalization, sharing economy, and circular economy change the demand for materials and energy.

Recognition of this knowledge gap, for our institute, should be a meaningful wake-up call to public policy decision-makers when designing and deploying evidence-based policies and action plans. In a nuanced game, the report shows the potentialities of digitization as well as disadvantages. Digitization is not a black and white option; it has different gradations that must be carefully weighed according to the contextual realities of the countries.

VI. Challenges for public policy

In keeping with climate urgency and the narrow window of action remaining to avert planetary disaster, the IPCC report concludes that digital technology can support decarbonization only if properly governed through early and proactive policies that avoid potential rebound effects and demand surges. But what exactly does proper governance mean? The IPCC gives some clues that coincide with our institute's public calls.

The **main objective of public policy should be to prevent the digital transformation from increasing energy demand and exacerbating inequalities and power concentration**. In other words, proper digital transformation governance can ensure that digitalization works as an enabler rather than as a barrier and additional stress on decarbonization pathways. As a result, governance can ensure that digitalization reduces the intensity of greenhouse gas emissions and contributes to reducing absolute greenhouse gas emissions by limiting runaway consumption.

In line with the main objective, some action lines that emerge from the report are:

a) Research:

Policies should direct investments in data collection and monitoring systems to ensure that net mitigation benefits are realized and that unintended consequences can be identified in time and managed appropriately.

b) Encourage low-carbon digitalization options considering systemic effects:

Digitization can decrease energy savings and produce leakage effects associated with additional consumption and GHG emissions. Systemic effects tend to have negative impacts, but policies on the proper infrastructure and architectures of choice can help manage and contain these effects. In this sense, policy action should encourage the adoption of low-carbon options in a broad sense.

c) Regulating e-waste:

Design appropriate e-waste governance, which considers people's working conditions and stops the unregulated disposal of e-waste.

d) Social justice in digitization:

If then, digitization under these conditions can be properly governed to support global warming mitigation, it must be realizable for all people, respecting their human rights. Therefore, substantial efforts must be deployed where less developed economies can have access to digital technologies so that their demand for labor is not restricted and, therefore, the welfare of their citizens is not compromised. Specifically, policies should stimulate business competitiveness, meet the demand for digital skills, and safeguard the distribution of and access to adequate resources. Likewise, and no less important, the digital divides of

individuals must be overcome, especially considering factors of race, gender, class, rurality, and other social intersectionalities relevant to the context.

VII. Final comments

The Latin American Institute of Terraforming appreciates that the IPCC 2022 report clearly shows the enormous political challenges that digitalization must face to be a decisive part of the measures to mitigate the climate crisis. Moreover, it seems to us that it poses a unique challenge, little discussed in digitization, such as its relationship with the saving of electricity consumption not only for efficiency but also for key socio-technical elements such as reducing the consumption patterns of people. The challenge seems enormous considering that the dominant business model of digital platforms is profiling people for consumption.

All in all, we believe it is indispensable to add some concerns to the latter, based on feminist principles of social justice that our institute advocates, which goes even beyond the intersectional analyses for the action plan that must be made in mitigation:

- A bold public policy of digitization in the context of extinction that the planet is experiencing must decisively confront exploitative and unsustainable production patterns, ranging from the material exploitation of natural resources and workers to the extractivism of data for consumption.
- It must also ensure a broad process of communities discussing measures as they must be addressed to them. In this regard, we are concerned that the governance of digital technologies is not very participatory and, particularly, is dominated by a handful of Big Tech companies.
- In the transformation to fair and sustainable digital economies, policies must reduce the scale of energy consumption, so they stimulate solutions at scale that include, in particular, regenerative economies led by women and indigenous peoples. It must also ensure that this de-escalation does not mean austerity policies for the working class.
- Finally, a bold policy of digitization for mitigation must reject false and harmful responses to climate change that do not address the root causes. More willingly and forcefully than ever, it must confront the technological promises of a green future that it wants to continue exploitation relationships, but with more efficient

technology. There is no longer time for that future because that technological future does not exist. The IPCC report is clear on this.

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