

CONCEPT NOTE

Digital Technologies and Environmental Sustainability in Brazil

Outcome 3: Mapping and dissemination of research and strategies on the use of Artificial Intelligence to support environmental sustainability

1

Cetic.br | NIC.br - São Paulo, SP, Brazil

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Programme (DAP) - UK

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I. SUMMARY

This document presents the project “**Digital Technologies and Environmental Sustainability in Brazil**”, carried out by **Cetic.br | NIC.br** and funded by the UK Government under the **Digital Access Programme (DAP)**. It focuses in particular on “**Outcome 3 – Mapping and dissemination of research and strategies on the use of Artificial Intelligence to support of environmental sustainability.**”

II. CONTEXT

Digital technologies, particularly Artificial Intelligence (AI), offer significant potential to **accelerate evidence-based decision-making**, support decarbonisation strategies, and strengthen climate resilience efforts, making them essential assets in addressing the climate emergency. However, the availability of **reliable evidence and robust indicators** to assess the environmental footprint of AI remains limited. This gap is largely attributed to fragmented and inconsistent measurement practices across the AI lifecycle, including training, inference, and supply chains, a challenge that is even more pronounced in countries of the Global South.

At the same time, the inclusive and equitable dissemination of digital and AI-enabled technologies depends on the presence of key enabling conditions, such as **universal and meaningful connectivity**. This is particularly relevant in regions of high strategic importance for climate action, such as the Amazon region, where digital divides risk constraining the adoption and impact of technology-based environmental solutions. In summary, the project aims to expand and systematize the evidence base required to inform public policy and strategic decision-making, while enhancing the visibility and scalability of AI applications

that contribute to environmental sustainability, with a particular focus on addressing measurement gaps and contextual challenges in Brazil.

III. PROJECT SUMMARY

2

Digital technologies are critical enablers for climate action—not just as tools for efficiency, but as transformative levers that can accelerate the transition to a sustainable future, while they can enable energy efficiency, climate solutions, and smarter resource management. According to a recent report from the Alan Turing Institute, AI can make decisive contributions to environmental sustainability by strengthening scientific understanding and providing actionable tools for mitigation and adaptation. Among its main contributions are enabling real-time environmental monitoring; improving forecasting of complex phenomena, such as the simulation of human costs of climate impacts through microsimulation models; and supporting adaptation strategies including AI-powered digital twins that optimize sustainable food systems (Alan Turing Institute, 2023).

At the same time, digital transformation and the adoption of AI-based applications carry significant risks of intensifying environmental challenges if not carefully managed (ITU, 2024). In particular, the **rapid expansion of digital infrastructures**—such as data centers, networks, and device supply chains—drives significant increases in energy and resources demand. Data centers are energy- and resource-intensive, contributing significantly to greenhouse gas emissions, water consumption, land footprint, and e-waste; they also face risks from climate change—such as heat stress, water scarcity, and extreme weather (WB; ITU, 2023).

The project aims to develop a **comprehensive diagnosis** on the intersection of digital technologies and sustainability in Brazil, while also strengthening the **mapping and dissemination of research and strategies** that leverage Artificial Intelligence to support environmental sustainability. Overall, the project's outputs are expected to strengthen the presence of the digital transformation debate within the climate agenda—particularly in key international forums, such as the United Nations Climate Change Conference (COP), as well as among national and subnational policymakers, civil society organizations, and academic researchers.

The project is structured around three complementary outputs:

- **Output 1:** Expand and improve indicators related to **sustainability in the context of digital infrastructures** (particularly data centres), through the project “Mapping Brazilian Digital Infrastructures”, with a specific focus on the installed capacity, main characteristics and future demand of data centres operating in the country. The main activities include quantitative and

qualitative research, building on the ongoing project “Mapping Brazilian Digital Infrastructures” and the dissemination of findings through a report assessing the overall readiness of Brazilian digital infrastructures (data centres) to environmental sustainability.

- **Output 2:** Improve the quality of available indicators on **connectivity and digital inclusion in the Brazilian Amazon region**, including the mobilization of available secondary available data sources, qualitative approaches, and regular quantitative surveys conducted by Cetic.br/NIC.br. The main activities include a quantitative research, based on the processing and use of secondary available data sources and regular surveys by Cetic.br/NIC.br; qualitative research relying on in-depth interviews with local communities; and the production of a report mapping the overall scenario of connectivity and digital inclusion in the Brazilian Amazon region.
- **Output 3:** Strengthen the **mapping and dissemination of research and strategies on the use of Artificial Intelligence to support of environmental sustainability**, relying on the Brazilian Observatory of Artificial Intelligence (OBIA) as a platform, in collaboration with strategic partners, such as the C4AI of the University of São Paulo and other AI Centres operating in Brazil and the United Kingdom.

3

IV. OUTCOME 3: MAPPING AND DISSEMINATION OF RESEARCH AND STRATEGIES ON THE USE OF ARTIFICIAL INTELLIGENCE TO SUPPORT OF ENVIRONMENTAL SUSTAINABILITY

Among the deliverables planned for this outcome are the production of a **report** mapping concrete applications of AI in support of environmental sustainability while mitigating risks generated by AI adoption; the organization of two **knowledge-exchange workshops**; and one dissemination **seminar**, to be conducted in São Paulo-Brazil.

The knowledge-exchange workshops aim to engage leading artificial intelligence research AI centres in both Brazil and the United Kingdom. Their primary objective is to connect researchers and policymakers through interactive activities that foster reflection and practical collaboration on AI applications that promote environmental sustainability. On the Brazilian side, the initiative seeks to involve representatives from the country’s main AI research centres, hosted at leading universities, such as the Centre for Artificial Intelligence (C4AI) at the University of São Paulo (USP). In parallel, the project envisages close interaction with AI research centres based in the United Kingdom. Each workshop is expected to host approximately 30 invited participants.

In addition to the workshops, the International Seminar of the Brazilian Observatory of Artificial Intelligence (OBIA) (<https://seminarioobia.nic.br/>) aims to promote a qualified, inclusive, and forward-looking debate

on the social implications of artificial intelligence in Brazil and in the broader regional context. The event will bring together academics, policymakers, civil society representatives, business leaders, and AI professionals to discuss how AI is reshaping the labour market, education, sustainable development, and other key areas. By convening national and international experts, the seminar seeks to deepen understanding of the opportunities and challenges posed by AI, promote responsible innovation, and support evidence-based policymaking aligned with Brazil's National Artificial Intelligence Strategy (PBIA). To strengthen discussions on environmental sustainability, the organizers will invite experts from UK-based AI research centres to deliver presentations as part of the seminar.

Finally, a report mapping concrete applications of AI in support of environmental sustainability will be prepared, drawing on the contributions systematized during the workshops as well as desk research based on robust and authoritative sources on the topic. The overall coordination of activities will be carried out by Cetic.br|NIC.br in partnership with the Brazilian Observatory of Artificial Intelligence (OBIA).

VI. TECHNICAL EXCHANGE – WORKSHOPS OUTLINE

The workshops will be designed to support the development of a comprehensive overview of the state of the art in research at the intersection of Artificial Intelligence and sustainability. To this end, the activities will begin with the preparation of a literature review aimed at providing a broad picture of the current research landscape in this field.

Subsequently, AI research centers based in Brazil and the United Kingdom will be invited to present concrete examples of past or ongoing research initiatives related to this topic. These sessions will prioritize discussion of lessons learned, methodological approaches, and the main challenges or bottlenecks encountered in conducting such research.

Finally, the workshops will create spaces for dialogue aimed at identifying key research “blind spots” at the intersection of AI and sustainability. This process will help highlight opportunities for future research projects and inform potential recommendations regarding priorities for investment in research in this area.

Expected outcomes include:

- The generation of inputs for a final report presenting the state of the art in research on AI and sustainability

- The creation of opportunities and collaborative networks among researchers from Brazil and the United Kingdom
- The development of policy recommendations focused on advancing the research agenda on AI and sustainability

Suggested Agenda

The suggested dates and location for the workshops and seminar are:	Suggested date	Location	Number of participants
Technical exchange – Workshop I	June 8-10	London, UK	30
Technical exchange – Workshop II [back-to-back with the OBIA Seminar]	September 1-2	São Paulo, Brazil	30
International Seminar of the Brazilian Observatory of Artificial Intelligence (OBIA) [https://seminarioobia.nic.br/].	September 3	São Paulo, Brazil	300

Technical exchange – Workshop I

Programme - <https://cetic.br/en/capacitacao/ai-sustainability/>

VII. REFERENCES

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About Cetic.br

The Regional Center for Studies on the Development of the Information Society (Cetic.br) is the NIC.br department responsible for the production of indicators and statistics on the availability and use of the Internet in Brazil. In 2012, Cetic.br|NIC.br was approved as a UNESCO Category 2 Centre with the mission of monitoring the development of knowledge and information societies in Latin America and the Portuguese-speaking countries of Africa. More information is available at: <https://cetic.br/en/>.

About NIC.br

The Brazilian Network Information Center (NIC.br) (<https://www.nic.br/about-nic-br/>) is a non-profit civil entity in charge of operating the .br domain, distributing IP numbers, and registering Autonomous Systems in the country. NIC.br implements the decisions and projects of the Brazilian Internet Steering Committee (CGI.br) since 2005, and all the funds it collects come from its activities that are eminently private in nature. It conducts actions and projects that benefit the Internet infrastructure in Brazil. NIC.br is made up of: Registro.br (<https://registro.br>), CERT.br (<https://cert.br/>), Ceptro.br (<https://ceptro.br/>), Cetic.br (<https://cetic.br/>), IX.br (<https://ix.br/>) and Ceweb.br (<https://ceweb.br/>), as well as projects such as Internetsegura.br (<https://internetsegura.br>) and the portal Best Practices for the Internet in Brazil (<https://bcp.nic.br/>). It also hosts the Brazilian W3C office (<https://w3c.br/>). More information is available at <https://nic.br/>.

About CGI.br

The Brazilian Internet Steering Committee (CGI.br), responsible for establishing strategic guidelines related to the use and development of the Internet in Brazil, coordinates and integrates all Internet service initiatives in the country, promoting technical quality, innovation and dissemination of the services on offer. Based on the principles of multistakeholderism, transparency, and democracy, CGI.br represents an Internet governance model in which all sectors of society participate equally in its decisions. One of its formulations is the “10 Principles for the Governance and Use of the Internet” (<https://www.cgi.br/principios>). More information is available at: <https://www.cgi.br/about/>.

7

About the Foreign, Commonwealth & Development Office (FCDO) - Digital Access Programme (DAP)

The Digital Access Programme (DAP) is a global initiative led by the UK’s Foreign, Commonwealth & Development Office (FCDO), currently implemented across five countries: Brazil, Nigeria, Kenya, Indonesia, and South Africa. DAP initiatives have engaged over 2,000 stakeholders, reached more than 2,000 communities, contributed to 48 regulatory reforms, tested 128 innovative models, and benefited approximately 7.8 million people. The programme is structured around three core pillars: connectivity, cybersecurity and the UK–Brazil Tech Hub. It aligns with the UK International Digital Development Strategy (2024–2030), which advances digital inclusion, digital transformation, and digital responsibility — further strengthening the strategic partnership between Brazil and the United Kingdom. <https://devtracker.fcdo.gov.uk/programme/GB-1-204963/summary>