

# The Barcelona Manifesto on *Digital Global Observatories*<sup>1</sup>

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**The issue:** the increasing digitalization of our societies and lives has promoted the development of *digital twins*, which may provide uncountable benefits in health, urban planning, and the environment, including precision medicine, low carbon planning of complex landscapes, as well as predictive maintenance and early risk detection of complex systems, to name a few. Whilst we should celebrate these successes, we need to better understand the ways to guarantee ethical and equitable solutions, as well as minimize inequalities that are being perpetuated or amplified in the digital sphere over the last decade, with relevance in the Global South<sup>2</sup>. This requires going **beyond the digital hype** and **balancing innovation with social responsibility**.

Since the early development of digital twins in the Apollo missions of the 1960's, the development of digital copies of real-world assets, systems and processes has advanced significantly with diverse approaches, including the ability to anticipate the behaviour of complex systems using Artificial Intelligence (AI)-based techniques, coupled with Internet of Things (IoT), high resolution satellite imagery and forms of advanced computing. By combining real world data (including physical and behavioural characteristics) with synthetic data, they facilitate the digital planning of complex landscapes, including urban, rural and forest environments, as well as of objects and people, with important applications over many domains. When paired with AI, digital twins can make forecasts and facilitate the digital planning of our complex living systems.

*Global digital observatories* expand the concept of digital twins making use of integrated solutions of IoT, high resolution satellite imagery, advanced computing, and AI-enabled innovations, with particularly relevant applications in public health and safety, sustainable urban planning, and land management, including preventing fires and help accelerating the path to carbon neutrality.

**The goal:** *Global digital observatories* must consider *human agency*<sup>3</sup>, be centered on people and be based on changing *collective behaviours* leading us to safer, cleaner, and more “collectively” resilient and cooperative societies. They make use of digital twins in health, urban planning and the environment and must **help shaping our common future in times of increasing uncertainty and unsettled lives with improved public engagement and understanding**.

**The context:** Recent unexpected threats to our common safety and public common goods, including public health, such as the Covid-19 pandemic, the increasing activity of individual digital terrorism, the Russian invasion of Ukraine and the recent crisis in the Middle East, have shown that our societies are not as safe as we thought. In association with the *climate emergency*, we all are facing, demographic forecasts and the tensions resulting from increasing water scarcity affecting the world's most vulnerable communities, we are facing unprecedented threats that should foster a clear call for action.

The analysis clearly shows that every forecast for world societies in the coming decades will be strongly affected by the emerging trends in the growing digitalization of our societies, communities and

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<sup>2</sup> See details at the Human Development Report, UNDP (2022), <https://hdr.undp.org/content/human-development-report-2021-22>

<sup>3</sup> See details and definition at Human Development Report, UNDP (2019), <https://hdr.undp.org/content/human-development-report-2019>. Also, in Castels, M. (2019), *Rupture*, Polity Press, Cambridge.

economies. It includes the increasing world relevance of the Global South and the critically relevant role of European led cooperation<sup>4</sup>.

The rationale for this discussion also relies on the fact that the *climate emergency* is probably the biggest challenge humanity is facing. The Paris Agreement is perhaps the most impactful health agreement of the 21<sup>st</sup> century<sup>5</sup>, however, there is no sustainable development without guaranteeing the *rights of all people/social justice*. Future actions must consider the connection between the “ecological footprint” indicators and those associated with the “social footprint” (i.e., poverty, inequality, and violation of basic rights), as well as the “human footprint” related to the increasing burden of diseases associated to the climate emergency.

**Advantages and Threats:** The advantages of digital observation and governance based on large data sets and digital networks are still subject to uncertainties requiring comprehensive technical and policy debates. The availability of large-scale data (e.g., Earth observation systems based on high resolution satellite imagery or large collections of medical data), together with the use of advanced computing, operating on decentralized digital networks complemented with blockchain control provide a first layer of potential solutions that must be carefully evaluated. AI opens new avenues in the digital era, including the analysis of information flows and the introduction of learning patterns.

However, the massified use of AI-enabled innovations is also not free of additional questions because the “power it has to make us act in the ways it predicts reduces our agency over the future”<sup>6</sup>. In predicting our behaviour, AI systems can end up changing it. Consequently, collective human wisdom needs to be strengthened so that emerging regulatory issues for an increasing digital age should help promote critical approaches to AI, with clear *transparency, accountability and clarity* about boundaries and purpose, as well as *responsibility*<sup>7</sup>. It requires rethinking of the techno-centric narrative of progress, embracing and harnessing *uncertainty*, as well as abandoning the fantasy of control over nature and the illusion of techno-centric dominance of AI-enabled innovations<sup>8</sup>.

The biggest risk comes from the concentration of economic and political power in the hands of a few organizations empowered with advanced AI tools and digital observations, which have the ability to target, manipulate and polarize the public opinion. But it should be clear that the potential erosion of the public sphere and the dominance of a few tech giants can only be avoided **by increasing public investment in global digital observatories and related solutions for the common good**. Digital observatories cannot be left in the hands of a few powerful companies and/or autocratic political regimes. They must become a **public good, democratically governed and benefitting all**.

The issue is clear in that it also creates *tensions* between developers/promoters and human-led policy making, which need to be informed by negotiations of trade-offs. Above all, it requires a *transdisciplinary approach to collective behaviours*<sup>9</sup> and consideration of “*human agency*” across economics, philosophy, law, science and technology studies, history and sociology to engage with all the necessary ingredients of an emerging decentralized digital age and responsible AI-enabled innovations.

**Priorities:** Recognizing the enormous progress over the last decades on computer infrastructures and data science, as well as the increasing digitalization of our societies and the use of AI tools, we stress

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<sup>4</sup> See the platform *K4P Alliances*, <https://k4palliances.com/>.

<sup>5</sup> WHO (2021).

<sup>6</sup> Helga Nowotny (2021), “In AI we Trust: power, Illusion and Control of predictive algorithms”, Polity Books

<sup>7</sup> Thelisson, E., Morin, J.-H., Rochel, J. (2019), “AI Governance: digital responsibility as a building block”, 2 DELPHI 167

<sup>8</sup> Karamjit S. Gill (2022), Book review, “Nowotny 2021: In AI we trust”, AI& Society, January 2021

<sup>9</sup> See, for example, the work of Bak-Coleman et al (2021), “Stewardship of global collective behavior”, *Proceedings of the National Academy of Sciences*, June 21, 2021.

the need to deepen the debate among all relevant stakeholders and robustly address **seven high-priority themes**:

1. **Scope:** By focusing *global digital observatories* on **people needs and on our emerging collective behaviours** we will guarantee the sustainability of the populations, simultaneously with their right to develop. This means “**digital humanism**” and the guarantee of a transdisciplinary approach to digital twins in a way to foster healthier lives and the development of sustainable and healthy territories.
2. **Scale:** By orienting *global digital observatories* to help changing our daily routines and work habits, as well as our cities, health systems or approaches to social and individual health, transport, agriculture, and industry, we will guarantee achieving a balance between the carbon emitted into the atmosphere and the carbon removed from it. This balance – or net zero – will happen when the amount of carbon we add to the atmosphere is no more than the amount removed. It requires **new knowledge, new observation methods and institutional innovation**, which can only be achieved through the **comprehensive use of advanced digital tools**, together with a **multidisciplinary approach, gender balanced and the collective commitment of all stakeholders** (policymakers, universities, industry, professional organizations, science communicators and educators, regulatory bodies, and funders).
3. **Public engagement, understanding & participation:** Digital awareness programmes, ranging from public understanding to public participation, must be strongly supported to foster a **general understanding of digital observation, AI tools and related outcomes**. This must involve experts and researchers across all areas of knowledge, science centres and communicators, education organisations, companies, and broader civic society. Increased digital awareness throughout society beyond the usage of mobile phones is key to foster the sustainable development of our societies, particularly among the most vulnerable. R&D labs need to develop, implement, and invest in public engagement with global digital observatories. Funding agencies need to prioritise funding to these initiatives. **We must bring to the centre of digital observation those that have been typically in the margins of our societies.**
4. **Governance:** Understanding *technology change* as a **common public good** will allow **citizens to be an integral part of future developments**. This will help policymakers to better understand how *digital observatories* can be used to develop further to make public services more effective by delivering seamless services, cutting down digital bureaucracy and giving citizens back their most precious asset, namely their time. In addition, it will drive new policy options to enhance the **governance and regulation of decentralized digital networks**, including those in the public sector, ensuring high standards of conduct across all areas of public sector practice, promoting public sector effectiveness, and delivering better service to its users. Our fellow citizens also need to have an active role at governance at the institutional level. But this requires regulators, developers, and users to **work together on designing regulatory frameworks as drivers of innovation, ethics and responsibility.**
5. **Quality jobs, commitment, and resources:** *Global digital observatories and solutions* are facing shortages in both personnel and funds. In addition, digital observatories cannot be left in the hands of a few powerful companies and/or autocratic political regimes. There is an urgent need to foster **digital public goods**, together with high quality jobs, reduce labour precarity and bureaucracy, foster cost optimization and the alignment of research and innovation agendas. This requires the commitment of **public administrations, companies, and research leaders**, together with closer interactions among **researchers and professionals in all areas of knowledge**. But is also requires forms of **institutional innovation** to strengthen **collaborative platforms oriented to foster global digital observatories operating in the public domain, together with high quality jobs** and the sustainable development of all our societies. Only by **increasing public investment in collaborative global digital observatories and related solutions** they will become a **public good, democratically governed and benefitting all.**

6. **Education and research:** a fundamental precondition to trustworthy development and use of digital global observatories, including high resolution satellite imagery and AI tools, is **extensive training and education, together with new research**. Responsible AI is not just to develop trustworthy systems, but to **ensure that all of us can trust ourselves and trust each other to use global digital observatories responsibly**.
7. **Europe-wide and global Europe collaboration:** Today's digital observation requires a cultural shift from regional/national efforts into **continent-wide partnerships** involving all stakeholders. Europe-wide collaboration oriented towards global issues and, in particular, the **sustainable development of the *Global South***, brings significant benefits for citizens and the economy at large, if equal access to high-quality digital observation and solutions and follow-up monitoring is provided.

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