

Sustainability: Designing for a Technological Utopia or Dystopia?

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Designing for sustainability is all about the future. As a discipline, design is rightly concerned with bringing about positive change for the long-term flourishing of the planet. From atomic bomb fallouts to shampoo microplastics, the Earth's environmental woes are indelibly linked to modern societies overconsumption of resources and the mass-waste that this creates, particularly Global North countries across Europe and North America. In an effort to curb their impacts, many of these country's governments signed the Paris Agreement in 2015 with the collective goal of keeping global temperature increases to a maximum of 1.5 °C, as well as pledging to meet ambitious Net-Zero carbon emission reduction targets by the year 2050.

Despite this growing consensus, how we collectively go about instigating the vital societal, economic, and technological transformations needed to move beyond the current Anthropocene remains a contentious issue. Resultantly, the dialogues that surround sustainability – both broadly and within the field of design – can often deviate into two opposing silos: one which frames 'the future' as a sustainable utopia and the other an unsustainable dystopia. Given their long-standing power and influence in shaping the modern world, technologies sit at the heart of this dichotomy.

Taking a solutionist stance, a number of scholars believe that advanced technologies will ameliorate most of society's environmental problems in the future. They argue that until then, we should 'learn to love our monsters' and embrace the Frankenstein-like consequences that modern technologies have wrought upon the planet. In contrast, other practitioners foresee an ecological non-future on the horizon. Looking through a rear-view mirror, they contend that in order to avoid climate collapse, we should eschew technological progress and readopt pre-industrial cultures and values.

This dichotomy in sustainable narratives is persistent and persuasive. It can lead to inertia amongst policymakers and publics in regard to the best ways to redress unsustainable processes and practices. It can create tensions amongst designers who are aware of their discipline's often lamentable environmental record but who also want to innovate novel strategies for restabilising our biosphere. It is therefore time to move away from the reductive binary of utopias and dystopias. These narrow and dogmatic visions of the future are not inspiring the type or level of sustainable change needed. The propensity of some to promote idealistic and overly solutionist futures should be seen as nostalgia. Similarly, hagiographic interpretations of the past contain elaborations and constructions which can distort history as well as conceal its flaws.

A more useful way to look at the issue of global unsustainability is to view it as a hyperobject (Morton, 2013). It is massive in scale and continually evolving. Maintaining some form of sustainable equilibrium is a 'wicked problem' (Rittel & Webber, 1973) which is becoming increasingly difficult to redress. Escobar's (2018) concept of the pluriverse reinforces this complexity. We live in a deeply heterogeneous world where 'sustainability' means different things to different people in different contexts. One person's vision of a

sustainable utopia might be another person's idea of an unsustainable dystopia. The earth may be one, but the world is not.

To develop new approaches for tackling unsustainability, we must directly engage with its complexity, its relationality, and its uncertainty. Design research can come to the fore here. Rather than retreating to the safety of the edges, through design research we can explore, expand and explain the 'messy' grey areas in between. By working with communities and industry to apply future-oriented approaches such as Speculative Design and More-than-Human-Centred Design, practitioners can begin to envision and consider a plurality of possible sustainable futures, as well as start to critically evaluate the environmental trade-offs and unintended consequences that new technological developments may come to pose.

For example, research with ImaginationLancaster colleagues has demonstrated that by negating means for repair, upgrades and recycling, the design of most so-called 'smart' devices – often referred to as *Internet of Things* devices – is unsustainable. This technological paradigm is increasingly contributing to global material scarcity issues, electronic waste streams and pollution – such as through the illegal dumping of redundant devices in Global South countries like Ghana and Nigeria. Yet, because of their innate connectivity, future, smarter devices could potentially have longer and more durable lifecycles through the incorporation of modular componentry which can be globally tracked, easily substituted, and efficiently recycled (Stead & Coulton, 2022). Emergent, related innovations like Predictive Maintenance and Digital Twins add further currency to these proposals.

However, our research has also highlighted that there is an additional caveat that comes with adopting data-driven technologies like the Internet of Things: these systems are themselves having a growing planetary impact. Invisible to the naked eye, data is often considered to be immaterial and innocuous. In reality, our billions of daily interactions with smart devices and digital services are collectively creating zettabytes of data every year. One zettabyte is 1,000,000,000,000,000,000 bytes – equivalent to 323 trillion copies of Leo Tolstoy's *War And Peace* or storage for 2 billion years of music. The generation, processing and storage of this data across vast networks like the Cloud (a proxy for millions of globally dispersed data centres) and mediated via systems like Artificial Intelligence is consuming fossil fuel derived energy and releasing carbon emissions at environmentally detrimental levels (Stead et al, 2020).

Other technological interventions such as renewable energies, electric vehicles and the transition to a Circular Economy are beset with similar compromises. It could also be argued that the latter promotes a utopic, monolithic vision for the future – one which responds to the problem of unsustainability from a distinctly Western vantage. Outside of this privileged lens, alternative forms of a Circular Economy are, to a degree, already flourishing. Born from necessity but built on resilience, in some Global South communities, product repair practices help older iterations of devices to continue to remain culturally, economically, and environmentally valuable. So, would the Global North do better to follow the lead of Global South repair communities when seeking to transform its unsustainable material cultures? Should new technologies continue to be designed and implemented to remedy the

environmental problems caused by earlier technologies? Might alternate forms of action, or even inaction, be more beneficial or worse for the environment and society?

Designing sustainable futures with and for wider sets of stakeholders has been key to our recent research. The Repair Shop 2049 project has been investigating the limitations of EU/UK Right-to-Repair policy which currently does not sanction the repair and reuse of Internet of Things device hardware and software. Collaborating with partner The Making Rooms, Blackburn's digital manufacturing hub, we have brought together a variety of stakeholders including citizen groups, local government, and industry to start to understand whether design methods can help improve access to better repair knowledge, skills and tools, increase smart device repairability and develop more equitable technology infrastructures across local communities (Stead et al, 2023). For our Edge projects, we have designed interactive games to highlight to stakeholders that there is a collective need to reduce our data-driven carbon emissions – just like there is to use less plastic and choose more environmentally friendly forms of travel. And that this decision-making often comes with uncomfortable trade-offs – our Edge game players must negotiate between improving their data sustainability while potentially forfeiting some of their data cybersecurity (Stead et al, 2022).

Crucially, our projects directly engage with citizens and communities to begin to allow them to have their say in how the design of new devices, practices and policies might positively and/or negatively affect the future of the planet – a planet whose fate is not yet set. For while it is imperative that we be extremely vigilant going forward, the future, like the past, will no doubt present a complex mix of opportunities and challenges for Earth and its humanity to flourish sustainably. 'Change is the only constant' (Toffler & Toffler, 1970) and designing for sustainability will likely always be both a utopian and dystopian project.

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