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Promises and contradictions of digital sustainability in the post-pandemic city

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While the climate crisis was calling for urgent transformative action, the COVID-19 pandemic led to sudden and abrupt social changes in 2020 (Shenker, 2020), most evidently the digitalisation of many activities ordinarily performed in person. Frequent lockdowns required people to perform most of their daily routines online: buying food, working from home, education of children and so on. Within this difficult situation, people nevertheless noted the reappearance of wildlife in the city (Arora et al., 2020; BBC, 2020): migratory birds (Brown, 2021) and small mammals (Lanzoni & Almond, 2020) repopulated riverbanks; birds of prey nested on central squares; animals timidly entered the suburbs looking for food.

Furthermore, researchers reported a drastic and noticeable drop in carbon emission in traditionally polluted areas (Wang & Su, 2020; Baldasano, 2020). This inspired a commitment to designing sustainable smart cities (Zellmer et al., 2020) while reinforcing the narrative that makes sustainability and digitalisation seemingly inextricable. Investing in digitalisation for sustainability goals is now a common strategy, incorporated, among others, in the EU New Green Deal (European Commission, 2019). The deal defines the main stakes of digital sustainability as not simply limiting negative environmental impacts of digitalisation, but rather as the ambitious plan to achieve zero pollution, supporting climate actions and sustainability protection through digital solutions.

In this chapter I focus on the nexus between digitalisation and sustainability, which entails understanding the interplay of overlapping geographies in a globalised world, characterised by multiple temporalities. Environmental and social changes are entangled and complex whereas digital technologies evolve rapidly. For instance, climate change is characterised by the confrontation between distinct temporalities that make it difficult to assess the long-term consequences of human agency, including the effects of technological innovations, and ecosystem reactions. From longer-term perspectives, contradictions, paradoxical effects and practical pitfalls emerge.

By discussing how and why our digitally supported habits are not as environmentally friendly as we might presume (Griffiths, 2020), I describe some of the long-term consequences of digitalisation, and the contradictory and paradoxical effects, socially and ecologically. On this basis, the chapter critiques the idea that the ecological transition towards a more sustainable world can be supported by digitalisation.

The digitalised sustainable city

Digitally reframing urban development plans aims to address both ecological and social aspects of sustainability. Sustainability is in fact a multidimensional goal requiring a balance between environmental protection and social measures supporting democratisation, cohesion and justice. The interplay between the multiple components of sustainability generates significant challenges in densely populated, polluted and mutable urban contexts (Haughton & Hunter, 2003; Pearsall & Pierce, 2010). Policy intervention programmes at different geographical scales assume that an increased digitalisation of social reproductive processes automatically equates to increased sustainability. For instance, at the macro-regional level, the 'Declaration on a Green and Digital Transformation' engages European countries in supporting green digital solutions to decarbonise energy networks, facilitate a circular economy and reduce pollution and environmental degradation (European Commission, 2021a). At the local level, programmes such as the 'Green Neighbourhoods' by the private Bankers Without Boundaries company proposes to establish local design and management entity able to coordinate energy retrofitting initiatives on a street-by-street scale (Bankers Without Boundaries, 2021).

The digitalisation processes also answer the need for participatory decision-making processes and transparent approaches to science and

politics production (Larsen, Gunnarsson-Östling & Westholm, 2011). People's access to shaping the urban fabric as contributors (rather than consumers) through digitalisation is thought to be key in helping democratisation and inclusion.[1] Thus the technological readiness of cities is key in sustainability imaginaries. Companies and financial and international institutions, as well as policymakers, are developing and promoting software innovations expected to find sustainable solutions (for example, optimised parking and travel, implementing smart-grid electricity consumption, avoiding the congestion of transport infrastructure and facilitating the access of citizens to services) (*ECM Technews*, 2017).

Building on the smart city concept, ICT and utilities companies promote a highly marketable vision of the future city, characterised by energy-efficient, socially vibrant and ecologically sustainable features. The vision promoted by the 26 large companies (including Siemens, Microsoft, Vodafone, Nexus Integra, Enel and Deloitte) that signed the 'Declaration on a Green and Digital Transformation' of the European Union clearly exemplify this. Feeding this imaginary further, particular cities are held up as prime examples depending on particular indicators: the Green City Index funded by Siemens identified Copenhagen as the greener city (Economist Intelligence Unit, 2020), while the European Green Capital programme selected Lahti in Finland (European Commission, 2021b).

Although the sustainable city has become synonymous with digital cities, it is questionable whether digitialisation is actually serving the cause of sustainable transition. Academic and journalistic research is now questioning its benefits, exposing the regressive consequences in terms of ecological sustainability or social justice. Having always been the locus of emerging social conflicts in their most apparent form, the city also represents the place in which contradictions of digital sustainability manifest.

Ecological contradictions of digital sustainability

During the COVID-19 lockdowns, many working and social activities were performed online. This trend is enduring well after the end of the most acute phases of the pandemic. Therefore, many scholars wondered what the post-pandemic city will be like in light of the speeding dematerialisation and virtualisation processes affecting goods production, distribution and consumption phases and the disintermediation (the short-cutting of long chains of intermediaries) in service provision. For instance, while

the worldwide increase in online shopping reduced the number of people using cars to visit retailers, delivery companies exponentially multiplied their affairs by generating a proliferation of at home delivery services operated by global logistic companies and 'riders', the new proletariat of the platform economy whose working conditions are often precarious and uncomfortable (Figure 21.1). These new forms of production and consumption merely displace negative environmental impacts from one node of global chains to another (Dryzek, 2012).

The race of cities to become digitally connected has many unseen environmental costs. Nearly 20 years ago, the European Joint Research Center estimated that the digitalisation of social reproduction processes (ICT-based supply chains, e-shopping, telework and smart working, virtual meetings, intelligent transport systems, smart grid, etc.) would have an overall positive impact in terms of greenhouse gas emissions (Casal et al., 2004). Nevertheless, there is an increasing awareness that the ICT industry is one of the most impacting sectors for electrical power consumption, and associated carbon emissions double every four years (McLean, 2019). Despite the difficulties in identifying the environmental impact of digitalisation (due to its reliance on complex, interconnected socio-technological systems engaging energy consumptions and material

Figure 21.1 Pisa in the 2020 lockdown. Riders only populate the streets. Photo: Chiara Certomà.

transformations on multiple geographical scales; Naughton, 2017), we know that data centres for interactive smartphones, allowing us to store, back up and recover our data, 'use more than 2% of the world's electricity and generated the same amount of carbon emissions as the global airline industry (in terms of fuel use)' (McLean, 2019).

To claim green credentials, internet companies reduce energy consumption by using renewable energy or – more questionably – by carbon offsets balancing carbon emissions with unknown effectiveness (Greenpeace International, 2017; Pearce, 2018). As McLean (2019) points out, 'The unaccountable nature of digital corporations hampers our capacity to hold them responsible for how they use energy, or whether they are improving the sustainability of their practices,' for instance by moving away from planned device obsolescence (Gibbs, 2018). Actually, the negative environmental impact of ICT hardware life cycles (from manufacturing to wasting) has been progressively explored. McLean (2019) signals that 'Devices are powered by electricity – often produced in coal-fired plants – and are manufactured from materials such as metals, glass, and plastics. These materials also have to be mined, made or recycled.'

The need for scarce and precious resources, notably rare earth metals, pushes the frontiers of extraction further and generates novel geographies of raw materials appropriation (Massari & Ruberti, 2013). Here, in geographically liminal areas, people work in miserable environmental conditions with limited or no control over safety standards. At the end of life, hardware recycling, disposal in landfills and disassembling areas all impact on the environment with limited acknowledgement of it (Krumay & Brandtweiner, 2016). Awareness of the harmful consequences of high-technology production processes on workers and the environment is still nascent, while digital consumerism adds mountains of toxic electronic junk around the world (Smith, Sonnenfeld & Pellow, 2006; Pickren, 2014; Schmidt, 2010; Kamiya, 2020).

Social contradictions of digital sustainability

The unprecedented availability of information, access opportunities and public engagement channels allowed by digital connectivity has been welcomed as a way of fostering democratic values of participation and justice, inherently connected with sustainability. This potentially advances awareness of climate and socio-environmental problems while offering possibilities to scale up effective solutions, such as car-sharing, proximity recycling networks and food waste prevention.

However, despite digital participation processes' promise to broaden the public space, they have negative effects in terms of the quality of engagement and democratic debate (notably via the promotion of tokenistic forms of participation, as 'clicktivism'; Frost, 2020). Moreover, the digital public sphere is characterised by different levels of participation from diverse social groups whose power asymmetries, along with the notorious technological gap effect (i.e. the new uneven geographies of production and use of high-tech devices; Gabrys, 2013), reverberate in decision-making processes (Mohan, 2001; Platteau, 2008).

The digital revolution, in fact, has arguably restructured power geometries between cities and citizens (de Wall, 2015). It characterises a major fracture between those that are in a position to control and modify the codes that govern our social (and private) life, those who passively use them and those who have no access to digital devices and infrastructure at all. The resulting digital divide (van Dijk & Hacker, 2003) is not limited to access to technological infrastructure and devices but is connected with cultural and social barriers such as digital literacy, education and language issues (Norris, 2003; Selwyn, 2004; Warschauer, 2004). Critical research has already documented power imbalances associated with the monopolistic appropriation of technological solutions and infrastructure control (Caprotti, 2015); with data and opinion manipulation (Nielsen, 2006); and with limitations imposed on the expression of social dissent (Loukis, Charalabidis & Androutsopoulou, 2014; Caulier-Grice et al., 2012). All of these (unintended) consequences of digital participation processes contrast with the design of a shared urban sustainability agenda. For instance, research on 'urban platformisation' documents how digitalisation is widening existing social inequalities and the difficulty of guaranteeing environmental sustainability in the (post-) pandemic city (Richardson, 2020; van Dijck & de Waal, 2018).

These inequalities emerging through digital restructuring of power geometries echo the limited possibilities for local governments facing super-powerful ICT companies. For example, citizens' data is regularly acquired as part of the exchange for providing technical infrastructure, such as smart-grid power installations (see e.g. ENEL X, 2021).

As Steward Brand, one of the gurus of the digital revolution, predicted: 'A society of large tools cannot be democratic, egalitarian, socialistic, humane, and just. It must be hierarchical, exploitative, bureaucratic, and authoritarian. If the day comes when all of humanity's wants can be supplied by a few giant tools, the people who tend them will rule the world' (quoted in Streshinsky, 2018). Predictably, while the digital

revolution was intended to subvert the twentieth century's elites, redistributing access opportunities and voices to the people (Turner, 2006; Cadwalladr, 2013), it ended up generating massive concentrations of economic, financial and political power in the hands of a few private companies. As a consequence, rather than fostering inclusion and collective sustainability-oriented decisions, the digitalisation of the public sphere is creating new enclaves of power (Tomalin & Ullmann, 2019). Power concentration is by default dangerous for sustainability because it undermines transparency, accountability and public control of the operating of internet companies, whose supranational business model makes them able to overcome nation-based rules.

These socially regressive aspects of digitalisation invite us to reconsider sustainability through digitalisation as synonymous with social justice. With the digitalisation, ICT companies exponentially increased their gains, while society got limited economic benefits as most companies pay limited amounts of national taxes and make large use of underpaid and precarious work (Graham, Zook & Boulton, 2013). Not surprisingly, the massive use of web-based services stimulated by COVID-19 lockdowns has been criticised for having disrupted local economies for the sake of big tech companies (Klein, 2020; see Figure 21.2).

Where next?

We cannot accept without question that digitalisation automatically leads to sustainability, however much this idea exists in imaginaries. The most severe phase of the COVID-19 pandemic brought about new hopes for transforming densely populated and polluted cities into hyperconnected hubs with digitally performed operational functions, avoiding harmful impacts in terms of sustainability. Nevertheless, there is nothing inherently sustainable in going digital, despite the fact that we often ignore the ecological costs of digitalisation processes (McLean, 2020). The socio-political consequences of digital capitalism (including the emergence of polarised power geometries, novel social inequities and technology imbalances) reverberate in the city, where issues of ownership, management and use of (hard and soft) digital infrastructures overlap with existing injustices.

Digitalisation is happening in multiple places and at a fast pace, whereas results on the pathway to sustainability are comparatively slower. Facing difficulties achieving progress in reducing carbon emissions, re-naturalising urbanised environments or implementing circular

Figure 21.2 Pisa. A sticker blaming big tech companies (together with international institutions) for their use of the COVID-19 pandemic as a Trojan horse to get more power and increase economic gains. Photo: Chiara Certomà.

economy measures, digitalisation has been seen as a short cut towards lightening the ecological footprint of the city. But like many short cuts, the costs may be obscured, or harder to read over longer periods of time. Are we ready to consider a new awareness (and take action) on the socially and ecologically unsustainable shortcomings of digitalisation?

Note

1. See http://sustainabledigitalcities.net (last accessed 19.08.22).

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