Digital Futures between Domination and Participation: Part 1

A digital future of resilience:
What can we learn from ecological thinking?

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Abstract
Due to the nomadic character of digital technology, digitalization easily crosses the institutional boundaries of modernity, interconnecting everything with everything. However, such hyper-connectivity makes it difficult to trace and explain the broader dynamics of digitalization, which can easily turn runaway and haunt us in the future with potentially catastrophic intensity. A myriad of examples already give testimony to the possibility of such a dire digital future, ranging from the polarization of political discourse through Facebook to the colonization of urban neighbourhoods through Airbnb. In response, I draw on ecological thinking to expand upon possibilities for tracing and explaining the wide reaching, boundary crossing effects of digitalization and the runaway dynamics they may lead to. Yet, while ecological thinking lends itself to critiquing technological attitudes of quick-fixes, colonization, and exploitation, it has yet to demonstrate its potential for guiding alternative practices towards a better digital future. Hence, I will focus on possible avenues for developing such practices by discussing the notion of "resilience" as a guiding principle of digitalization. For this purpose, I will draw on the seven principles of enhancing resilience developed by Biggs et al. (2012) as central categories for a digital future that is more responsive to a world increasingly marked by precarity and crisis.

Keywords
Digital ecology, digital society, political ecology, resilience, runaway dynamics, systems thinking

Introduction

Digital technology has been migrating from the boundedness of formal organization into its institutional and natural environment (Luhmann 1989, Hörl 2017). By doing so, digitalization is becoming ecological, mixing and interweaving with the mounting precarity brought about by the ecological crisis of modernity and by the ideology of infinite growth and technological progressivism modernity is built on (Escobar 2016, Banerjee and Arjaliès 2021). Clearly, such an understanding of digitalization stands in stark contrast to the predominant narrative of digitalization as a sophisticated tool that helps us to fix problems. Yet, as we know from ecological thinking, such a technological quick-fix attitude merely treats superficial symptoms while, typically, ignoring the underlying, root problem (Bateson 2000). As a result, digitalization can end up intensifying existing runaway dynamics rather than dampen them (Márton 2022). In the section that follows, I will outline four telling examples from the literature: (1) the polarization of public and political discourse by social media platforms; (2) the erosion of labour by gig economy platforms; (3) the colonization of local neighbourhoods by digital transaction platforms; and (4) the technological quick-fixing of problems, as is increasingly the case with AI.

In response to these runaway dynamics, I will draw on ecological principles to explore how such runaway dynamics may be dampened in order to imagine a more promising digital future. In more detail, I will conceptualize such a digital future as a future marked by resilience or the capacity to adapt to complexity and surprises. For this purpose, I will draw on seven principles on how to enhance resilience developed in ecological research so as not to only critique the harmful dynamics of digitalization but to also explore alternative guidance towards a better digital future.

Nomadic digital technology

As digitalization is transforming societal patterns (institutions, practices, processes and so forth), it is, at the same time, increasingly interconnecting the entire range of planetary (and also beyond) existence (Nail 2021). Take, for instance, the central role computational data and automated algorithms play in contemporary society, ranging from political discourse, economic activity, and warfare, to privacy, friendship, and intimacy (Van Dijck, Poell et al. 2018, Burrell and Fourcade 2021). By the same token, digital sensors are released into wildlife habitats, such as forests and oceans, to better capture their developments for, amongst other things, the purpose of environmental protection and preservation (Adams 2019). It is in particular with the migration of algorithms and sensors into, what typically would be referred to as, "the environment" (be it in the sense of the natural environment or institutional environment of social organization) that digital technology demonstrates its capabilities to travel across conventional, modernistic boundaries of nationality, industry, formal organization, life-world, mind, and body (Weizman 2006, Márton 2022). Digitalization, in other words, has become ecological, demonstrating what Hörl (2017) refers to as the technoecological condition of our time – a condition

where the distinctions between nature, technics, and mind disappear, replaced by a conceptualization of ecology as a non-modern epistemology based on relationality, multiplicity, and heterogeneity or rather "togetherness", to put it into one word (Simondon 2012, Tsing 2015).

Digitalization becoming ecological can be explained, in parts, by the kind of nomadism (Deleuze and Guattari 1987), which has become a characteristic of contemporary digital technology (Kallinikos, Aaltonen et al. 2013, Mousavi Baygi, Introna et al. 2021). This is not to say that other forms of technology are not capable of nomadism. Case in point, of course, is the pollution caused by exhaust emissions and plastics or contamination caused by radioactive leakages (Beck 1996, Kalonaityte 2018). Yet, there is, by now, a crucial difference in the sense that digital technology increasingly demands to be nomadic by design for it to be able to function and indeed evolve. Take the latest developments in machine learning for self-driving cars, which needs real-life data about actual traffic to train respective neural networks and, ultimately, to develop full self-driving capabilities (Smith 2019). It is for this reason that Tesla, for instance, relies on its customers to not only collect as much data as possible by driving their cars but, more importantly, to also beta-test the latest full self-driving version for Tesla's neural networks to be trained. Thus turning everyday life into a laboratory for experimentation and development (Marres 2017), the migration of digital technology is not an accident (Perrow 1984) or an unintended consequence (Luhmann 1993) any longer (as is the case with, say, nuclear or bio-tech), but indeed a necessity (Waardenburg, Huysman et al. 2022).

Arguably, this characteristic nomadism is due to a unique combination of three capabilities that sets digital technology apart. To begin with, in addition to automating processes (not unlike mechanical machinery), digital technology is able to "informate" processes (Zuboff 1988). This is typically addressed under umbrella terms such as data- or information-processing, which is, most notably, used in formal organizations for purposes of command and control, decision-making support, and others (Kallinikos, Hasselbladh et al. 2013, Ens, Hukal et al. 2023). Second, digital technology also serves as a variety of communication media, ranging from transmission protocols to symbolic media, such as email and video chats, all relying on binary bitstrings of 0s and 1s (Márton and Mariátegui 2015, Beverungen, Beyes et al. 2019). It is also in this sense that, going back to above-mentioned diffusion of sensors into our biosphere, digital technology, as it were, can give voice to ocean and atmosphere through the data we collect via those sensors (Latour 1993, Hörl 2017). Third and final; digital technology has the capability to exploit labour and thus to extract and capture value (Ekbia and Nardi 2017, Ens and Márton 2021). Digitalization, therefore, is to be seen in terms of its political economy and as the successor of industrialization rather than as the mere diffusion of artefacts (Zuboff 2019).

Following the combination of these three capabilities and the kind of intentional nomadism it brings about, digital technology becomes, if you will, injected into all niches of planetary existence, irrevocably transforming its patterns (Simondon 2012, Hörl 2017). And it is this transformation of

patterns that I refer to and mean to explore, when I use the term digitalization; that is, to put it in more abstract terms, to understand how digital technology changes the patterns of change – or how change changes (Deleuze and Guattari 1987, Bateson 2000, Mikołajewska-Zając, Márton et al. 2022). For this purpose, I will now turn to some of the well-known, problematic examples for illustration.

Runaway dynamics of digitalization

Critical inquiry into the dynamics of digitalization has highlighted a wide variety of problematic developments, which typically refer to runaway patterns of exploitation and colonization (Van Dijck, Poell et al. 2018, Zuboff 2019, Mikołajewska-Zając and Márton 2022). The following runaway dynamics are examples most relevant for the sociological study of digitalization:

The first and probably best-known runaway dynamic is the polarization of public and political discourse brought about by predominantly for-profit, corporate social media platforms (Whitten-Woodring, Kleinberg et al. 2020). The main driver is the underlying business model to maximize user engagement and then to sell the attention of their users to advertisers. This is accomplished by designing respective apps such that users become addicted to them, but also by presenting users with personalized content algorithmically predicted to enrage them, triggering escalating engagement on social media (Harris 2016). Case in point is, of course, Facebook, which has been regularly accused of fuelling the polarization of political discourse – the most disturbing being its involvement in the rising tensions in Myanmar, resulting in the genocide of the Rohingya minority (Amnesty International 2022).

Second, runaway erosion caused by, for instance, the so-called gig economy and its singular focus on disaggregating the kind of work, which used to be done by a salaried employer as part of their job, into tasks (or gigs) coordinated by digital platforms (Arendt 1958, Márton and Ekbia 2021). Thus, those platforms take over the role of management, putting them into a dominant position of dictating the labour conditions of their giggers (Kost, Fieseler et al. 2020). For instance, as the social shopping platform Poshmark scaled to tens of millions of users, it became overcrowded by sellers who ended up in a pattern of erosion, as they (due to the ways the platform was designed) had to put more and more work into promoting their goods for fewer and fewer sales (Ens and Márton 2021).

Third, complementing above pattern of erosion, digitalization can also lead to a pattern of dependence and colonization (Tsing 2015, Mikołajewska-Zając, Márton et al. 2022). In the gig economy, for instance, workers may become dependent on their income from gig economy platforms, shifting their status from working on those platforms to working for those platforms (Kost, Fieseler et al. 2020). A more telling example, however, is how entire neighbourhoods become dependent on Airbnb. Simply put, the dynamic is a particular kind of gentrification; since it is more profitable to rent out short-term on Airbnb, the prices for long-term rentals and, crucially, the total costs of living increase until locals

cannot afford to live in their own neighbourhoods anymore and are forced to leave (Wachsmuth and Weisler 2018). Furthermore, those locals who own property end up having to rent out on Airbnb and local shop owners end up having to cater to tourists to make ends meet.

The fourth and final example; when used to technologically quick-fix a problem (rather than to address the underlying root causes), digitalization can end up merely shifting the symptomatic stress, caused by the problem, thus making the problem worse as well as creating new problems (Meadows 2008). Couchsurfing, the platform matching travellers with hosts offering free accommodation, was a technological quick-fix to make tourism affordable for the less well-off (such as students), which, going back to above pattern of dependence, laid the groundwork for profit-maximizing corporations such as Airbnb (Mikołajewska-Zając, Márton et al. 2022). A more disturbing example, however, is the way artificial intelligence is indiscriminately used as a quick-fix for all sorts of societal woes, supposedly introducing more objectivity into decision-making while, in practice, reifying existing prejudices and injustices or even creating new ones (Bridle 2022).

Ecological epistemology

Since runaway dynamics, as exemplified above, do not stop at modernistic boundaries, such as those of nations or formal organizations, or even those separating public from private or the natural from the socio-cultural, they call for an ecological style of thinking to trace, study, and mitigate their effects (Bateson 2000, Meadows 2008, Márton 2022). In this sense, ecology does not refer to merely environmental protection (it is however a logical outcome of it), but to a more fundamental engagement with patterns of relationships without drawing "an arbitrary line between organism and environment [and] without stopping at species, mechanical or linguistic boundaries, and especially without invoking a reified conception of society" (Star 1995).

Historically, of course, ecology has been typically understood as the biological study of life on earth since roughly the mid-19th century; expanding from the study of plants and animals to, now, including all biotic forms and their non-biotic environments, such as calorie food chains and the planetary climate (Pickett and Cadenasso 2002). This naturalist ecology, however, considers human activity as a separate, social domain and, therefore, its impact on the ecological as exogeneous to nature (Stewart 2000/2011). The interaction between these two domains, the social and the natural, is then subject to socio-ecological research (Stokols 2018).

By contrast, the kind of ecological thinking I am drawing on, is an epistemological disposition diametrically opposed to modernistic reductionism. Ecology is not the other from the social (and technical), but an interconnected and transversal way of thinking—a non-modern ecologic (Luhmann 1989, Guattari 2000, Baecker 2007). Humanity (whatever that may be) is therefore not just living *in a*

world (that serves as a passive stage for humanity to act on) but is an inextricable, intimate *part of the world,* which does not only include the human body or the food we eat but, crucially, also human ideas, institutions, and artefacts (Bateson 2000). In more abstract terms, as nature cannot be seen as something pure, untouched by humanity (Shotwell 2016), ecology becomes deterritorialized from nature (Haraway 1991, Hörl 2017), connecting patterns we call biotic, abiotic, social, mental, and mechanical into wider patterns that are without inherent, natural boundaries and dichotomies—including those that artificially and arbitrarily isolate humanity and its technology from nature (Star 1995, Márton 2022). A computer or even pollution, in other words, is just as natural as a tree (Tsing 2015, Nail 2021).

Ecological resilience

Understanding digitalization ecologically (that is, without imposing an ontological separation between the social, the technical, and the natural) means to trace its dynamics and effects regardless of where they lead. For instance, one can trace the ecology of social media as a pattern connecting corporate business models (e.g. ads-based revenue streams), platform functionalities (e.g. algorithmic content curation), and app designs (e.g. addictive interfaces) with sleeping patterns (e.g. doomscrolling), body self-images (e.g. body dysmorphia), and mental health (e.g. depression), and then again with, say, labour (e.g. exploitation of attention), public discourse (e.g. conspiracy theories), and warfare (e.g. propaganda), and on and on and on with no end (Márton 2022). Conceptually speaking, ecological thinking is, therefore, not concerned with boundaries in the sense of walls or skin; instead, it is concerned with limits in the sense of capacities and how ecological patterns change when those capacities are pushed or even breached (Meadows 2008). Viewed in such terms, ecological research has shown that so-called *ecological resilience* is a crucial capacity and needs to be protected from erosion, as runaway dynamics undermine the resilience of ecosystems – the green-house effect being the paradigmatic example (Holling and Meffe 1996).

A helpful point of departure is to first clarify the ecological understanding of resilience by contrasting it with robustness, with which it is usually conflated (Folke, Carpenter et al. 2010). Robustness (sometimes also referred to as "engineering resilience") can be defined as the capacity to resist change and to "bounce back" from environmental jolts. Hence, a robust system can become too inflexible or even too brittle, which may lead for it to break, if the demands for change (such as a catastrophe) surpass the capacity of the system to resist it. Thus conceived, robustness is desirable in situations that require predictability and stability - a fail-safe system (that is a system that must not fail), as is the case with, say, a bridge or bureaucracy. By contrast, resilience (sometimes also referred to as ecological resilience) is the capacity of a system to adapt to change, particularly in situations of major crisis. Hence, a resilient system is able to learn from a crisis to better cope with similar crises in the future in order to become a "safe-fail" system (that is a system that is safe to fail).

Given its focus on control and domination, modernity has favoured robustness over resilience in order to maximize predictability and stability (Beniger 1986, Holling and Meffe 1996). In this, technology plays a crucial role, as it is utilized by modernity and its formal organizations to engage in one-sided and non-reciprocal (that is technological) relationships for purposes of colonization and exploitation (Arendt 1958, Marx 1961). The same can be said about digital technology, of course, as big-tech corporations utilize, for instance, digital platforms for the same purposes (Roberts and Zietsma 2018, Ens and Márton 2021). The runaway dynamics of digitalization, I outlined above, are then nothing but the probably unintended but by now unsurprising outcomes of this harmful urge to make the world predictable and stable, or in other words robust. Take the colonization of local neighbourhoods by Airbnb mentioned above (Wachsmuth and Weisler 2018), by which those neighbourhoods lose their uniquely local flair to fit the demands of the platform; as a result, they become homogenized and, not unlike a monocultural field of crops, overspecialized to meet the global demand of Airbnb tourist until they are too brittle to adapt to crises, such as the Covid-19 pandemic (Mikołajewska-Zając and Márton 2022).

Being diametrically opposed to this modernistic urge to engineer robustness (to maximize predictability and stability), ecological epistemology and related research has focused on resilience as a more appropriate concept for dealing with the complexity of the contemporary world and the ecological crisis it has to cope with (Holling and Meffe 1996, Nail 2021). As part of that effort, a comprehensive literature review by Biggs, Schlüter et al. (2012) contributed seven principles for enhancing ecological resilience, which are (slightly changed to keep the paper's terminology consistent): (P1) maintain diversity and redundancy; (P2) manage connectivity; (P3) manage slow variables and feedbacks; (P4) foster systems thinking; (P5) encourage learning and experimentation; (P6) broaden participation; (P7) promote polycentric governance. In the following, I will demonstrate that these principles can also apply to the runaway dynamics of digitalization, providing some guidance towards how we can build a better digital future.

A digital future of resilience?

While digitalization has received considerable critique with regards to its troubling implications (Van Dijck, Poell et al. 2018, Zuboff 2019), it is difficult to find guidance on how to mitigate those implications that does not fall for some sort of technological progressivism, in the sense that the solution to our technologically caused problems is more technology (Parker, Choudary et al. 2016), and accounts for the complexities of digitalization and the runaway dynamics it triggers, which cannot be managed by regulatory organisations alone (Holling and Meffe 1996, Márton 2022). It is against this backdrop that I will, in this section, draw on above mentioned seven principles (Biggs, Schlüter et al. 2012) to elaborate on how aiming to enhance ecological resilience can provide such helpful guidance.

Principle 1: maintain diversity and redundancy

Diversity, as a concept, refers to the variety of elements (such as species and institutions or, in terms of this paper's ecological epistemology, relationships and patterns), how balanced that variety is, and how different the elements are (Biggs, Schlüter et al. 2012). Redundancy, in a sense, is a counter-weight to diversity, as it provides for the ability to compensate for failures by having one element jump in for another (Biggs, Schlüter et al. 2012). Both are important for resilience, because they provide, as it were, a reservoir of potential solutions (ideas, innovation) for unforeseen problems – or a budget of flexibility, as coined by Bateson (2000). In functioning (that is resilient) democracies, for instance, it is indispensable to have a diversity of ideas and democratic institutions that can compensate for each other's failures (Bjola and Papadakis 2020).

A relevant example for the loss of resilience is the current state of the World Wide Web, as it has evolved from an open ecology of ideas to a closed monetization and marketing machine divided into the "walled gardens" of big-tech corporations and governments (Van Dijck, Poell et al. 2018). As a result, the diversity of the Web has eroded to give way to the blitzscaling of digital platforms (such as Google, Facebook, OpenAI, and many others) and their maximization for profits. This brings with it the real danger that the Web becomes overly specialized, eroding its resilience. To counter this development, it would require supporting the smaller niches of the Web, exactly because they are not (successful) like, say, Google or Microsoft and, thus, provide spaces for experimentation and reservoirs for potential alternatives (Mikołajewska-Zając and Márton 2022). Ecologically speaking, a successful Web is not about maximizing any single variable (be user numbers, profitability, or others) but about balancing diversity with redundancy.

Principle 2: manage connectivity

Connectivity refers to the ways and degree to which dispersion, migration, and interaction takes place across an ecosystem (Biggs, Schlüter et al. 2012). Hence, connectivity is important for resilience, as it impacts communication and coordination to better cope with and recover from perturbations or crisis. Yet, too much connectivity is detrimental to resilience, since it allows for undesirable local events to spread across an ecosystem quickly and with ease, as is the case with a local virus infection becoming a global pandemic (Holling 2001).

When it comes to digitalization, an all too obvious example is the technological mantra of Silicon Valley (and its disciples around the world) to reduce as much friction as possible (i.e. the best step is no step) and to maximize connectivity at all costs (Harris 2016). Take, for instance, the hyperconnectivity promoted by social media platforms, such as Twitter, but also by Just-In-Time supply chains, maximizing their efficiencies with digital technology so that we can get an Amazon delivery within a

few days rather than weeks (Márton 2022). To enhance resilience, however, would require to counter this narrative of hyperconnectivity in favour of more moderate connectivity (Bjola and Papadakis 2020).

Principle 3: manage slow variables and feedbacks

Keeping an eye on slow changes and feedback is essential, because they can gradually build up towards a tipping point over time, resulting in sudden changes and regime shifts (Biggs, Schlüter et al. 2012). Climate change is a telling example, as we are worrying that the build-up of, say, air pollution and related feedback loops (such as the greenhouse effect) will inevitably result in a drastic regime shift of the planetary climate (Nail 2021). At the same time, it may also be desirable to induce a shift, when a regime is too invested in maintaining an unsustainable development, such as a dictatorship (Holling 2001).

This principle is, arguably, the least researched (and because of that probably the most important one) in terms of digitalization (Márton 2022). This is due to digitalization predominantly linked to speedy innovation and the ideology of creative destruction (see Facebook's motto to move fast and break things), making technologists, policymakers, and researchers alike disregard the slow variables and feedbacks of digitalization, which, as we know from climate change, will come back to haunt us (Meadows 2008). In a sense, what is required is the equivalent to the study of the planetary climate but for the climate of our information ecology.

Principle 4: foster systems thinking

As resilience is generally considered to be the capacity of an ever-evolving, systemic whole (such as an ecosystem), it also requires fostering systems thinking when it comes to managing and enhancing resilience (Biggs, Schlüter et al. 2012). By doing so, one accepts the uncertainties that result from engaging with a complex world, demanding an adaptive management approach that, as it were, rolls with disturbances and surprises rather than a command and control approach trying to prevent them (Holling and Meffe 1996). At the same time, such engagement with complexity can be overwhelming, especially when it calls for a radical shift in mindset (Meadows 2008).

The discourse on digitalization (public, scientific, policy, or otherwise) is dominated by a focus on social actors and technical artefacts, be it how large-scale corporations are running the world and how they need to be regulated (Zuboff 2019); or how mobile phones are hijacking our attention (Terranova 2012). A broader, holistic view on digitalization, which, as argued above, does not merely attend to the immediate human-computer or society-technology interface, but to the ecology of digitalization, attending to concerns of diversity and redundance, connectivity, and slow variables and feedbacks, in

order to enhance the resilience of our information ecosystem as a whole (Márton 2022). To return to the example of World Wide Web as such an information ecosystem, the concern would be about how to enhance the resilience of the Web as a whole rather than of individual actors (e.g. corporations) or populations (e.g. users) (Mikołajewska-Zając, Márton et al. 2022).

Principle 5: encourage learning and experimentation

Understood as modifying existing or acquiring new knowledge (individual and social), learning is essential for resilience, as one's knowledge is, by definition, always incomplete and therefore needs to be constantly revised in the face of disruption and surprise (Biggs, Schlüter et al. 2012). Learning, thus conceived, also includes double- and triple-loop learning – or learning how to learn and a theory of learning (Bateson 2000). In this context, experimentation serves to trigger and facilitate learning and to discover blind-spots (such as unnoticed slow variables) but can also fall victim to short-term thinking and power dynamics asserting special interests and misrepresentation (Waardenburg, Huysman et al. 2022).

While digitalization owes much of its dynamics to early hacker culture and their experimentation (Turner 2006), it has become, as it were, domesticated by corporate profit interests and governmental administration and surveillance (Van Dijck, Poell et al. 2018). The last and therefore important vestige worth protecting is, of course, the open-source movement, which has maintained this notion of hacking and experimentation, its potential forcefully demonstrated by Wikipedia and Linux (Benkler 2006, Lindman 2014). However, such an attitude of being open to experimentation or, in broader terms, surprises also challenges the predominant approach to policy and regulation of trying to prevent surprises and thus to have more predictability or rather robustness (Mikołajewska-Zając and Márton 2022).

Principle 6: broaden participation

Central to the facilitation of collective action, diversifying and broadening participation enhances legitimacy, monitoring, sanctioning, learning, and more (Biggs, Schlüter et al. 2012). In this sense, broadening participation improves resilience, because it serves as a catalyst as well as outcome of all previous principles; at the same time, however, it can lead to more disagreements or even conflicts between stakeholders, who may also be in it for short-term gains rather than long-term resilience (Sunstein 2006).

Not unlike the point made in above principle 5, participation in digitalization has been narrowed down drastically to corporations and governments (Van Dijck, Poell et al. 2018). Importantly, participation

must not be conflated with being a mere user of a digital service. In this sense, social media platforms, for instance, are highly inclusive in the sense that anybody can join by default as a user (and exclusion happens ex-post by, for instance, closing accounts), but they are not inclusive in the sense of political participation (Ekbia 2016). To counter such exclusion of participation, there are movements demanding to (re)decentralize the internet away from the walled gardens and gated communities of corporate and government platforms (Verborgh 2020).

Principle 7: promote polycentric governance

Polycentric governance, that is the exercise of deliberation and decision-making, which can facilitate, for instance, variety and redundancy, learning and experimentation, and participation, as it helps to distribute knowledge and allows decision-making, as it were, close to the problem; at the same time, however, polycentricity may also serve power asymmetries, allowing powerful elites to externalize negative effects, as is the case when countries determine policies on a national level but do not account for the impacts of those policies beyond their borders (Biggs, Schlüter et al. 2012). In particular, polycentric governance provides an institutional structure suitable for a complex, heterogenous, and ever-surprising world (Ostrom 2010).

Given the complex dynamics of digitalization, it is safe to assume that polycentric governance would provide institutional support for resilience. Take, for instance, the treatment of computational data more as a common pool resource, which then calls for a polycentric governance structure as the only known way that has the requisite complexity to deal with the complexity of digitalization; an increasingly urgent debate to be had, given the recent rise and diffusion of AI (Benfeldt 2020, Waardenburg, Huysman et al. 2022).

Conclusion

Driven by the nomadism of digital technology, digitalization is radically increasing the complexity of the world (and beyond) and with it the challenges of coping and regulating this complexity. This increase, I argued, is clearly demonstrated by a variety of runaway dynamics triggered by rampant digitalization – ranging from the polarization of public discourse by social media platforms to the utilization of AI as a quick fix for all our woes. As a response, an ecological epistemology is a helpful approach, as it allows to trace the wide-reaching effects of digitalization, in particular the kind of runaway dynamics I outlined above, connecting across the conventional boundaries of modernity. Viewed against this backdrop, I attempted a first step, exploring how ecological thinking can be helpful to guide digitalization (and our critique of it) towards a more promising digital future. For this purpose, I focused on one of the central categories of ecological thinking – resilience – to conceptualize how

such a digital future may be understood by drawing on well established principles of enhancing resilience from ecological research. Hence, a digital future is a future that understands digitalization as a way to enhance resilience by caring for diversity and redundancy, connectivity, slow variables and feedbacks, systems thinking, learning and experimentation, broad participation, and polycentric governance.

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