Chapter 3
Commodities or collectives? The fight over the future of technology

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Introduction

One cannot think about the future of human societies without considering the place of technology in it. As a species, after all, we are in a sense cut from the same cloth as our technologies, making it pointless to try to separate the social and the technological. But how should we think about technology as we try to imagine its future? What perspective should we adopt? Many options present themselves. They include the *functional* (what role and purpose does technology serve?), the *social* (how does technology mediate different spheres of social life?), the *historical* (what does the past of technology teach us about its future?), the *feminist* (how can technology enable an ethics of mutual care and support?), the *phenomenological* (how does technology shape human subjectivity and life forms?), and, with an eye on pandemics, perhaps even *epidemiological* (how can we use technology to compose human societies on a planetary scale?). There may of course be others.

Each of these perspectives has its own merits, but for the purposes of the present discussion it might be best to go with the 'social' perspective, because it would give us the insight that a forward-looking approach demands, while also giving us a handle on those other perspectives. In what follows, I will focus on socio-technical mediations, outlining a few basic lessons that we have learned about technology in recent times.

1. First lesson: technologies are not mere tools, nor are we mere fools

Let us concentrate, then, on how technology might *mediate* different spheres of social life. I understand 'mediation' here as an act, a process that 'gives rise to categories and classes, words and things' (Bowker 2010: 725). Technology thus mediates in the sense that it gives rise to 'things' as well as the 'words' we need to talk about those things. The two are tightly interconnected. In fact, technology itself emerges as a mediation among human beings and between them and their environment. Computing technology, as we know it today, for instance, has been shaped incrementally as a response to the socio-historical, political and economic developments of recent times, especially by the demands of the embedding capitalist system. It has, in turn, given rise to cell phones, laptops, GPS, NFT, tweets, chat bots, digital photos, armed drones, sex robots, cryptocurrencies, and a million other things, along with their names and numerous other words to talk about what we do with these things: texting, emailing, speed trading, remote therapy, telework, cyberwars, sexting, hacking, cyberbullying, online

dating, banking and shopping, and all manners of other activities that were unheard of just a few decades ago.

The term 'mediate' is central here because it pre-empts two common deterministic fallacies, social and technological. Social determinism tends to assign too much credit to human subjectivity, turning technologies into mere 'tools', while technological determinism does the opposite, turning human beings into mere 'fools', who are increasingly willing to turn their agency over to 'smart' machines. Technological determinism is especially paramount and prevalent in discussions of the relationship between technology and so-called social 'problems'. Technology, in many such discussions, is portrayed as either the source of all troubles or their solution. Both perceptions are flawed. Technology on its own is neither the *cause* nor the *cure* for our social predicaments; it can neither *enslave* nor *liberate* us from our worst instincts and institutions. Rather, it mediates our relationships with each other and with our surrounding environment.

Our first lesson, therefore, is about our relationship to technology. We are not mere fools to easily fall for anything that technology will bring about, but nor are technologies mere tools that can be forged and folded at will. Technology, as Melvin Kranzberg (1986) showed, 'is neither good nor bad; nor is it neutral'. With that lesson in mind, the question now facing us is, what will technology bring about a few decades from now? How is it going to mediate our future? And how should we prepare for that future?

2. Second lesson: technology is indispensable, but not inevitable

The most accurate and honest response to this question is, 'nobody really knows'. This is because of the common fallacy mentioned earlier — namely, determinism. The deepest truth about technology, other than the fact it is an indispensable part of who we are as a species, is that there is nothing *inevitable* about its path of development. As Stanislav Lem (2013) reminded us, the most interesting thing about technology is how unpredictable it is. Existentially indispensable, but historically contingent; immanent in form, but opportunistic in substance; that is the paradox of technology, its elusive beauty, if you will.

We don't know much about the history of early technologies – fire, the wheel, even language – to demonstrate this paradox in action, but even here we do see a strong element of accident and contingency in their creation. Think of fire, for example, which took millions of years to be harnessed and preserved by early hominins from its natural occurrence. Mounting archaeological evidence shows a strong element of opportunism at work here (Gowlett 2016). Similar accounts can be given of other early technologies.

We know more, however, about the history of modern technology to see the unravelling of the paradox in action. Take any example of a modern technology and you will notice that things that seem indispensable to modern life could easily have been otherwise. Thomas Boyle's air pump is an early example in which hindsight provides us with a clear understanding of the slow adoption of technology, but also of the road not taken.

In order ultimately to be adopted, the technology of the pump had to be reinforced by the literary and social technologies (such as the blessing of the Royal Society) that legitimated its products and its uses (Shapin and Schaffer 1985). Electric power, similarly, could easily have been distributed in a decentralised manner as opposed to the centralised grid that prevailed at the end. The fact that it didn't was as much an outcome of economic and political power as anything else (Hughes 1993; Sawhney and Ekbia 2022). The same can be said of the computing wars of the 1980s, Blue-ray versus DVD, fossil fuels and renewable energy, and other 'battles of dominance' between rival standards (Suarez 2004).

And it is not as if the winning technologies in each of these cases were necessarily superior or the 'fittest' among alternatives. Darwinian selection doesn't work in the 'evolution' of technology (Noble 1984). Fights have to be fought, resources mobilised, allies recruited (and, more often than not, betrayed), political muscle exerted, Potemkin villages set up, public images managed, and so forth. The path of technology development is contingent, contentious, messy, political and uncertain.

This is our second lesson in thinking about the future of technology. While technology is an indispensable part of human life, there is nothing inevitable about its trajectory of development. Things can be steered in different directions through policy, regulation, action, participation and resistance.

3. Third lesson: the earth is the limit, not the sky

While we have great discretion in shaping the future trajectory of technology, there are limits to what we can do. These limits can take different forms — social, material, political — but keeping them in mind is imperative for our thinking.

Materially, we have to start with the most neglected fact about technology in Silicon Valley, namely, the limited resources that our globe, despite its rich abundance, can make available to us. The current magical thinking about what AI and computing can supposedly do should not distract us from this basic fact. Machines are deeply physical in character, and the current push toward virtuality cannot ignore this. 'Online retail' stores such as Amazon are a case in point. With hundreds of distribution centres around the globe, a fleet of thousands of vans, and server farms that consume the equivalent of a midsize town in energy, Amazon's operations are as physical in character as retailers of the late nineteenth and early twentieth centuries (Ensmenger 2021), not to mention the thousands of employees who work in the so-called 'fulfilment centres' under harsh working conditions (Ekbia 2023).

Socially, for technological projects to be actualised, human skills and ingenuity, institutional resources, cultural practices and action repertoires have to be mobilised at various levels and scales. Throughout human history, no major technological breakthrough has been accomplished without the mobilisation of these variegate components, whether it was the Great Wall of China, the Egyptian pyramids or the Suez Canal or more recently the Manhattan, Soyuz or Apollo projects.

The political will that provides the momentum behind these projects is as important as the material and social resources. While in the past, that political will was often exerted by the power of the sovereign at the expense of the masses (slaves, serfs, proletariat, taxpayers), future mobilisations of power for technological development do not have to follow the same pattern. Rather, it can emanate from those same masses who in times past were largely left at the margins of history.

Our third lesson therefore is to take seriously the material, social and political constraints of technology development, but also alternative ways of dealing with those constraints. Notwithstanding technological escapism driven by the futuristic fantasies of Silicon Valley billionaires about colonising other planets, in the foreseeable future we will be bound by the limited resources available on our globe, whether they be energy sources, or rare earth minerals and other crucial elements. In this light, the current enthusiasm for battery-driven electric cars, for example, needs to be checked against the reality of the limited amount of lithium available on earth. This hard fact is often either brushed under the carpet or may give rise to military force instigated by dominant elites.

4. Fourth lesson: the main culprit is the profit motive, not efficiency

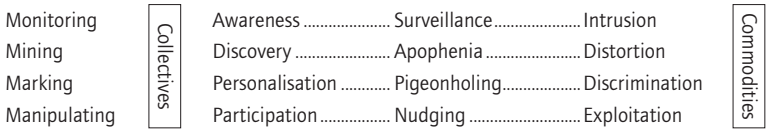
What end should technology serve in a future that is meant to work for the majority of human beings, as opposed to a select few? To address this, let us ask about what ends technology is currently serving. Understandably, there is no single answer, as there are many such ends, but broadly speaking current technology serves the ends of the embedding socio-economic system in which technology is developed, disseminated and used, namely, capitalism. Capitalism is a system that is ultimately driven by the *profit* motive, its bottom line. It is the profit motive that has established *brute efficiency* as the main criterion of technical evaluation in modern times. The road from Adam Smith's pin factory through Frederick Taylor's scientific management to the current harsh conditions at Amazon warehouses and Tesla manufacturing plants has been paved with increasing layers of profit-driven techniques of brute efficiency enhancement. Inherently, efficiency is not a negative measure that should be frowned upon. The main culprit here is profit, *not* efficiency.

The rise of machine learning techniques illustrates this point vividly. Broadly speaking, machine learning can be understood as a process in four stages: monitoring, mining, marking and manipulation. At the *monitoring* stage, data are collected about entities (objects, events, individuals, behaviours, and so on) in an environment increasingly equipped with sensing devices and information-gathering techniques, from health trackers and mobile technologies to closed-circuit cameras and online services. The vast amount of data collected through these mechanisms is aggregated and *mined* to identify patterns that are otherwise hidden from direct human perception. These patterns are then used as the basis for sorting those same entities that served as original sources of data, pigeonholing and *marking* them as belonging to certain relevant categories. Finally, these markings are in turn used to target and *manipulate* the behaviour of the

entities in ways imagined or desired by the developers and proprietors of algorithms. The cycle is repeated, feeding back on itself in the incessant four-stage process outlined here.

This generic process often works fine when applied to areas such as drug discovery, where hidden patterns of interaction between living cells and chemical compounds can be discerned much more effectively through machine learning techniques. One example was the 'repositioning' of a compound called 'ebselen', originally developed to treat stroke survivors, which has received new attention as a treatment for people with bipolar disorder (Nosengo 2016). The story is more complex, however, when it comes to human beings and their social behaviour. Rather than taking a predictably harmless form, the application of machine learning techniques in these areas can lead to a range of possible outcomes throughout the four stages described above. We can apprehend this range as a spectrum at the left end of which are possibilities for awareness, discovery, personal empowerment and participation, while at the right end are possibilities for intrusion, distortion, discrimination and exploitation. This is, therefore, a spectrum between collective growth and rampant commodification of human life. In between these two extremes, there is a broad range of possibilities, the midpoint of which might be captured by terms such as surveillance, apophenia (finding patterns where there are none), pigeonholing and nudging (Figure 1).

Figure 1 **Spectrum of possibilities in different layers of machine learning**



In the current socio-economic environment, driven by the profit motive, big data and machine learning have largely pushed things to the right side of the spectrum on all of these layers, turning data into the 'new oil' and human beings into data tokens that are made legible for manipulation by modern systems such as advertising, political campaigns, policing, and so forth. Critiques of these trends in recent years have highlighted their risks and downsides, including issues of privacy, algorithmic bias, opacity, discrimination, surveillance, and so forth. These, as I hope to show here, are linked issues, and they need to be tackled in a conjoined manner. In particular, the undue focus on privacy and surveillance, based on a liberal model of individual autonomy, tends to be narrowed down to the tip of the iceberg, distracting us from the deeper underlying issues. A first step in that direction is to go back to the driving engine behind all this, namely, the profit motive.

There are different ways of understanding the strong presence of the profit motive in human affairs, but one common explanation is that human behaviour is driven by a combined desire for the acquisition of money, power and prestige, an instinct that appears to have been entrenched institutionally 'for the foreseeable future as symbolic of what is considered a desirable economic order' (Bornemann 1942: 235–236). A century ago, John Dewey (1922: 145) described this as a 'a mythological psychology

of instincts behind modern economics'. One hundred years on, with the lessons of Covid-19 behind us, it might be high time to upend the profit motive as the ultimate end of economic activity.

And that is our fourth lesson about the future of technology: the profit motive has largely shaped modern technology, giving efficiency a bad name, and we need to explore alternatives driven by more collective motives.

5. Fifth lesson: the problem is not the throng of data, but the wrong data

To explore alternatives, we need to dig deeper below the surface of privacy and surveillance. The Covid pandemic showed the vulnerabilities of modern societies not just to the prevalence of *improper* surveillance, but also to the absence of *proper* surveillance, to borrow terms from Timothy Campbell (2011). Current academic discourses on control, privacy and 'surveillance society' (for example, Zuboff 2018) overemphasise the risks of the former at the expense of the latter. In this way, these discourses find themselves hand in glove with right-wing populist movements of anti-maskers, anti-vaxers and misinformation driven by rampant conspiracy theories. The issue with current applications of technology is not that a lot of data is collected, rather that the *wrong* data is, such as data on consumption behaviour, entertainment preferences ('engagement') and other information that can be collected about individuals to nudge and coerce them toward the types of behaviour that ultimately serve the profit motive. To avoid these pitfalls, we have to think differently about the challenges posed by new technologies. Various proposals have been put forth recently for dealing with this dilemma and other related issues.

One proposal is to adopt an *epidemiological* perspective on human societies that calls for 'a model of governance based on planetary-scale technological rationalism'. Such rationalism differs from the perhaps more familiar cold-blooded calculative logic, and would allow the human species to 'deliberately compose itself with compassion and reason' (Bratton 2021: 5). The implementation of such rationalism would require, among other things, the development of 'good models' of governance based on an allocentric orientation as opposed to the egocentric models that permeate current simulation and modelling practices. Were we to follow this approach, we have to be wary of the possibility of new forms of centralised governance, with their attendant risks of control, inequality and oppression, only this time on a planetary scale. While it is important for systems of health surveillance to be 'inclusive', counting in as many individuals and communities as possible, it is equally, if not more, important for those individuals and communities to have a say in their affairs.

This is a challenge for humanity going forward, where the old rule of the 'golden mean' might not work anymore. We cannot work our way out of the growing number and frequency of pandemics by *averaging* humanity, for example. We should think about the challenges posed by technology as mounting dilemmas, not in terms of utopian promises and dystopian nightmares. This basic observation is at the root of the current

dilemma facing human societies as regards how to make a proper and positive use of technology, while minimising improper and negative uses. The relevant dilemma here is what to count and what not to count (Ekbia et al. 2015). As William Cameron wrote many decades ago, 'not everything that can be counted counts, and not everything that counts can be counted' (1963: 13).

Another proposal comes from the perspective of 'cosmo-technics', advocating techno-diversity on a par with natural diversity. The idea here is that, rather than understanding technology as a universal phenomenon, we should see it as constrained and enabled by particular cosmologies (Hui 2017). Chinese medicine, for instance, goes beyond the utility and functionality of Western medicine, but it is no less medical in character, according to this view. By the same token, technology can be understood differently from the commonly adopted view that sees it as the liberation of bodily organs or the exteriorisation of memory and cognition. To acknowledge this point would be to acknowledge techno-diversity, allowing us to appropriate modern technologies by giving them new directions, for example, social media platforms designed as structures connecting various collectives rather than atomistic individual subjectivities.

A third perspective calls for a shift of orientation from individualism to collectivism, or more accurately, from one of individuals as given in advance to individuals as produced through social interaction, their autonomy being predicated on collective autonomy. The feminist media scholar Joanna Zylinska (2018) provides a provocative take on this perspective in thinking about the Anthropocene and the current environmental crisis, challenging 'the widespread belief that salvation from the current planetary apocalypse will come from a secularised yet godlike elsewhere: an escape to heavens in the form of planetary relocation, or an actual upgrade of humans to the status of gods via Artificial Intelligence (AI)' (Zylinska 2018: 7). In its place, she proposes a 'feminist counterapocalypse', which accepts as a given the precarity of our current condition in a material sense, but which understands it as 'the condition of being vulnerable to others' (ibid: 55). This leads her to the possibility of a realistic future that would avoid a Hobbesian everyone-is-good-on-their-own, 'while also giving up a fantasy of peaceful coexistence between individuals, species, or systems' (ibid: 59).

I would like to take these thoughts as constituting a fifth lesson for the future of technology, namely, that it should bring about an arrangement based on a whole mutual benefit, meaningful collective ownership and participation in constructing and maintaining socio-technical systems. The problem in the existing arrangements is that the majority of people are turned into passive recipients of technical innovations, while their labour and creativity is used and leveraged for the creation of economic value for powerful players (Ekbia and Nardi 2017).

6. Sixth lesson: fights have to be fought to put technology to proper use

Many things have to change to correct this state of affairs. At the deepest level, as suggested above, our ways of thinking about ourselves as individuals and a species

should be transformed, moving away from liberal notions of individual rights and liberties to more collective notions of mutual care and responsibility. This change of outlook can, in turn, transform our understanding of technology and its place in human affairs — neither as an intrusive outside rival or threat, nor as an almighty and omnipotent saviour, but as an *ally* and support in the betterment of the human condition.

That, of course, is easier said than done, for at least two reasons. First, changing our ways of thinking is going to be a long and tortuous process. The habits of thought that have to be abandoned and replaced have deep roots in centuries of philosophy, culture and tradition. Putting these behind cannot be achieved by fiat, but through patient institutional change and persistent social reform: family practices in terms of gender dynamics, child rearing and mutual care have to change; educational systems must overcome disciplinary siloes, replacing them with genuine multi-perspective theories and practices; media structures and incentives need to be cleansed of commercial sensationalism, focusing instead on the fluid flow of valid information and credible ideas; reparations have to be made to those groups and communities who have contributed to the development of technology but who have not benefited from the fruits of their labour and creativity, and so on and so forth. The most recent manifestation of this phenomenon is so-called 'heteromation', in which the affective, cognitive and social skills of billions of human beings are being channelled and appropriated for the benefit of a few (Ekbia and Nardi 2017).

The second reason change is hard has to do with the entrenched interests that have a huge stake in maintaining the status quo. There is a wide spectrum of such interests that belong broadly to the powerful and the privileged. To convince these vested interests to accept change is not going to be easy. In fact, there is going to be resistance and backlash. Falsehoods will be spread, accusations made, technical obstacles fabricated, economic resources mischanneled, political barriers erected and legal battles launched, ad infinitum.

There are thus going to be fights of at least two kinds: a fight against old habits of thought and a fight against entrenched interests. It is hard to say which of these should take precedence, because they are tightly entangled. But there are going to be fights, nonetheless — and that is our sixth lesson.

7. Seventh lesson: the fight over technology is planetary, not regional

What about the scale of the fights? The current global order has staged technological development along geopolitical lines, casting it in terms of a competitive logic among corporations, nation states and strategic blocs, giving rise to a close overlap between xenophobia and technophobia (Bratton 2021: 30). Future technology, if it is to serve the interests and aspirations of the majority of the global population, cannot follow this competitive logic. It should rather be based on strategic cooperation among communities, nations and regions.

For that to happen, techno-diversity as opposed to techno-dominance should be adopted as the modus operandi of technological development on a planetary scale. Monotechnics are as devastating as monocrops. Here, as in the case of agriculture, old ways of thinking and vested interests are going to uphold resistance, calling for struggles on a global scale. Those struggles cannot be fought in the same way as they were fought in the nineteenth or twentieth centuries, narrowly defined between global capitalism and the international proletariat. Rather, broader coalitions have to be established among various social groups, including the working classes, ethnic and religious minorities, environmentalists, gendered oppressed groups, and even some white-collar professionals who are increasingly finding themselves in the precarious condition of current capitalism (as we have seen in recent months).

8. Looking ahead

The lessons outlined above provide a brief sketch of what we have learned from historical experience, especially from the recent pandemic with regard to our relationship to technology. On the surface, these lessons seem to be disparate and disconnected, while at the same time grand in scope. Below the surface, however, there are close relations between these seemingly separate lessons. The truth of the matter is that we cannot deal with technology in isolation from the embedding socio-economic, cultural and political environment that devises, develops, delivers and deploys technologies. To treat these in isolation, as we have seen, is one of the fallacies that has put a great deal of technological work on the wrong track in recent times. To avoid such a fate, we have to start with the very basic premise that we human beings are of the same cloth as our technologies, and vice versa; in other words, our technologies are created in our own image. Once we accept that premise, it would not be hard to see the connections among the lessons laid out above, as sketchy as they might be.

The choice in front of us, ultimately, is whether we want to build future technologies according to a logic of commodities traded in a marketplace or a logic of collectivities engaged in mutual care and support. Commodities or collectivities? — that is the question.

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