

1 TECHNOLOGY FOR THE PUBLIC GOOD: EMERGENT AND DISRUPTIVE

What happens when we take materiality seriously? That's the question asked by a fresh wave of scholarship on the impact that physical stuff has on social relations and social action, a trend seen in the titles of recent books such as *States of Knowledge*,¹ *Human-Built World*,² *New Materialisms*,³ *Materiality and Organizing*,⁴ *Bits and Atoms*,⁵ *Signal Traffic*,⁶ *The Undersea Network*,⁷ and *Stuff of Bits*.⁸ Some conceptual looseness is needed to recognize the complexity of including software, algorithms, and artificial intelligence into our definition of technology alongside websites, zines, and barricades. I am partial, for example, to the Armenian term for material—*նյութական*—which translates to both *corporeal* and also *ponderable*. Thinking about *tools in use* points us back to the “tightly-interwoven relationship between the material and the symbolic” that technology often represents.⁹

Communication is one important use, and communication technologies have long proven critical to collective-action efforts. Yet important and high-visibility technologies like the

printing press, radio, telephone, television, Internet, and mobile devices are but the most visible islands in vast undersea ranges that shape currents flowing nearer the surface. New scholarship on digital infrastructure, undersea cables, artificial intelligence, political bots, the Internet of Things, smart cities, and wearable technologies are broadening our understanding of what counts. Much can be learned from a focus on the ways non-state actors adopt technology and technological capacities more broadly, in digital *and* analog forms of communication and beyond.

Activists and advocacy groups use tools to draw attention to their cause and mobilize support, but they also use tools and techniques to generate political leverage by making the status quo too expensive to maintain. And advocates often use technology in ways the public never sees, and might generate data that is never entirely communicated to the outside world—government accountability groups do this on a regular basis. The Environmental Data and Governance Initiative and the Sunlight Foundation spearhead initiatives to archive and monitor government web resources, including critical information stored on the websites of federal agencies like the Environmental Protection Agency and the Department of Health and Human Services. This *data resistance* came in response to a widespread and credible fear that the 2016 election of Donald Trump would threaten evidence-based policy making.¹⁰

A host of material artifacts and objects are also used to do things like protect political challengers from the elements (umbrellas, clothes, and offices) and make life difficult for incumbents (barricades, slashed tires, and denial of service attacks online). The tactical tools most readily identified with police clashes prioritize practical issues (preventing tear gas from entering one's eyes

and lungs) over the communicative capacity of those materials. Other tools, including paste, poster boards, and spray paint, must be recombined in order for their communicative potential to emerge as posters or graffiti. Online tools, including Tor, political bots, and viruses, are not necessarily geared toward communication, but may be flexibly combined and deployed for any number of objectives.

Such a list is pragmatic rather than normative, as many tools can be used for either violent or nonviolent purposes and may be used by nonprofits, community-based organizations, non-governmental organizations, social movement organizations, the communities they serve, or the incumbents they target. An approach emphasizing objects and their use also includes complex technologies that are themselves able to produce tools, as when a printing press produces an event flier or when a 3D printer produces a printing press.

Each community of users creates unique logics of use. Advocates of social change have long debated the utility (rather than the ethics) of violent tactics. Some have suggested disruptive protests are more likely to secure important gains,¹¹ while recent empirical work suggests the evidence is with Mahatma Gandhi and Martin Luther King Jr. on this count.¹² As a result, some tools cluster around particular normative or tactical commitment, like nonviolence. Other patterns of use emerge in time- and space-bound ways and reflect local resources and folkways. For example, barricades and balaclavas are important tools in urban protest, but everyday farming material—seeds, hoes, soil—may comprise the tools of the rural weak, as James Scott has so memorably demonstrated.¹³ Of course, norms and materials intersect in many ways—farmstuff like fertilizer and

construction material like nails can be deployed as an improvised explosive device, but violent tactics are rejected by most change-oriented advocacy efforts in settled democracies. These configurations depend on time, place, and resource.

How should we think about these tools and their use? It's this chapter's job to answer that question, though at this point I feel obligated to be frank with the reader. The rest of this chapter has been written in the hope of better connecting two important scholarly communities. As a result, it strays from time to time into technical details that are intended as a bit of note-passing between my colleagues focused on technology, media, and society and those focused on contentious politics, protests, revolutions, and social movements. Readers interested in how drones, satellites, balloons, and kites are used, and who would rather not read about repertoires, affordances, and whether nonhuman living beings have agency, might rather skip ahead to the next chapter. For those who continue: don't say you weren't warned.¹⁴

REPERTOIRES AS CLUSTERS OF THINGS IN USE

Thus far I have argued that civil society actors use tools for many purposes, including awareness-raising (i.e., communication), data storage and analysis, and the creation of political leverage through obstruction and cost-raising. Technology is regularly used to gather and analyze data crucial for decision-making within organizations or concession-extracting from powerful institutions. While informing the public and mobilizing constituents are critical ingredients in the politics of social change, they are not the only way technology is used. The term *repertoire* has been used by social scientist Charles Tilly to describe the

broad constellations of strategies and tactics used to encourage or thwart social and political change.¹⁵

I propose we can apply this logic to tools in use, such that a technological repertoire is simply the *broad and repeated use of tools and techniques*. This framework may help us to better conceptualize and debate technology as a field of action or a state of play, rather than as a fixed and stable inventory of stuff that's just sitting there.

A dynamic approach is best, since repertoires are not inherently stable. They are instead nested within broader contexts and subject to spurts of human creativity or the drag of precedent. Repertoires are part of the status quo, and the status quo is almost always being consolidated or challenged. The present moment—any present moment—is only a set of settlements. All *longues durées* are way stations.¹⁶

Every field of action has its own repertoire and every community and every struggle has its own way of doing things. Intergovernmental organizations are more likely to rely on a host of tools and technologies that facilitate state-level coordination and communication. These could include security protocols, specialized communication channels, and centralized headquarters. The United Nations offers a perfect example of these factors. The UN's white vehicles, blue helmets, and branded supplies are all part of their material footprint. The UN ecosystem relies on the technologies of bureaucracy, like modern office systems, as well as tools of logistics and infrastructure, like tarps, radios, and shipping containers.

Nongovernmental organizations rely on technologies that run the gamut from generic office systems to purpose-built technologies in the field. Public-service campaigns focused on

reducing the prevalence of disease, for example, may distribute bed nets, vaccines, and condoms. Sociologist Terrance McDonnell has documented the extent to which the aid industry relies on cultural objects over which they have very little control.¹⁷ For example, the female condom creatively doubles as a bracelet, and mosquito nets are used to sift sand or are repurposed as wedding veils.¹⁸ While it is beyond the scope of this volume to document the number of ways nongovernmental organizations use technology, it is safe to say that such an inventory would find a staggering range of practices, as means and as ends, across context and over time.

Community-based organizations are groups that prioritize a grassroots connection to a particular place or group. Since they rely on local support, their legitimacy is critical. As a result, organizational form, leadership composition, and the nature of material resources are all subject to local considerations. Community-based organizing, especially, requires buy-in from the community, as these efforts often rely on a theory of power and social change that prioritizes the role of local voices and experience in creating bonds of solidarity that allow for broader impacts. Getting things wrong in these contexts can mean the difference between authenticity and a perception that a group or person is fake.¹⁹ Here two things are on display. The first is the power of the repertoire, and the second is the power of community efforts that get the repertoire right. As a result, it is difficult to simply drag and drop tools or technologies into communities and expect buy-in. This is another of the key takeaways from important sociological analysis of the humanitarian aid industry—people have agency and use aid material as means to suit their ends. In my own work, I have documented a vil-

lage of bonded laborers in rural India that mobilized against the upper-caste landlords who were working them to death in their stone quarries. Enraged, the workers picked up the resources at hand—rocks—and pelted their abusers.²⁰ A particularly abusive member of the landlord class was killed in the ensuing violence.

Repertoires emerge from local material, economic, political, and social conditions.

For social movement organizations, repertoires describe the cluster of movement tactics that are available and desirable at any particular point in time. Again, we find no comprehensive list, but rather a rolling constellation of approaches. In the 1960s, activists in the New Left used a range of tactics, including “petitioning, rock throwing, canvassing, letter writing, vigils, sit-ins, freedom rides, lobbying, arson, draft resistance, assault, hair growing, non-violent civil disobedience, operating a free store, rioting, confrontations with cops, consciousness raising, screaming obscenities, singing, hurling shit, marching, raising a clenched fist, bodily assault, tax refusal, guerrilla theater, campaigning, looting, sniping, living theater, rallies, smoking pot, destroying draft records, blowing up ROTC buildings, court trials, murder, immolation, strikes, and writing various manifestos or platforms.”²¹

Writing in the same era, nonviolence advocate Gene Sharp proposed a list of 198 nonviolent tactics, including skywriting and earthwriting, protest disrobings, and the destruction of one’s own property.²² Of course, not every struggle for social change uses even a fraction of these tactics. Nevertheless, the list points to the range of nonviolent options available within the broader repertoire of change-oriented approaches on offer at one time (the 1960s) and in one place (the United States). These broad strategic goals included raising awareness, changing

public opinion, and raising the cost of the status quo. The goal is usually to secure public support and force official action on new policies and legislation related to rights, resources, and recognition. There is nothing about change-oriented strategies that prescribes particular tactics, and much debate continues about particular constellations of tactics, as evidenced by the ongoing debate over the utility of violence.²³

Repertoires are appropriate in different times and places, and they are also subject to cultural and material constraints. Social actors that rely on public approval cannot adopt approaches that are in opposition to key values and beliefs within their host society, nor can they engage in activities that are unintelligible in the local idiom.²⁴ A nonprofit organization working to end animal cruelty would have a hard time justifying a fundraiser in which a hunting safari was on the auction block, for example. Whether raising money in a fundraiser or raising hell on the streets, even the most creative actors must draw on or innovate around the material in their immediate vicinity, whether it be a website or a boulder.

Making demands effectively, Charles Tilly argues, depends on people and groups having “a recognizable relation to their setting, to relations between the parties, and to previous uses of the claim-making form.”²⁵ The same logic applies to the use of technologies. It is not technological determinism to observe that cobblestones are handy missiles in a clash with police, or that a protestor cannot throw cobblestones at the authorities if they have been preventively glued to the ground.²⁶ The mass circulation of pamphlets was impossible before the invention of the printing press, yet an anthropomorphic bias directs our attention *away* from the printing press and toward the pamphlet getting read by publics who then gather in front of Parlia-

ment.²⁷ This bias is understandable—politics are often by and for human groups—but an eye toward hybridity suggests both the technological and the political are important, something scholars like Benedict Anderson have gotten right in describing the importance of print media.²⁸

A pattern is evident: in our accounts of advocacy and social change, the means of production are overshadowed by the modes of engagement. This difference in perspective—was it the printing press or the public?—is important, as technology is both enabling and constricting of collective action, both prior to and simultaneous with advocacy efforts. Technology is causal at the structural level—it lays the groundwork for action—and critical at the level of the lived experience of social actors. Particular repertoires draw on material culture and involve the use of placards, fliers, and other objects and artifacts, making up an analog and urban protest repertoire familiar from the nineteenth century to the present.

Simply put, individuals and organizations interested in social change need tools and technology to perform whatever tasks are appropriate within their particular contexts. They do so in ways that match both public opinions and organizational philosophies. Over time, with neither planning nor intent, these efforts and actions aggregate with other users' uses to produce repertoires of action.

Repertoires are emergent, rather than stable, fixed, or predictable.

AFFORDANCES: WHERE TOOLS COME FROM

At this point, we begin to see the broader argument as it stands: Technologies are really just things that get used, and over time

usage clusters into patterns that I've called repertoires. Yet how does an assessment of usefulness come about? Is it a function of the object or a function of the actor? Do some objects have their own purposes (realism), or are all objects simply social constructs (constructivism)? This debate has been central to science and technology studies for the past two decades, but is seen less often in efforts to understand politics and social change.

Those of us trained in the social sciences are better attuned, unsurprisingly, to the ebb and flow of political and social processes than we are to technology's currents. We would do well to pay a bit more attention to *affordances*,²⁹ which simply refers to the *possibilities that things offer for action*.³⁰ The possibilities for action differ by time and place, but they also differ based on a range of features unique to the human actor.

Humans have different intentions for an object's use, and not everybody imagines using things in the same way.³¹ As Winston Churchill famously argued, "we shape our buildings; thereafter they shape us."³²

This is essentially the claim made by a line of scholarship on the social construction of technology. It is human action, not technology, that shapes how tools are identified and used. In a seminal article on technologies, tools, and technological artifacts, the sociologist Ian Hutchby adds nuance to this approach, suggesting tools "do not amount simply to what their users make of them; what is made of them is accomplished in the interface between human aims and the artifact's affordances."³³ Technology is more than the incubator of new forms of social relations, since "social processes and the 'properties' of technological artifacts are interrelated and intertwined" in theoretically important ways.³⁴ Here we see the outlines of a world com-

prised of human and nonhuman actors operating in a broader network, within which all have agency—as in the actor-network theory developed by French philosopher Bruno Latour—and people as well as material objects are *actants* with agency sufficient to shape our lives.³⁵ Speed bumps are the classic example of how the actor-network approach conceptualizes the agency of artifacts. They are as vital of an actor, in Latour’s thinking, in the flow of suburban life as any human; shaping—demanding, forcing—a human response.

Not so fast, argue scholars Wiebe Bijker and John Law:

Technologies do not have a momentum of their own at the outset that allows them ... to pass through a neutral social medium. Rather, they are subject to contingency as they pass from figurative hand to hand, and so are shaped and reshaped. Sometimes they disappear altogether; no-one felt moved, or was obliged, to pass them on. At other times they take novel forms, or are subverted by users to be employed in ways quite different from those for which they were originally intended.³⁶

Female condoms doubling as bracelets and fishing nets used for wedding veils make this point quite neatly. The human is in charge. Speed bumps, in this light, are designed, installed, driven over, and eventually replaced by humans, the ultimate agents.

Recent thinking about affordances for advocacy and social change has directed attention to digital tools. Here the concept of *leveraged affordance* suggests people take action and use things for their own ends, regardless of what the thing itself was made for. There is general agreement in this space. Sociologists Jennifer Earl and Katrina Kimport suggest digital affordances are a “type of action or a characteristic of actions that a technology enables

through its design,”³⁷ and political communication scholars Lance Bennett and Alexandra Segerberg argue interactive affordances facilitate political engagement and provide broad opportunities for action.³⁸

How does the concept of affordance help us think about the work Tautis and I have done with drones and balloons? The answer comes from media scholar Steven Livingston, who has suggested that digital affordances come in three types: 1) digitally networked affordances; 2) forensic affordances; and 3) geospatial affordances. It is the latter, Livingston argues, that provide the ability to flexibly deploy “spatial and panoptical awareness and virtual presence.”³⁹ Livingston’s approach takes an important step in shifting attention from new digital technologies like the Internet and social media to a broader constellation of tools for sensing and seeing the world. Livingston’s own work focuses on satellites, but the lesson resonates more broadly: we have an opportunity to recognize a wider array of tools and objects and to debate the range of ways they are used.

Opportunities for action don’t just sit on the shelf, patiently waiting to be used. Rather, opportunities must be recognized as opportunities. This may seem obvious for most readers, but students of contentious politics have long debated two critical puzzles. The first is whether opportunities and threats can be identified independent of the event they are trying to explain—in other words, can the right moment for political action be reliably and independently identified by an objective bystander? The second question, more pressing for our work here, is whether the impetus for action lies within a political moment and broader environment, or is in the hands of individual agents who make their

own history. The stakes are high, as these questions get at the heart of how social change is thought to happen.⁴⁰

Scholars focused on materiality, Latour and Hutchby among them, offer direct responses to these concerns: potential exists independent of perception. Speed bumps bump whether or not I notice them, and regardless of whether I brake. Furthermore, while the particular features of a physical object set limits on what *can* be done with an artifact, they do not constrain the human agent's range of experimentation with what *might* be attempted.⁴¹ In fact, it is through experimentation itself that new innovation happens and discoveries are made. An affordance may be false, but this might not stop a human agent from using it anyway for whatever end they have imagined.⁴²

I like Ian Hutchby's approach, because he charts his own path, rejecting both realist accounts of technological affordances, which suggest that objects have "inherent properties that act as constraints," as well as constructivism, which considers the reality of these same objects to be the result of "discursive practices in relation to the object."⁴³ It is in their actual consideration and use by human agents—that is, in relation—that potential emerges.⁴⁴ This potential resides in both the worldly object and the human agent. A complementary argument is made by sociologist Gina Neff, who suggests technological determinism is a red herring, and rejecting it out of hand avoids important and unresolved questions about how tools are designed, how tools function, and users' awareness of the power and position of tools. Neff suggests that a narrow focus on a few examples in actor-network theory (like Latour's agentic speed bump—we know it has agency because it makes us slow down) ignores the importance of *scale* and *scope*.⁴⁵

By this logic, it is possible to produce a number of hypotheses: in the short run, humans have agency to create and use tools; in the medium run, institutions (groups of humans) have agency to further shape the institutions and systems that govern tool use; in the long run, it is systems that shape human action and define the context in which individual agency is exercised; and each of these factors is in play simultaneously in every society for a wide range of processes, none of which are as linear as these hypotheses suggest. This observation is not new, and in fact simply incorporates tools into more traditional assessments of social change.

My focus here is on the first two of these hypothesized stages, as humans and groups of humans develop and adopt technologies, with particular attention to how they are used, and the implications that flow on from there. The significance of an object or artifact remains so long as it is used—passed from figurative hand to hand, to use Bijker and Law’s metaphor. Presumably, tools are used, revised, reimagined, and passed along because they fit comfortably within the broader political, cultural, and economic landscape. They can be seen, can be acquired at a reasonable cost of energy or money, are useful for some purpose, and seem appropriate considering the norms and values of the society people find themselves in. When tools are used often enough and are shown to meet key objectives, a technological repertoire emerges.

But what of politics?

Early decisions about technology, political scientist Langdon Winner suggests, are actually decisions about politics and, even more fundamentally, are about what we value as a society. More important than a focus on user intent is the recognition that “the

technological deck has been stacked in advance to favor certain social interests and that some people were bound to receive a better hand than others.”⁴⁶ Humans make decisions about technologies that go on to have causal impacts on humans, Winner argues. In other words, affordances are “the dynamic link between subjects and objects within sociotechnical systems”;⁴⁷ they are one of the stages on which the stuff of politics—interests, grievances, hopes and fears—takes form and takes flight.

Humans choose to use tools for all sorts of reasons. It is important to ask, alongside scholars like Ian Hutchby and Gina Neff, how and why this happens. It is also important to explore the implications of these choices. Cautious skeptics like Langdon Winner and caustic critics like Evengy Morozov are both at pains to emphasize the fact that technology can build power or erode power, and whether this power accrues to the already powerful or to those struggling for justice should be a matter of grand public debate. Social actors use affordances they think will help them accomplish their objectives, and this use is nested within existing circuits of power. Affordances are the emergent property of material and perception, of objects and actors. They are therefore always in flux, as broader social, political, and economic contexts shape both what exists and what can be imagined. These broader contexts also rest on systems of production that prepare various admixtures of raw material for consideration.

AGENCY IN AN ERA OF ARTIFICIAL INTELLIGENCE

The story I have told thus far is that scholars of politics and society should take technologies more seriously, since institutions and individuals already do; that clusters of usage form patterns

and habits (repertoires); and that this usage is shaped by a sense that particular tools are useful. In so doing, I have struck a middle ground between realist and constructivist approaches to the material world, settling for an assessment that recognizes the capacity inherent in physical objects, independent of perception, but ultimately privileges human agency in the deployment of these objects.

Will this always be the case?

The simple answer is that, no, this will not always be the case. Rapid developments in artificial intelligence are adding new wrinkles to this story. If change is coming, what should we be on the lookout for? Answering this question requires a more nuanced understanding of the nature of agency. In their landmark text *Acting with Technology*, Victor Kaptelinin and Bonnie Nardi suggest agency is the ability and need to act in such a way that produces effects (for one's self or for others), and is a "fundamental feature of both the subject and the object" of any particular *interaction*.⁴⁸ An emphasis on both *ability* and *need* suggests that, while both people and things are regularly "acting-in-the-world," their agency is not all of the same sort. Networks of interaction, Kaptelinin and Nardi argue, have *asymmetric degrees of agency*,⁴⁹ a direct challenge to Bruno Latour and actor-network theory's more generous and homogeneous consideration of a blanket agency that describes the impact of both human and non-human actors, but also a tacit admission that some things make demands and thus have the effect of slowing us down.⁵⁰

Kaptelinin and Nardi account for multiple agencies through a typology that recognizes biological and human needs ("needs-based agency"), action on someone else's behalf ("delegated agency"), and unintended consequences ("conditional agency").

A need to act, they argue, can come from either biological or cultural needs.⁵¹

Needs, then, are something animals have, but speed bumps don't.

This approach can be found in table 1.1, which originally appeared in Kaptelinin and Nardi, but has been reproduced (and modified) here. *Things* can be natural nonhuman entities, or they may be cultural bits of the built world. In either case, they produce effects, though not because they have needs of any sort. Likewise, nonhuman living beings produce effects and act according to their own biological needs, but these also come in two forms. The first is natural and independent of humans. The second is cultural and consists of the world that humans have built for themselves, including domestic animals, plants and fungi, live vaccines, and clones. The things and nonhuman living beings that are part of the human-built world exercise *delegated agency*, in that they realize the intentions of other human beings. Humans, for their part, hit on every note, since they produce effects, act according to biological and cultural needs, and are able to manifest the intentions of others, or to resist doing so. Finally, Kaptelinin and Nardi argue, social entities like the United Nations produce effects, act on cultural needs, and realize the intentions of others, but have no biological needs of their own.

Readers who came to this book out of an interest in technology and social change are right to ask what all of this has to do with the case at hand. My response is found in the shaded column in table 1.1 above, which I have taken the liberty of adding to Kaptelinin and Nardi's original six-category set of actors. This book is written at what may be the dawn of an era in which new sets of autonomous devices and systems will require new think-

Table 1.1 Kaptelinin and Nardi Agency Typology (modified), 2006

Agencies	Agents	Things (natural)	Things (cultural)	Nonhuman living beings	Nonhuman living beings (cultural)	Nonhuman living beings (emergent)	Human beings	Social entities
Examples	Tsunamis, Northern lights, vernal pools, Martian rocks	Speed bumps, sewing machines, teapots, adzes	Grizzly bears, California poppies, truffles, protozoa	House cats, Dolly the sheep, GMO corn, Bourbon roses	Artificial intelligence, deep neural nets	Spinuzzi's traffic engineers, Mierlinden's scientists, AINT's princes	World Trade Organization, ISO, Doctors Without Borders, United Nations	
Conditional agency	Produce effects	+	+	+	+	+	+	+
Need-based agency	Act according to own biological needs	—	—	+	+	/	+	—
Delegated agency	Act according to cultural needs	—	—	—	—	/	+	+
	Realize intentions of (other) human beings	—	—	+	+	+	+	+

Note: For a detailed exploration of the original table, see Victor Kaptelinin and Bonnie A. Nardi, *Acting with Technology: Activity Theory and Interaction Design* (Cambridge, MA: MIT Press, 2006).

ing about what, exactly, constitutes *need*. I am neither technically equipped nor intellectually prepared to argue that artificial intelligences are on track to develop their own biological and cultural needs, but enough is known about emergent properties in complex systems to anticipate that an era of radically unpredictable sociotechnical change may lie before us, especially in the form of self-healing within large algorithms and artificial intelligence—two breakthroughs that drones rely on, for example.⁵² This fact will be relevant to both scholarly debates over structure and agency as well as practical efforts to shape the world through contentious politics.

This additional column creates room for the emergence of what Kaptelinin and Nardi themselves anticipate: “actual artifacts with intentions or desires” may emerge from innovation and advancement in artificial intelligence.⁵³ To imagine how we might get there, one need only imagine a drone tasked with hovering over a particular place, pausing to recharge its batteries. Is recharging batteries a need? Are survival and energy renewal different things, and if so, how? This idea is most provocatively explored by Nick Bostrom, whose book *Superintelligence* imagines the apocalypse that would follow if an artificial intelligence was tasked with the apparently simple job of collecting paperclips. Radical and focused attention to this simple imperative could bend all knowledge, resource, and production to this effort, and in this way erode or destroy all the other atoms and bits of the world that make life livable.⁵⁴

I began this book in the hopes of better understanding and explaining several near-future applications for the kind of drones being used by both police and protestors. These devices have become safer to fly thanks to a sophisticated combination

of sensor arrays and control systems, the very features that allow them to autonomously enter and navigate environments, gather data, and, increasingly, to take action on that data. Such a combination of mobility, sensing, and action capacities suggests the possibility of emergent activity beyond the original intentions of the programmer responsible for the algorithm.⁵⁵

This is a challenge that I bravely leave to others, but that recurs throughout this volume, as well as in debates about drone warfare and autonomous weapons systems more broadly.⁵⁶

EMERGENT AND DISRUPTIVE TECHNOLOGY

Technology can change the balance of power and help hold the powerful to account. These uses are usually thought of as disruptive. One look at the headlines confirms why the concept *disruptive new technology* is popular. Yet the phrase is more frequently used than explained, and much good could come from a clearer articulation of what we mean by it. Technologies, as I use the term, are *tools in action*. But what are we to make of the concepts *disruptive* and *new*? At the broadest level, I would like to use the term *disruptive* to signal the use of a tool that is politically or socially unacceptable and does not jibe with dominant repertoires at play in a particular social, economic, or political context. More parsimoniously, it is the use of a technology whose means or ends enjoy little initial approval. Likewise, the most parsimonious approach to *emergence* simply indicates whether a particular task can be accomplished with current technology.

Where disruption asks *should*, emergence asks *could*. The simplest version of this argument is found in table 1.2.

Immediately, we must add caveats.

		Emergence	
Disruption		Can be done with current tools (non-emergent)	Cannot be done with current tools (emergent)
	Follows norms (non-disruptive)	<i>Definition:</i> Ends can be reached with current technological means	<i>Definition:</i> Ends cannot be reached with current technological means
		Broad approval for ends or means	Broad approval for ends or means
	Challenges norms (disruptive)	<i>Definition:</i> Ends can be reached with current tools	<i>Definition:</i> Ends cannot be reached with current tools
	Little approval for ends or means	Little approval for ends or means	

This book is full of instances in which non-state groups use drones to accomplish tasks that had previously been impossible. Yet powerful nation states have historically been able to accomplish these same tasks using large and expensive technology like helicopters. Practically, in the pages that follow, I use the term *emergent* to ask: *is the device performing a task that can be performed by civil society using other tools?* If the answer is *yes*, then the tool is not new and therefore not emergent. Observant readers will note that in narrowing my inquiry to civil society actors, I am deliberately excluding those tools available to powerful actors like states and corporations. A higher threshold—physical impossibility of task performance by other means—should be taken seriously, and indeed I highlight a few such cases in the pages that follow. Others may develop more particular understandings.⁵⁷

Under a strong interpretation, requiring physical novelty, any task that can be performed by an airplane or helicopter is not new. Under a weak interpretation, any task that cannot be accomplished by a moderate-sized civil society group working to influence the

state or market is new. I leave it to the reader to adjudicate between these two thresholds, the former being political and the latter being technological and economic. The observant reader will note that I am avoiding the question at its broadest, which is whether, as Winner asks, “modern technologies added *fundamentally new* activities to the range of things human beings do.”⁵⁸ This question was first raised about three thousand years ago by Solomon, and I leave its answer to the reader.

Determining whether a technology’s use is disruptive requires us to ask: is the device performing a task that may be *acceptably* performed by civil society using other tools? In other words, is the usage sanctioned by the dominant social and political norms of the day? Political norms are often shaped by the expectations that people have for accountability, authority, and control. Cultural norms are often shaped by our expectations around privacy, safety, accountability, transparency, and the interplay of these factors.⁵⁹ These norms vary between countries, regions, polities, and cultures. It should be no surprise that the use of drones would be governed by public policies that emerge at the intersection of political pressures and cultural norms. In some countries, cultural and political norms may conflict, as when the public demands levels of transparency and accountability that the political establishment is unwilling to accommodate.⁶⁰

Readers unhappy with my terms are invited to find others, as my goal is not to create cumbersome new taxonomies or start tendentious academic debates, but to instead disconnect phrases like *disruptive new technology* from an axiomatic association with digital tools like social media and the Internet. In the pages that follow I’ll be arguing that the phrase *disruptive new technologies* describes, at varying times, kites, balloons, satellites, and drones. It is to these technologies that we now turn.

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The Good Drone

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