Crafting Stories of Technology and Progress: Five Considerations

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A story, to triumph, must seize our imaginations. A story about technology's role in social progress is no exception. Its characters must invoke love and hate. Its beginning must establish urgency; its middle twists and turns; and at its end, there must be resolution—though perhaps the best stories reserve space for sequels and future chapters not yet written. A story about social progress must accomplish all of the above while fearlessly engaging in difficult conversations.[1] Conversations about crises and persistent problems: the equitable provisioning of basic human needs; long-term sustainability of our ways of living and producing; crises of climate, crises of capitalism, crises of employment, and crises of democracy.

These dilemmas are not academic. They are much more important, vital even, to issues of social justice, fairness, equality and policy, and to how we imagine as well as achieve a progressive future for all. Producing stories is not only our most fundamental method of making sense of experience;[2] it is our primary and most effective way of

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[1] The issue of the framing of social progress is itself political, contested and beyond the scope of this essay. For an introduction to this debate in the context of the IPSP, see http://theconversation.com/is-it-still-possible-to-believe-in-social-progress-86112; Johan Schot, *Difficult Conversations*, 2016, www.johanschot.com/2016/09/01/a-difficult-conversation-on-social-progress/.

[2] B. Flyvbjerg, "Five Misunderstandings About Case-Study Research," *Qualitative Inquiry* 12, no. 2 (2006): 219.

compelling change. Storytelling is an inherently political act. For Hannah Arendt, stories were the principal means by which to open up public space for participation by active citizenship.[3] For us—authors, academics, activists—telling the stories of technology's role in social progress is not merely one of historical reportage and sharp narrative, but rather a strategy by which to propel and direct further progress.

In telling technology's stories of social progress, we are right to celebrate unprecedented advances in health and education, transport and computation. But we must point out hidden costs, uneven distributions, and unequal access. We must open our stories to a wider cast of characters, be they heroes, villains, or those with ambiguous intent, and we must confront the individuals, interests, and institutions that propel technological change for better or worse.

This special collection of *Technology's Stories* attempts to do just that. Four essays are produced here to mark the publication of *Rethinking Society for the 21st Century*, the ambitious final report from the International Panel on Social Progress (IPSP).[4] *Rethinking Society* brings together more than 300 scholars from the social sciences and humanities, who contribute to twenty-two chapters across a diverse topic range. The report prompts conversation and debate on what "progress" now means. It provides knowledge, resources, and perhaps a spark of momentum to politicians, civil servants, the media, academics, teachers, charities, and campaign groups; all who believe in and strive for a redefinition of what global progress can look like and how it might be achieved. Within the report, the role of science and technology in contributing, or not, to social progress is drawn out across a special crosscutting theme. Drawing on this theme, in this introductory article we reflect on five specific features vital to how the stories of technology and social progress might be told.

Social Progress is Technological *and* Social

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[3] H. Arendt, *The Human Condition* (Chicago: University of Chicago Press, 1958).
[4] The International Panel on Social Progress, http://ipsp.org.

We seek to explain social progress as produced by social *and* technological worlds. We are skeptical of stories proffering deterministic explanations, be they technological or social. Simply put, there is nothing deterministic about how societies respond to technological innovation. Yet we have only to glance at contemporary media headlines about the coming of the robots and the future of work to see strong techno-determinism in action. The danger in these tales of seemingly inevitable jobless futures is that events yet to happen are used as justifications for social regress, prompting moves to social adaptation and forgoing attempts at mitigating the harms of future technologies.

Scholars working in the fields of science, technology and society studies (STS) and the history of technology offer us concepts such as "socio-technical systems," "assemblages," "practices," "routines," and "scripts" with which to better gather the components of our stories.[5] That is, the people, firms, organizations, sites, infrastructures, rules, institutions, technologies, and knowledges that are the subjects and objects—and very often heroes and villains—of our tales. Using these components, we can document what kind of *alignments* of knowledge, technology, and society produce better outcomes in terms of, for example, issues of poverty, climate change, or the distribution of power. We explain how these alignments are reproduced, by whom and by what processes and outcomes. And so our stories focus on the *co-production of knowledge* and the *co-evolution of science, technology, firms, society*, and *socio-technical systems* and *infrastructures*.[6]

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[5] S. Matthewman, *Technology and Social Theory* (Basingstoke: Palgrave Macmillan, 2011).
[6] U. Felt et al., *The Handbook of Science and Technology Studies*, 4th ed. (Cambridge, MA: The MIT Press, 2017).

Figure 1. Networks of power: our infrastructures, political structures and economic structures of production are often deeply entangled. Here former UK Prime Minister David Cameron addresses workers at Hinkley B as part of his visit to the site of the UK's first new nuclear power station in 20 years, Hinkley Point C. (Source: [cc] deccgovuk on Flickr.)

So how might we produce a story that weaves in sociological as well as technological factors and processes which influence progress, while also paying heed to the socio-technical systems, practices and scripts? For example, a richer narrative, evident in *Rethinking Society's* chapter on the future of work, includes contemporary stories of globalization changing demography. Revealing stories about the "recent history of work" documents how jobs at the bottom have been financialized and brought into other economies through a combination of new technologies, market arrangements and global firm structure. Meanwhile, other stories question the extent to which the very conception of work is bound up with ideas of paid and unpaid labor.

Science and Technology Advances through the Work of Many

A story of progress that focuses only on "winners" fails. A diversity of characters is vital; many actors, including entrepreneurs, policy makers, and experts, make innovative contributions in a myriad of ways. Diversity matters, not only in considering the users of technology but also those who produce it. Science and technology

advances through high-tech research, development, and innovation processes from inside labs as well as through low-tech processes in sheds, garages, workshops, and barns; through dominant practices by powerful firms, and through minority practices in oppressed communities.

Figure 2. Science and technology advances through high-tech and low-tech innovation. (Sources L-R, both [cc] on Flickr: CERN CMS 4 by Radoslaw Orecki; Kenya Seed Company Guide to Seed Selection by STEPS Centre.)

Our narratives must also pay attention to the remaking of social and technological configurations, drawing attention to the maintenance and repair of technologies and not simply their research and design. We might consider practices in the global south as well as the north, and among knowledge communities on the margins of society and culture, such as hackers and tinkerers. As self-evident as it seems, it is vital we tell stories which demonstrate that many different people may be innovators: women, citizen scientists, and the oppressed.

With the introduction of a diverse stage of characters, the focus of the storyteller shifts from one of following the appropriation of technology into society, to revealing the myriad of conditions and contexts of technology in use. Put another way, our stories shift from focusing on technologies that, as if by magic, appear in social settings (the

black-boxed innovation process) towards examining technologies beyond mere individual use and into new contexts.

Figure 3. Science and technology advances through the work of many. (Sources: all [cc] on Flickr, clockwise from top left: Citizen Science Project, FloridaSeaGrant; Solar engineering trainer, Barefoot College, India, by UNWomen; IBM CEO Ginni Rometty by FortuneLiveMedia; Black Cloud Arduino Sensor Workshop by gregoniemeyer.)

Ultimately, this way of telling stories recognizes the contribution of the many creators, carriers, and users of technology to social progress. So, for example, debating the efficacy of reports on the future of work can reveal a failure of imagination of experts who on the one hand are convinced the changing nature of work will lead to distress, but on the other see no reason to think the global capitalist system will fail to create new jobs. However, taking into account the perspective of a diverse set of people and a changing socio-technical configuration might reveal a different story entirely; a story for people for whom the present, let alone the future, is already far from okay.

Social Progress Unfolds along Multiple Pathways

Our storyboard is getting crowded. How are we to make sense of these often competing and contentious developments? Tracing the stories of many actors leads us down numerous pathways along which progress may unfold. STS and history of

technology scholars have developed tools with which to reflect over alternative plot twists and narrative arcs by revealing these multiple pathways towards social progress.[7] This can reveal hidden alternatives and path dependence, taking from studies of innovation the idea that history matters, and that which has come before influences future directions.

In telling technology's stories, it is easy to focus on speed and lose sight of these pathways. Technologies such as cars, cell phones, and computers sometimes disperse quickly throughout global marketplaces.[8] But on a great variety of technologies, from fossil fuels to agricultural biotechnology, neither official expert responses nor those of lay people have converged, even when there is strong scientific consensus about the nature of the risks and benefits. So, telling the stories that might catalyze the policies and institutions necessary to bring social progress about might demand flexibility, working on various pathways simultaneously, thus keeping them open and responsive to long-term social pressures, such as social movements, or shocks, such as war, famine, or sudden mass migration. These stories transcend preoccupations with speed and velocity to involve considerations of the direction of progress.

Having to choose between alternative paths is often a significant source of tension in stories. Understanding who gets to set the direction matters, and brings into focus issues of participation in decision making and the distribution of agency to effect change. Indeed, progress itself may be redefined as a broadening out of potential pathways. These multiple pathways might direct progress towards alternative solutions for societal problems. Perhaps, for example, through new forms of participatory democracy we might incorporate a huge variety of knowledges and practices in future solutions.

Beyond Catching Up: Connecting the Local and the Global

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[7] See for example the STEPS Pathways Approach and a range of methods and methodologies to explore diverse and plural pathways, https://steps-centre.org/methods/.
[8] *Rethinking Society for the 21st Century*, chap. 9 (forthcoming, IPSP.org).

Technology adoption by households in the United States

Technology adoption rates, measured as the percentage of households in the United States owning, or the adoption rates of, a particular technology.

Source: Comin and Hobijn (2004) and others
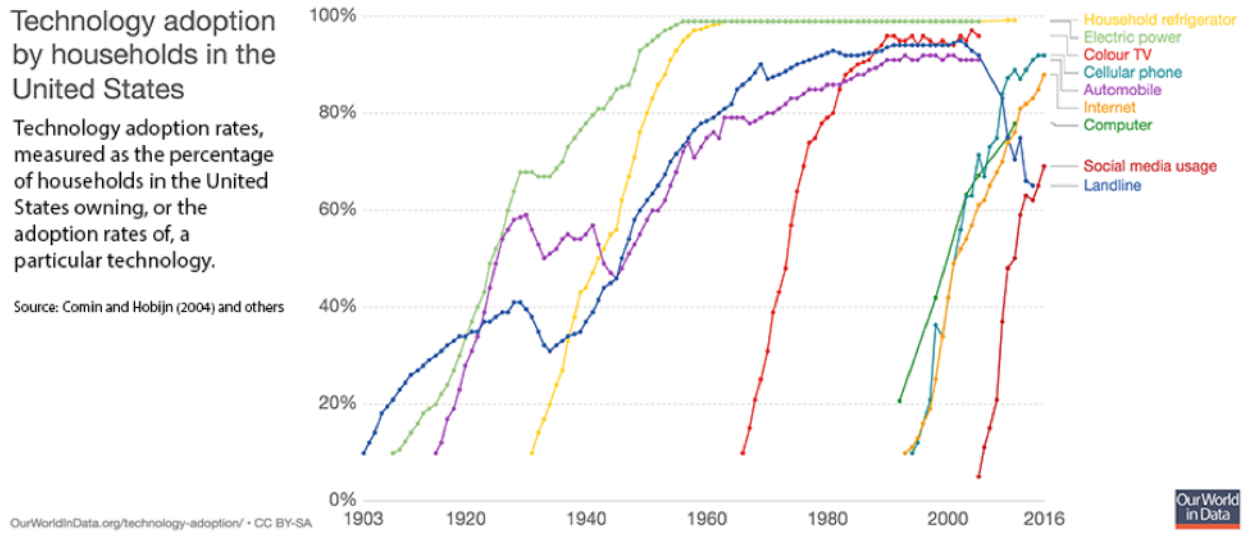
OurWorldInData.org/technology-adoption/ · CC BY-SA

Figure 4. Diffusion and technology adoption rates tell only part of the story. Accounting for progress, we must go beyond these data and account for context and contingency. (Source: [cc] Our World in Data, https://ourworldindata.org/grapher/technology-adoption-by-households-in-the-united-states?country=Automobile+Cellular phone+Colour TV+Computer+Electric power+Household refrigerator+Internet+Landline+Social media usage.)

In spite of this attention to pathways and direction, there remains a requirement to report on specific, local appropriations of technology, not least for governments and agencies investing in economic growth or sustainable technologies. Transitioning from a fossil-fuel economy to one based on renewable energy production remains urgent. But reports and policies that seek to address such urgencies must go beyond framing the story as merely a matter of "diffusion" and "catching up", which in doing so privileges some firms and countries as the sources of knowledge, narrowly consolidating power and agency to direct further progress.

Consider the building up of *the global* through the circulation of knowledge, and the distribution and appropriation of benefits of it. Historic circulation perspectives do not consider the United Kingdom to be the epicentre of an industrial revolution that was diffused outwards in the holds of East India Company steamers. Rather, it is a nation seen as a node in a wider network that appropriated benefits from other nodes around the world. These stories cast a different light on just who is responsible for compelling or repressing progress and what form progress might take. Social progress in this context

might mean maximum flexibility for local appropriation and fair distribution of the benefits of circulation. We therefore narrate our stories of social progress by asking who is appropriating what from whom, is there appropriation from the marginalized, and on what terms? In doing so, we reject universal stories which rely on models of analysis and explanation based on harmonizing models, for these denude our narratives of local diversity. Rather, we focus on bringing together various scales of action—from the very local to global—and trace the relations between them.

Figure 5. Poster produced by the Empire Marketing Board showing men in a Cotton Dye Works. Our stories might make visible in this case those who grow and pick the cotton, its means of transport and the appropriation of value along the way. (Source: [cc] The National Archives UK on Flickr.)

Social progress is not given

Knowledge arises from social processes. This simple but powerful observation has important implications for anyone telling stories of technology and progress. Most importantly, social progress is not given. In representing progress, we need to be

reflexive and responsible in how and why we select one representation over another. There is no innocent form of description, be it numbers, categories, definitions, visual representations, or indeed our rich narrative tales. Numbering, for example, is one dominant way that allows us to capture certain facets of progress while excluding others. However, qualitative representation is as deeply implicated in forms of closure as quantitative.

Again, our stories must advocate plural understandings of progress, rather than interpreting progress in a unitary and linear fashion. Practically, this means that when considering historic cases, we explore processes of choice and contingency. It means seeking out different and multiple expectations and imagined futures. And it means contributing perspectives on the conditions and contexts on which claims of knowing and description are based.

Stories permit us to situate knowledge in context. They will usefully reference sites of knowledge production, processes of knowledge construction, and the often deeply entrenched political conflict within and between these processes. By doing this, our stories permit us to reveal diverse knowledge communities, reinforcing our commitment to acknowledging that innovation and knowledge production involve many actors.

Stories for Rethinking Society for the 21st century

Each of the stories in this special collection draws on these perspectives:

- **Judith Sutz** confronts the challenges that lie ahead in mobilizing science, technology, and innovation in challenging inequality. She argues that the prevailing orientation of scientific and technological efforts, by concentrating on the well-off and not searching to solve the problems affecting most of the world's population, reinforce inequality. Sutz's stories suggest the need for a refreshed politics of development which might uncover hidden stories and recognize the

knowledges and innovations already available to us, in order to orientate them towards addressing inequalities and, ultimately, achieving progress.

- Andy Stirling and colleagues draw attention to and exemplify the issue of *directionality*—the idea that technology progresses not only with a given velocity, but also in directions that are influenced, shifted, and steered along the way. Social progress, they suggest, is best realized not by concentration of power in vertical (top-down) global structures for planetary control, but by reinforcing the horizontal relations of solidarity that lead to more equal societies of people who are, in turn, incentivized to exercise greater care not only for each other, but also for the environments in which all live.

- Suzanne Moon explores the complex interplay of religion, technology, and science in the modern world, attending particularly to the stories we tell about religion and the consequences of those stories. She argues that understanding better the pervasively technological character of modern religious life as not an aberration but rather a normal state of affairs can make clearer how assemblages of religious and technological lifeways can be productive of human flourishing, or the lack thereof, of lives that people have reason to value or which prevent valuable lives from being possible. It is vital to recognize in stories we tell about religion the character of technoreligious life, and the ways that scientific and religious narratives may speak to each other, rather than merely against each other, in the context of social progress.

- Helga Nowotny and Johan Schot provide a summative view on the overall project of the social sciences from this past century or so, addressing the *longue durée* of technology and social progress and asking how it might be otherwise. Indeed, a major contribution of this piece is to suggest that the consideration of alternatives lies at the heart of the social sciences' offer to society.

Why is the telling of these stories so urgent today? In a world where the legitimacy of experts and expert knowledge is under attack, what needs to be urgently reclaimed, according to MacKenzie Wark is not a state-maintained responsibility for progress, but

rather "an art of paying attention. . . . We need consensual stories about what is supposed to matter."[9] *Rethinking the Future* dares us to study long-term possibilities for the future, going beyond policy analysis and imagining how alternative sets of institutions can advance social progress, and ensure new senses of belonging develop which will nurture social ties between people. As this special collection shows, technology's stories are deeply intertwined with social progress. And how we tell these stories—be they embedded within *Rethinking the Future* or elsewhere—is vital to the drivers of policy, the visions that inform social movements, and the formation of societal norms; what is considered right and what is considered desirable.

Acknowledgements

About "Rethinking Society" on *Technology's Stories*

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[9] M. K. Wark, *General intellects: Twenty-one Thinkers for the Twenty-first Century* (London: Verso, 2017).

This article is one of a series of contributions drawn from or inspired by the International Panel on Social Progress. The IPSP is a global academic initiative of more than 300 scholars from all social sciences and the humanities who have contributed to *Rethinking Society for the 21st Century* (https://www.ipsp.org/), a report on the prospects for social progress today. This special collection for Technology's Stories marks the publication of the report and offers important insights from a cross-cutting IPSP theme that sought to examine the role of science and technology, as it contributes—or not—to social progress.

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