

8 Introduction: Critics

Innovation is not an inherent social good. Automation and driverless vehicles have profound trade-offs, including the elimination of blue-collar jobs.¹ Facebook and Twitter erase privacy by design, while foreign governments utilize the platforms to manipulate elections.² Innovators, moreover, are not naturally virtuous. Engineers and entrepreneurs devote their talents to building clever smartphone apps even as vital infrastructures in underserved communities—such as Flint, Michigan’s lead-tainted water supply—fall apart.³ Meanwhile Silicon Valley firms are rife with sexual harassment, misogyny, and discrimination.⁴

Yet as recently as five years ago, few publicly questioned the imperative to innovate. It is not hard to see why. The initiatives described in the previous section provide convincing evidence that the nation requires more innovators to meet real societal challenges. By emphasizing individual and collective improvement, champions of innovation receive widespread social and political support. But attitudes are changing as the daily news cycle highlights the negative consequences of innovation and the questionable practices of innovators.

This section brings together experts who critically analyze the assumptions, methods, equity, and efficacy of the innovator imperative. Its contributors work primarily in academic disciplines that include history, science and technology studies (STS), and economics. Some of these critics believe that innovation, properly deployed, can be a force for good. They identify the imperative’s flaws to improve the enterprise. A more strident subset of contributors argues that innovation is a destructive and irredeemable ideology. They reject “innovation” as a buzzword; they condemn the economic neoliberalism, racism, and sexism of pro-innovation institutions; and they espouse alternative values such as maintenance, care, and continuity. Overall, these

critics invite readers to question their assumptions about innovation. They ask *why* the demand for innovators is so ubiquitous, whether innovation's champions are meeting their promises, and at what cost?

An increasingly common refrain is that innovation is a meaningless concept.⁵ Today the term describes everything from “disruptive toothbrushes” to microenergy programs in rural India.⁶ Still, “innovation” remains a convenient shorthand because of its conceptual breadth. As we saw in part I, experts ambiguously use the term to signify the diffusion of new ideas, institutional change, and technology commercialization. But what does “innovation” really mean? And *why* is it assumed to be a good thing?

In chapter 9, “How Innovation Evolved from a Heretical Act to a Heroic Imperative,” historian Benoît Godin excavates the surprising history of the idea of innovation. From its semantic origins in ancient Greece through the Enlightenment, an “innovation” was an unwelcome novelty that upset the established social order. In fact, the word “innovator” was an epithet that branded someone as a religious heretic or political revolutionary. By the late nineteenth century, innovation began to signal technological and economic progress, but it was only after World War II that economists, politicians, and technologists embraced the concept as an imperative for remaking people, institutions, and nations.

Given the emerging backlash against innovation, Godin's chapter raises the possibility that innovation could return to its original, negative connotation. He implicitly chides those who valorize innovators as the panacea for society's problems; after all, yesterday's innovators were routinely castigated as dangerous subversives. Godin offers no solutions for the current innovation obsession. Moreover, his study privileges innovation's linguistic changes over the social and technological changes the term now describes; thus, practitioners might dismiss his account as an etymological curiosity. Nonetheless, his *longue durée* analysis destabilizes the twenty-first-century conviction that innovation is synonymous with progress.

Critics also question the efficacy and sustainability of innovator initiatives. These programs deploy impressive statistics on the number of students they train and the start-ups they launch. However, a fundamental instability resides beneath these metrics of success. For example, UIF depends on grants and corporate sponsorships that necessitate perpetual

fund-raising (Fasihuddin and Britos Cavagnaro, chapter 3). Similarly, federal programs such as I-Corps (Arkilic, chapter 5), which is currently ascendant, and Obama-era citizen science efforts (Gustetic, chapter 7), which are moribund, are vulnerable to changing political agendas.⁷ Skeptics ask, *why* should we support innovator initiatives if their track record is so precarious?

In chapter 10, “Failed Inventor Initiatives, from the Franklin Institute to Quirky,” historian Eric S. Hintz describes a 150-year pattern of fragility among organizations that support would-be innovators. Hintz uncovers the history of precursors to programs such as Quirky, a recent start-up that combined crowdsourcing with in-house design expertise to “make invention accessible.” Until its bankruptcy in 2015, Quirky was hailed as a completely new and participatory approach to innovation. However, Hintz shows that the Franklin Institute, a Philadelphia technical society founded in 1824, offered—but failed to sustain—a remarkably similar set of services. In fact, Hintz finds that nearly every inventors’ association since the Franklin Institute has collapsed within a decade of its founding.

Hintz argues that professional communities like Quirky and the Franklin Institute are vital to the success of individual innovators; however, a founder’s confidence and claims of novelty are not enough to guarantee an initiative’s survival. He asserts that attention to history can help innovators better understand innovation as a social and institutional process, a theme taken up by W. Bernard Carlson in part III (chapter 16). Of course, champions of innovation might retort that the churn of these short-lived initiatives is actually a sign of success, the natural consequence of innovation’s “creative destruction.”⁸ Conversely, the record of failure that Hintz documents may indicate that the innovator imperative is built on false premises.

Critics of innovation also dispute the essentialism of the best practices proffered by innovation experts. Efforts to emulate successful models of local and regional innovation (Feldman, chapter 6) have expanded on an international scale. At the same time, scholars have shown repeatedly that attempts to replicate technological and cultural practices in new settings are always context dependent. Initiatives for implementing American innovation models are complicated by the motivations of local imitators, by the experts hired to implement those models in foreign environments, and by the sheer messiness of change on the ground.⁹ *Why*, then, are universal models for cultivating innovation and innovators in high demand?

In chapter 11, “Building Global Innovation Hubs: The MIT Model in Three Start-Up Universities,” science studies scholar Sebastian Pfotenhauer describes a global imperative for innovation that looks to the United States for experts and best practices. He explores how technical universities in Singapore, Russia, and the United Arab Emirates have partnered with the Massachusetts Institute of Technology (MIT) to import the university’s blueprint for training innovators, founding start-ups, and commercializing new discoveries. However, Pfotenhauer shows that these groups interpreted the same “model” in dramatically different ways: Singapore adopted the MIT model as a radical break from current engineering practices, Russia sought a “counter model” that bridged to its traditional institutions, and the United Arab Emirates sought regional capacity-building for economic development.

Pfotenhauer claims that there are no fixed models of innovation. In fact, he argues that the “MIT model” is not really a model at all but rather an ambiguous ideal that can accommodate the needs of multiple stakeholders while maintaining the legitimacy conferred by the MIT brand. Regardless, the mutability of the MIT model challenges the authority of American innovation expertise and suggests that other “best practices” of innovation may be just as tenuous.

A growing chorus of critics also has questioned the lack of diversity among innovators. In response, most programs that champion innovation have explicit diversity goals to cultivate a more representative cross section of innovators. Yet, despite major demographic shifts in the US population and the ongoing efforts of these groups, technological innovation remains a largely white, male enterprise.¹⁰ *Why* do gender and racial disparities persist in the innovation workforce?

In chapter 12, “The Innovation Gap in Pink and Black,” economist Lisa Cook explains that the underrepresentation of women and African Americans in the innovation economy is rooted in entrenched discrimination. For centuries, women and African Americans were denied equal access to education and the technical professions. Drawing on a wealth of empirical data, Cook demonstrates that women and African Americans are less likely to earn an advanced STEM degree, less likely to receive a patent, and less likely to commercialize those patents than their white, male counterparts. Consequently, women and African Americans are less likely to enjoy

the higher employment rates, wages, and capital gains of the innovation economy, further exacerbating inequality.

Cook asserts that careers in innovation are pathways to personal wealth, national economic growth, and societal advancement, but that innovation's benefits are not equitably distributed. Her data indicates that the structural origins and impacts of these disparities cannot be solved with rhetorical Band-Aids or surface-level initiatives. She concludes with a call for further research to assist organizations that are working to confront innovation's racial and gender gaps (Sanders and Ashcraft, chapter 17). She is optimistic that innovation can be an engine of progress for women and African Americans; however, her own analysis also lends credence to the critique that the innovation economy is inherently unequal.

The harshest critics of innovation claim that its champions perpetuate a rigged system that privileges disruption and profit over stewardship and the common good.¹¹ They warn that an obsession with gadgetry and schemes for disruptive change obscure how we actually live and work with technology. We are, in fact, surrounded by and dependent upon infrastructures and legacy technologies such as electrical grids, roads, and sewer systems that require democratic governance and public investment. Innovator initiatives, however, can instill misleading notions about careers in science and technology and direct attention and resources away from the knowledge, practices, and values required for a healthy society. *Why*, then, do we privilege novelty and disruption over alternate values such as maintenance and care?

In chapter 13, "Make Maintainers: Engineering Education and an Ethics of Care," Andrew L. Russell and Lee Vinsel focus on the innovator imperative's corrosive effect on universities and the way it distorts how engineers are trained. Today's engineering students are now required to take courses in entrepreneurship and to complete capstone senior design projects that direct them to invent new things, such as robots and electric cars. Russell and Vinsel warn that these educational trends are misleading students, since most professional engineering work is comprised of the mundane—but critically important—labor of inspections, repairs, adjustments, and incremental improvements to existing systems.

Russell and Vinsel denounce the proliferation of "innovation-speak" and revile the corporate impulses that have co-opted modern universities. They condemn programs like UIF and I-Corps, and argue for alternative values

of maintenance and care. In this respect, they anticipate contributors in part III such as Natalie Rusk, who seeks to blend creativity with caretaking (chapter 15), and the “responsible innovation” programs at Arizona State University described by Erik Fisher, David Guston, and Brenda Trinidad (chapter 18). Champions of innovation would counter that maintenance depends upon new innovations. Moreover, they worry that maintenance can devolve from responsible stewardship into a defense of the status quo, or worse, a retrograde obstacle to progress.

By asking *why*—and to what effect—innovation has become a societal imperative, the contributors assembled in this part work against boosterism for innovation. As they question the efficacy of innovator training initiatives and the presumption that innovation is a social, cultural, political, and economic good, they offer differing answers to whether America needs more innovators.

Contributors agree, however, on the reasons why innovation increasingly is on trial. First, innovation experts seem to overpromise and underdeliver. Likewise, innovation’s champions are no closer to resolving long-term challenges such as the underrepresentation in the technology economy of women, African Americans, and other minority groups. Finally, as innovation has become a dominant societal goal, innovators appear less as insurgent advocates for progress than as contributors to an economic system that serves only a fraction of the world’s population.

Seen together, however, the critics’ flaws also become visible. The relatively homogenous backgrounds of innovation’s critics—each of this section’s contributors holds a PhD and works for a university or research center—invites the charge that they are “ivory tower” academics. Moreover, most are willing to teach in institutions whose missions support the training of innovators. By rejecting innovation as an empty ideology, the harshest critics dismiss its capacity for progressive social change, the very quality that attracts the champions. Finally, these contributors offer several critiques but few practical solutions.

In short, the following chapters emphasize diagnosis over treatment. They reveal how the values, practices, and inequities of innovation are perpetuated. By examining the limitations and fallacies of innovator initiatives, these critics set the stage for reform.

Notes

1. Martin Ford, *Rise of the Robots: Technology and the Threat of a Jobless Future* (New York: Basic Books, 2015).
2. Tim Wu, *The Attention Merchants: The Epic Scramble to Get Inside Our Heads* (New York: Knopf, 2016); Craig Timberg and Elizabeth Dwoskin, “Russian Content on Facebook, Google, and Twitter Reached Far More Users Than Companies Previously Disclosed, Congressional Testimony Says,” *Washington Post*, 30 October 2017.
3. Donna Riley, *Engineering and Social Justice* (Williston, VT: Morgan & Claypool, 2008); Steve Kolowich, “The Water Next Time: Professor Who Helped Expose Crisis in Flint Says Public Science Is Broken,” *Chronicle of Higher Education*, 2 February 2016, <https://www.chronicle.com/article/The-Water-Next-Time-Professor/235136>.
4. Anna Wiener, “Why Can’t Silicon Valley Solve Its Diversity Problem?” *New Yorker*, 26 November 2016, accessed 17 July 2017, <http://www.newyorker.com/business/currency/why-cant-silicon-valley-solve-its-diversity-problem>.
5. For example, see Michael O’Byrne, “Innovation: The Most Important and Overused Word in America,” *Wired*, accessed 17 July 2017, <https://www.wired.com/insights/2013/11/innovation-the-most-important-and-overused-word-in-america/>.
6. Alexander George, “Dental Disruption: Is the Toothbrush Ready to Be Reinvented?” *Popular Mechanics*, 27 May 2015, <https://www.popularmechanics.com/technology/gadgets/a15706/toothbrush-test/>; Bigsna Gill, “Lighting a Billion Lives: A Local Approach to a Global Problem,” *Sustainability* 8, no. 5 (2015): 245–253.
7. In 2016, I-Corps’ budget increased by over 200 percent. “NSF Announces \$8M in New Funding for I-Corps Nodes,” SSTi, 12 January 2017, accessed 30 April 2018, <https://ssti.org/blog/nsf-announces-8m-new-funding-i-corps-nodes>. The OSTP staff, in contrast, is down from approximately 130 under President Obama to approximately thirty under President Trump, and it still lacks a director. Jeffrey Mervis, “Trump’s White House Science Office Still Small and Waiting for Leadership,” *Science*, 11 July 2017, accessed 30 April 2017, <http://www.sciencemag.org/news/2017/07/trump-s-white-house-science-office-still-small-and-waiting-leadership/>.
8. According to economist Joseph Schumpeter, “the perennial gale of creative destruction” is the “process of industrial mutation that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one.” Schumpeter, *Capitalism, Socialism, and Democracy* (New York: Harper & Brothers, 1942), 81–86.
9. Harry Collins, *Changing Order: Replication and Induction in Scientific Practice* (Chicago: University of Chicago Press, 1985); Sheila Jasanoff, ed., *States of Knowledge: The Co-Production of Science and Social Order* (New York: Routledge, 2004).

10. Adams Nager, David M. Hart, Stephen Ezell, and Robert D. Atkinson, "The Demographics of Innovation in the United States," Information Technology and Innovation Foundation, 24 February 2016, <https://itif.org/publications/2016/02/24/demographics-innovation-united-states>.

11. Langdon Winner, "The Cult of Innovation: Its Colorful Myths and Rituals," *langdonwinner.com*, 12 June 2017, accessed 10 September 2018, <https://www.langdonwinner.com/other-writings/2017/6/12/the-cult-of-innovation-its-colorful-myths-and-rituals>.

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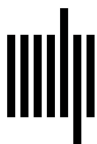
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