2 Introduction: Champions

Innovation experts often use a problem-setting tool known as the "how might we" statement to imagine social change.[1] This simple heuristic is designed to spark solutions to a market opportunity, technical problem, or societal concern. "*How might we…* meet the customer's need and solve their problem?"[2] "*How might we…* use tech to create a culture of civic engagement?"[3] "*How might we…* help corporations, universities, and societies to accelerate innovation in ways that keep pace with these challenges?"[4]

In this section, unapologetic champions of innovation describe the *how might we* mentality that guides nationally prominent initiatives for making innovators. The contributors are a more heterogeneous group than one might imagine. They work variously in academia, government, and the private sector. Not surprisingly, three of the authors reside in Silicon Valley, but the others work in Pittsburgh, Washington, DC, and Chapel Hill, North Carolina. They pursue different objectives that include fostering innovative mindsets among students, delivering solutions for clients, stimulating regional economic growth, turning academic scientists into entrepreneurs, and engaging technically inclined citizens through open innovation.

Presented in expanding scale from individuals to nationwide collaborations, these innovation experts provide first-person accounts of the origins and outcomes of their programs. They invite readers to learn from their stories, to emulate their methods, and to join their causes. Viewed in context, their accounts offer important insights about the strengths, limitations, and consequences of a *how might we* mentality.

Advocates consider innovation to be a requisite skill set for the twenty-first century because of its association with highly valued competencies such

as creativity, critical thinking, and problem-solving. They claim that these skills are especially important since today's college graduates face an uncertain future in which they will have multiple careers. Yet they assert that universities remain organized around disciplinary "silos" that train graduates for well-defined jobs.[5] They ask: *How might we* give young people the tools to thrive in a future of continuous change?

In chapter 3, "An Innovators' Movement," Humera Fasihuddin and Leticia Britos Cavagnaro describe how their University Innovation Fellows (UIF) program simultaneously seeks to prepare a generation of innovators and to reform higher education. Based at Stanford University's d.school, the UIF network includes students from more than one hundred colleges, in fields ranging from mechanical engineering to the creative arts. Fasihuddin and Britos Cavagnaro explain how UIF's Silicon Valley training equips young people from across the country with "empathetic" design methods and the confidence to "ignite" social change. As student fellows organize hackathons and set up maker spaces, UIF encourages them to improve the innovation ecosystem on their local campuses.

Fasihuddin and Britos Cavagnaro argue that collective change begins with personal empowerment. They define innovation as a mindset for questioning the status quo and a set of transferable skills for enacting change. For students, UIF is a safe place for experimentation; when a student succeeds at organizing a TED talk, she can acquire leadership skills and improve her resume, but the stakes are low if the college try does not pan out. For universities, a local UIF chapter signals that the institution is taking positive steps to contribute to the national innovator imperative. UIF's critics, however, argue that its design thinking approach gives students false confidence in quick fixes to societal challenges (Russell and Vinsel, chapter 13) and downplays the value of traditional education for cultivating creative students (Carlson, chapter 16).[6]

While UIF aims to inspire individuals, other innovator initiatives stress that collaboration among multiple experts is necessary to solve the twenty-first century's "wicked problems."[7] These champions argue that a revolution in information technology has complicated the already difficult task of creating social change within existing infrastructures, political and economic constraints, and stakeholder demands. Since the 1980s, human-centered design firms such as Frog Design, IDEO, and MAYA have defined innovators as interdisciplinary collaborators who integrate technical and

social approaches in order to "tame complexity."[8] These firms ask *how might we* foster collaborative creativity to address sociotechnical problems?

In chapter 4, "Building High-Performance Teams for Collaborative Innovation," Mickey McManus and Dutch MacDonald share lessons learned at their firm MAYA to explain why high-performance, multidisciplinary teams prevail while "heroic" individual approaches to innovation typically fail. Their company works with clients as diverse as Whirlpool, the Pentagon, and public school systems. While each client's challenges differ, MAYA's interdisciplinary model of innovation is consistent: assemble the right people, with the right mix of skills, in the right work environment, with the right set of methods. Utilizing this approach, MAYA has spawned an innovation training company, the LUMA Institute, and a popular handbook, *Innovating for People*.[9]

McManus and MacDonald argue that innovation is first and foremost a problem of human interaction. Their LUMA Institute declares that "the need for more people to be more innovative … is a global, social and economic imperative" that requires tested methods for unlocking collaborative creativity.[10] The authors are self-reflective in codifying their firms' creative process—and they have certainly delivered for clients. But their for-profit model prefigures who gets to deploy innovation expertise and who benefits from it. For example, women and minorities rarely are equal participants on high-performing teams in the innovation economy (Sanders and Ashcraft, chapter 17), and many communities and civic organizations cannot afford expert consulting services.

Private companies such as MAYA play a crucial role in the innovation economy, but since World War II the federal government has been the primary funder of scientific innovation in the United States. Agencies such as the National Science Foundation (NSF) have persistently faced pressure to provide a return on taxpayers' investment by translating government-funded research into commercial technologies. Policymakers and scholars typically view technology transfer as a problem of institutional structure and economic incentives.[11] Academic scientists, however, are not typically trained to translate their research into usable applications. So bureaucratic innovators ask: *How might we* change the attitudes of scientists to reap the social and economic rewards of new discoveries?

In chapter 5, "Raising the NSF Innovation Corps," venture capitalist Errol Arkilic describes how he and his colleagues built a federal innovation

"boot camp" that teaches teams of university professors and their students to engage in technology transfer. Innovation Corps (I-Corps) is built on the belief that the innovation process can be studied scientifically and then codified, taught, and learned. In 2011, NSF made its first I-Corps awards consisting of small grants that provided intensive instruction on developing prototypes, interviewing potential customers, and writing business plans. Over a thousand teams have since participated in the program.

By teaching NSF grantees how to commercialize their discoveries, I-Corps has launched over one hundred start-ups. However, I-Corps revives a longstanding debate on NSF's proper role: Should the agency fund "basic" science as a public good and leave commercialization to the private sector?[12] Critics argue that university entrepreneurship and commercialization enhance the corrupting influence of capitalism in science.[13] Furthermore, I-Corps' standardized process and emphasis on economic gain may diminish the values of exploration and self-discovery associated with innovation (Rusk, chapter 15) and overshadow deliberation and social responsibility as core values of science and engineering (Fisher, Guston, and Trinidad, chapter 18).

Innovation experts have long emphasized the role of *place* in the gathering and training of innovators.[14] Silicon Valley, Boston, and North Carolina's Research Triangle Park are hotbeds for innovative activity in part because they provide the right institutions, amenities, and culture for innovators to thrive. After decades of efforts to build the next Silicon Valley have failed, however, experts recognize the perils of a cookbook approach. They ask: *How might we* cultivate successful innovative regions that honor and build on local strengths?

In chapter 6, "Making Innovators, Building Regions," economic geographer Maryann Feldman surveys how "local champions" work in concert with universities, firms, and other institutions to build high-tech regional clusters. Like many economists, Feldman defines innovation as the commercialization of new knowledge and the primary driver of economic growth. She synthesizes insights of a career spent studying high-tech regions and measuring their outcomes. Drawing on examples from places as diverse as Kansas City, Missouri, and Greenwood, Mississippi, she argues that there are common ingredients in making innovative regions but no single recipe. Each innovative region has its own unique blend of institutions, regional capabilities, and social configurations.

Feldman documents how as innovators build their own companies they also build local institutions and shared resources that produce even more innovators. But Feldman only shows us the dynamic processes underlying *successful* innovative places. She does not address regions such as Dallas or Albany, New York, where local champions have assembled all the necessary ingredients yet ultimately failed to ignite high-tech clusters.[15] As we will see in part II, innovative communities can be difficult to replicate and sustain (Hintz, chapter 10). Also, regional efforts to build new innovation hubs often become entangled with national priorities that complicate what counts as success (Pfotenhauer, chapter 11).

Despite insisting that innovators are made not born, the programs described so far portray innovation as an elite activity beyond the reach of most citizens. The innovators they hope to make are PhD scientists and driven entrepreneurs, generally in high-technology regions. However, there is also a longstanding tradition in the United States of amateur scientists and do-it-yourself tinkerers.[16] In the past decade, moreover, experts such as Eric von Hippel and Henry Chesbrough have argued that organizations benefit when they bring end users and outsiders into the innovation process.[17] As government agencies respond to market pressures and the inequities in the innovation economy, policymakers ask: *How might we* democratize innovation to harness the contributions of all Americans?

In the section's last chapter, "Innovation for Every American," Jenn Gustetic, a federal innovation expert, contends that all Americans can contribute to innovation. She recounts how, under President Obama, the White House's Office of Science and Technology Policy (OSTP) encouraged citizens to participate in scientific discovery and technology design through crowd-sourcing and citizen science initiatives. Gustetic recounts how these innovation programs were as much a project for reforming government as a strategy for harnessing open innovation; government bureaucrats were forced to leave their comfort zones, work across departments, and partner with new kinds of innovators to solve their agencies' challenges. She argues that future presidential administrations must attend not only to who produces innovations but also to who owns the results.

The Obama administration's open innovation policies recruited students, retirees, and ordinary Americans to become innovators. The OSTP elevated the innovator imperative to a national goal and perpetuated the belief that innovation is an inherent social good (Godin, chapter 9). But

"inclusive" techniques such as crowdsourcing and offering incentive prizes shift many of innovation's risks and costs from the government onto its citizens.[18] Citizen-innovators risk their own money to develop solutions, but the government pays only for those that meet the prize criteria. Volunteer citizen scientists, meanwhile, generally go unpaid. Also, while federal open innovation efforts target participation from underrepresented groups, they do not confront the structural inequities that prevent deeper participation in the innovation economy (Cook, chapter 12).

Collectively, the experts profiled in this section believe that innovation leads to social progress and national prosperity. Their initiatives share the premise that the failures of the status quo and existing bureaucracies can be overcome; that no matter the life stage, everyone can work to better themselves; that innovative skills can be learned; and that large-scale interventions are required to support them. All of these contributors also draw upon a network of institutional support from the government, corporations, and universities. Does America need more innovators? The answer for these practitioners is a resounding "Yes… and let me show you how it's done."

But there are significant differences in the goals of these initiatives. Some programs equip students with new skill sets; others hope to maximize the return on taxpayers' dollars; still others are driven by the potential for profits. These different motivations, in turn, result in programs for different target audiences, tactics, and messages. For example, UIF's methods explicitly focus on empathy and self-actualization, while NSF's I-Corps teaches senior academics to become competitors in an unforgiving market environment.

Finally, innovation's advocates rarely question the necessity or the potentially negative consequences of their work. As Part II will address, where creators of innovator initiatives describe empowerment, detractors find boosterism and false promises. Where these champions promote novel twenty-first-century methods, historians recognize well-trodden patterns with a mixed record. Where this section's contributors describe beneficial collaborations among industry, government, and academia, critics detect the privatization of public goods. And where advocates of innovation training see avenues for personal growth, critics see the redistribution of risk and anxiety from institutions onto individuals. Exploring competing interpretations of the nation's innovator imperative requires first understanding its champions.

Notes

1. Warren Berger, "The Secret Phrase Top Innovators Use," *Harvard Business Review,* 17 September 2012, https://hbr.org/2012/09/the-secret-phrase-top-innovato.

2. Andrew B. Williams, "A Recipe for Unleashing Creative Design Thinking in Your Teams," *In Search of Innovation*, 31 December 2014, accessed 15 May 2017, https://drandrewspeaks.wordpress.com/category/design-thinking/.

3. "How Might We Use Tech to Build a Culture of Civic Engagement?" *CHORUS*, 22 March 2017, accessed 23 May 2017, https://www.jointhechorus.org/blog/2017/4/4/how-might-we-use-tech-to-build-a-culture-of-civic-engagement.

4. Larry Leifer and Christoph Meinel, "Design Thinking for the Twenty-First Century Organization," in *Design Thinking Research: Taking Breakthrough Innovation Home*, ed. Hasso Plattner, Christoph Meinel, Larry Leifer (Cham, Switzerland: Springer International Publishing, 2016), 3.

5. Carolin Kreber, *The University and Its Disciplines: Teaching and Learning within and beyond Disciplinary Boundaries* (New York: Routledge, 2010).

6. Additionally, see Natasha Iskander, "Design Thinking Is Fundamentally Conservative and Preserves the Status Quo," *Harvard Business Review*, 5 September 2018, https://hbr.org/2018/09/design-thinking-is-fundamentally-conservative-and-preserves-the-status-quo.

7. The term "wicked problems," popular among innovation advocates, actually is a twentieth century one. C. West Churchman, "Wicked Problems," *Management Science* 14 (December 1967): B141–B142.

8. Barry M. Katz, *Make It New: The History of Silicon Valley Design* (Cambridge, MA: MIT Press, 2015); Tom Kelley, Jonathan Littman, and Tom Peters, *The Art of Innovation: Lessons in Creativity from IDEO, America's Leading Design Firm* (New York: Currency, 2001); Peter Lucas, Joe Ballay, and Mickey McManus, *Trillions: Thriving in the Emerging Information Ecology* (New York: Wiley, 2012).

9. LUMA stands for Looking, Understanding, Making, Advancing. *Innovating for People: Handbook of Human-Centered Design Methods* (Pittsburgh: LUMA Institute, 2012).

10. "Our Beliefs," LUMA Institute, accessed 9 April 2018, https://www.luma-institute.com/why-luma/our-beliefs/.

11. David Mowery, Richard Nelson, Bhaven Sampat, and Arvids Ziedonis, *Ivory Tower and Industrial Innovation University-Industry Technology Transfer before and after the Bayh-Dole Act* (Redwood City, CA: Stanford University Press, 2015); Henry Etzkowitz, *The Triple Helix: University-Industry-Government Innovation in Action* (London: Routledge, 2008).

12. On debates over basic versus applied research at NSF, see Daniel L. Kleinman, *Politics on the Endless Frontier: Postwar Research Policy in the United States* (Durham, NC: Duke University Press, 1995), and Dian Olson Belanger, *Enabling American Innovation: Engineering and the National Science Foundation* (West Lafayette, IN: Purdue University Press, 1998).

13. For example, see Philip Mirowski, *Science-Mart: Privatizing Modern Science* (Cambridge, MA: Harvard University Press, 2011).

14. Arthur P. Molella and Anna Karvellas, eds., *Places of Invention* (Washington, DC: Smithsonian Institution Scholarly Press, 2015); Margaret Pugh O'Mara, *Cities of Knowledge: Cold War Science and the Search for the Next Silicon Valley* (Princeton, NJ: Princeton University Press, 2005); AnnaLee Saxenian, *Regional Advantage: Culture and Competition in Silicon Valley and Route 128* (Cambridge, MA: Harvard University Press, 1994); Bruce Katz and Julie Wagner, *The Rise of Innovation Districts: A New Geography of Innovation in America,* Washington, DC, Metropolitan Policy Program at Brookings, May 2014, accessed 22 May 2017, https://c24215cec6c97b637db6-9c0895f07c3474f6636f95b6bf3db172.ssl.cf1.rackcdn.com/content/metro-innovation-districts/~/media/programs/metro/images/innovation/innovationdistricts1.pdf.

15. Stuart W. Leslie and Robert H. Kargon, "Selling Silicon Valley: Frederick Terman's Model for Regional Advantage," *Business History Review* 70, no. 4 (1996): 435–472; Stuart W. Leslie, "Regional Disadvantage: Replicating Silicon Valley in New York's Capital Region," *Technology and Culture* 42, no. 2 (2001): 236–264.

16. Jack Hitt, *Bunch of Amateurs: Inside America's Hidden World of Inventors, Tinkerers, and Job Creators* (New York: Broadway Books, 2013).

17. Eric von Hippel, *Democratizing Innovation* (Cambridge, MA: MIT Press, 2006); Henry Chesbrough, *Open Innovation: The New Imperative for Creating and Profiting from Technology* (Boston: Harvard Business School Press, 2007).

18. Jacob Silverman, "The Crowdsourcing Scam: Why Do You Deceive Yourself?" *The Baffler*, October 2014, https://thebaffler.com/salvos/crowdsourcing-scam.