

# Hacking Hacked! The Life Cycles of Digital Innovation

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The association of hacking with computer software is gradually changing, as new walks of life are being explored with a hacker mind-set. The creation of “hackerspaces” or “makerspaces” in cities around the world has facilitated the spread of hacker practices to new fields of engagement, such as open hardware development and do-it-yourself (DIY) biology. This evolution brings with it a renewed need to analyze the significance of hacking from a historical angle and in relation to its role in industrial and institutional innovation. The works that compose this special section of *Science, Technology, & Human Values* draw on the idea of *recuperation* and suggest that such a theoretical framework is a productive tool for analyzing the life cycles of digital innovation. Three papers examine the process of recuperation following a red thread that runs through many recent works on hacking. “Recuperation from below” captures the essential meaning and promise of hacking, which is to use technology to serve ends other than those originally intended, starting with the computer (which is itself a product of the military-industrial complex). This evokes the emancipatory promises that are invested in reverse engineering and the repurposing of tools and

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technology. Our proposition, and that of the contributing authors, is that the job is only half done if we rest content with restating this promise (Troxler and Maxigas 2014). As the saying goes, “two can play that game,” and hacking can be hacked. Hacker practices and innovations are adopted, adapted, and repurposed by corporate and state institutions on a regular basis, thus made to serve other ends than the (emancipatory) ones claimed at the outset. By saying this, we do not deny that there is a potential in hacking, only that this promise must be weighed against the likelihood of a future recuperation of the same practices.

Hacking can be seen as a special case of a broader trend of citizen engagement with science and user appropriation of technology (Oudshoorn and Pinch 2005). The users that have been studied in the Science & Technology Studies (STS) literature over the past decades are heterogeneous, ranging from patient groups to sheep farmers. There is no unifying narrative or collective identity among them that could give direction to their engagement with science and technology. Yet in spite of the absence of a political subject, many scholars have ascribed an emancipatory potential to this trend, similar to the claims made by hackers. According to some writers, user involvement will overturn Modernist epistemological hierarchies (Akrich and Rabeharisoa 2012), and others welcome a democratization of the decision-making processes that govern science and technology (Feenberg 1999). However, as we make an analogy between hacking and other forms of involvement in science and technology, we believe that the concept of recuperation has a broader bearing on the politics of the user.

The concept of “recuperation” implies interpretation of an event or a process, which in turn presupposes an interpreter, which is to say, a political subject. Consequently, reflections about recuperation have chiefly been developed at the intersection of STS and social movement theory. David Hess’s musings about technology-oriented social movements are instructive. He identifies three phases in the co-evolution of a social movement and the product innovation it brings about: firstly, the goals of technology-oriented movements are articulated in close liaison with entrepreneurs and companies willing to create a market for the new product. Secondly, as the product matures, the design and meaning of the alternative technology are transformed under pressure from market and mass production constraints. Thirdly, this transformation gives rise to conflicts between the movement and its for-profit allies, and between different factions within the movement (Hess 2005).

Examples are readily found among hackers: in the long-winded debate over what kind of alternative licenses to use, for instance, and whether to

call them “free” or “open” (O’Mahony 2003; Berry 2004). The same tensions are manifest in the maker movement, where debates go on about what to call their physical locations: “hacklabs,” “hackerspaces,” or “makerspaces.” Each name comes with different connotations and appeals to different constituencies (Maxigas 2012). Most conflicts revolve around the proper design and the adoption or rejection of a technology, but these debates are always paired with clashes over collective (self-)representations. In such clashes are decided what idealized past and desirable future will set the agenda for the group. One faction might be marginalized to the point that the very existence of a conflict line is rendered unrepresentative.

Arguably, hackers can be situated in between a social movement, with a common history, a collective identity and shared goals, and a multiplicity of users, who lack such defining traits. The more closely hackers are made to resemble the latter, the more reliable source of innovation for firms they become.

This observation provides us with the other side of the story of how innovations are harnessed from hackers (and users) by firms. By definition, this method for procuring innovation is systematic in the open-innovation regime. In order to grasp the systematic character of this, we need to rethink recuperation in terms broader than the life cycle of the individual hacker project/community. Boltanski and Chiapello (2005) reflect on the emergence of a *new spirit of capitalism* and reiterate that capitalism’s sources of legitimacy are to be found outside capitalism itself. The new spirit they describe is based on an inquiry into the incorporation of the 1968 critiques that helped to restructure and renew the ideological and organizational logics upon which capitalism works. In their view, capitalism feeds on critical cultures: only the incorporation and adaptation of critiques give capitalism means to overcome its own impasses. For instance, the inverse side of the critique against proprietary software and other forms of “closed innovation” systems expressed in free software communities is an investment in “open” forms of capital accumulation. Thus, the oppositional stance can be turned into an “ethical foundation for contemporary capitalism” as they are integrated in the new spirit (Barron 2013, 19; Tkacz 2012). Likewise, other writers have noted how the rebel-outsider position claimed by hackers has become an asset in an authenticity-stricken and consumer-driven market society (Liu 2004; Fleming 2009).

Whereas Boltanski and Chiapello’s argument dwells on the evolution of organizational forms, they have little to say about the role of technology in the processes they describe. Yet technical innovations spawned by hackers (modular software code, mesh computer networks, distributed retrieval

systems, private cryptography, etc.) constitute the material infrastructure of today's capitalism. In this collection of articles, we argue for including hacking as one of the sources of the processes that constitute such infrastructure.

## The Authors

In "Hacking with Chinese Characteristics: The Promises of the Maker Movement Against China's Manufacturing Culture," Silvia Lindtner explores the ongoing commodification of hacking as DIY makers and venture capitalists, related to the Chinese state. Her article presents aspects of a long-term, multi-sited ethnography and analyzes Chinese open hardware development, documenting how the hacker ideals of openness, resourcefulness, and individual empowerment proliferate while being reformulated in relation to China's national, politico-economic project. Central to this is its move away from "made in China" to "created in China." DIY making and manufacturing come together in Shenzhen, a region in the South of China chiefly associated with factories run by subcontractors appalling working conditions. The rise of hackerspaces is discursively well placed for framing a new image where making and innovating are traditional Chinese traits.

Through direct engagement with institutional actors, DIY biology also actively contributes to state regulation and control. Sara Aguiton and Sara Tocchetti provide in their article an account of the relationship between DIY biology groups and security agencies in the United States in the context of the institutionalization of a new preoccupation with biosecurity. In "Is an FBI Agent a DIY Biologist Like Any Other? A Cultural Analysis of a Biosecurity Risk," Aguiton and Tocchetti analyze how a group of "amateur biologists" and "biohackers" was labeled a "biosecurity concern" shortly after its emergence. This led the Federal Bureau of Investigation (FBI) to include DIY bio members as part of its Outreach Program for biosecurity. The amateur network soon became a strategic partner of the FBI Bioterrorism Prevention Program. Particularly interesting is how bio-hackers reached out to FBI agents and thereby increased their own leverage.

Hackers offer corporations horizontal organizational practices and associated cultural values. In her ethnographic account of an Indian hackathon, "Hackathons and the Making of Entrepreneurial Citizenship," Lilly Irani highlights the predicament of hacker practices' adaptation and integration into corporate structures and situates hacker organizational processes as both a manifestation of a hacker ethos and as local political practices that reconfigure new forms of exclusion and inclusion through digital making.

Hackathons take their form from open-source software development cultures, but have grown in popularity in recent years in both for-profit and nonprofit work. Irani's research took place in a design studio in urban India that conceptualized itself most immediately as a way of producing a software prototype for participatory law making. Irani argues that its cultural politics are present not only in the kinds of value circulation or values-laden technologies it produces but also in the organization of time and sociality it orchestrates and celebrates through the hackathon. The "managed urgency" of the hackathon enables entrepreneurial software building but excludes the slow time of coalition building and democratic debate.

Although the authors in this special section draw on various intellectual resources, explore different temporalities, use different terms, and refer to a plentitude of different scholars, their inquiries, indicative of a growing body of work on hackers, have at least one thing in common. They investigate hacking while unceasingly asking the question if it has been hacked and then specify to what extent and in what sense this is (or is not) the case.

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