Remaking Creativity & Innovation: China's nascent DIY maker & hackerspace community

Silvia Lindtner
Post-doctoral Fellow
Fudan University & University of California, Irvine
lindtner@ics.uci.edu

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In September 2010, China's first hackerspace opened its doors in Shanghai under the name XinCheJian, (literal translation: new workshop, or new factory). Hackerspaces are shared studios that bring together people committed to the free and open sharing of software and hardware, as well as ideas and knowledge. As of April 2012, there are more than 500 active hackerspaces in existence worldwide, making them a global phenomenon[1]. A typical studio will be equipped with tools that allow for experimenting with the physical/digital boundary—laser cutters, 3-D printers, microcontroller kits, and so forth. Many hackerspaces also host educational workshops where these tools are used to teach others about manipulating the physical environment through software, or vice versa. The global hackerspace movement has helped proliferate a "maker culture" that revolves around both technological and social practices of creative play, peer production, a commitment to open source principles, and a curiosity about the inner workings of technology (Coleman 2012, Ratto 2007).

Only a year after the founding of XinCheJian, the Shanghai government announced a call for proposals to build 100 "innovation houses" (chuangxin wu 创新屋) to be supported by

[1] http://hackerspaces.org/wiki/List_of_ALL_Hacker_Spaces

government funding. Although the official document[2] described this initiative as part of a larger effort to build a citywide platform for supporting popular science work and innovation, national and international media interpreted this move as an endorsement of China's fledgling maker culture by Chinese politicians.

What is going on here? What motivated politicians in China to support the growth of a community that has come to be known for its commitments to a do-it-yourself (DIY) approach toward making technologies and to the free and open exchange of knowledge? How does maker culture manifest itself in China, where "making" in the DIY sense collides with China's image as the world's largest manufacturer?

I will show in this paper how both Chinese politicians and countercultural hackers argue for a remake of China, but differ in the ways in which they envision this change to unfold. In doing so, I debunk two common myths: first, that maker culture is inherently apolitical, and second, that innovation is limited to so-called post-industrial or developed regions functioning on the principle that wealth production comes from "ideas, knowledge, skills, talent and creativity." My explorations are based on a two-year ethnographic engagement with the DIY maker community in Shanghai as well as the participation in a series of "maker" and hacker workshops and conferences across China.

Creativity in China

Establishing a hackerspace in China is necessarily entangled in both the nation's wider economic and political transformations *and* the global DIY maker culture. The story of setting up a hackerspace in China is not about the linear transfer of knowledge and tools from the West to the East. On the contrary, the story of China's hackerspace community critiques such a view and highlights how technologies and values are sites of negotiation, remaking, and constant appropriation as they are translated into particular local settings. By looking at hackerspace developments in a place like China, where commercial hardware manufacturing provides

[2] See http://www.stcsm.gov.cn/jsp/xxgk/zhtz/content.jsp?id=2267 and http://www.stcsm.gov.cn/zwzyml/fileUpload/file/20111102100853.doc

employment for many, I provide an alternative perspective on dominant stories of innovation and creativity.

When we talk about "making" of innovation, the quintessential example commonly used is Silicon Valley tech entrepreneurialism and start-up culture. China, on the other hand, is often invoked as Silicon Valley's unimaginative counterpart. Silicon Valley comes up with the ideas and China manufactures them. Many of our computers for instance are labeled as "designed in" California and "assembled in" China. It is exactly this image that assembled or "made in" inherently stands for China" and "created in" inherently stands for California that Chinese politicians and DIY makers are driven to change today.

For example, in 2004, the Chinese politician Liu Shifa from the Ministry of Culture, stressed that: "China should focus its attention on a new century. From creative industries to creative economy then to creative society. Contemporary China should be a creative China; from manufacturing to creative work, from 'made in China' to 'created in China.'"[3] By this, Liu Shifa suggested a transcendence of China's reliance on manufacturing (made in China) by re-directing economic and social development towards the creation of ideas, services and knowledge (created in China).

This vision of remaking China had material consequences. One example is the urban redesign of over 80 old city neighborhoods in Shanghai into trendy art and design loft-spaces, incubator and start-up firms, under the rubric "creative industry clusters." Politicians present this urban re-design and industry building effort as the ultimate path to train a high-quality workforce that will enable China to move ahead in a global market oriented towards information and knowledge production. They call upon Chinese citizen to develop techno-entrepreneurial thinking and become adaptable and flexible workers in order to contribute to the remake of China. By enlisting citizens as co-creators in the cultivation of creative China, politicians tether neoliberal politics and free market ideology to Confucianist values. They argue that it is China's low quality of its citizenry and the failure of Chinese people to modernize that still holds the nation back from cultural leadership in international comparison.

[3] in Chinese: 新的世纪，应当是创意世纪；从创意产业的蓬勃发展到创意经济的乘势崛起直到创意社会的应运而生，正在为我们的世纪带来新的文化视野。当代中国应当是创意中国；从中国制作到中国创作，从中国制造到中国创造。

In their call for societal change in order to move China ahead, Chinese politicians are not alone. They share this vision with politicians, policy makers and business leaders in other regions across Europe, North America and Asia. Emily Martin (1995), Aiwah Ong (2006), Susan Greenhalgh (2011), and Arif Dirlik (1998), for example, trace how political discourse and managerial literature across North America, Asia and Europe take up ideas of an innovative and creative workforce in order to promote the training of tech-savvy, self-reliant and inventive citizens. Martin, for example, traces how the related notion of flexibility is now commodified as "one of our new taken-for-granted virtues for persons and their bodies arising as a trait to be cherished and cultivated, from corporations and city governments to credit cards and shoes, flexibility is an object of desire for nearly everyone's personality, body, and organization. Flexibility has become a powerful commodity, something scarce and highly valued, that can be used to discriminate against some people." (Martin 1994, p. xvii).

China is perhaps a particularly interesting site through which to explore the uptake of the broader discourse of creativity and social change, because of its reputation as a site of rapid transformation and social upheaval. Since the years of opening up, Chinese politicians have been centrally concerned with change, in particular with China's development in international comparison. This political concern has been accompanied by a series of economic reforms, which are made visible in projects such as the building of new production sites, international markets and cities. And also, the image of China portrayed in international media and news coverage is often one that centers on China's remake over the last 30 years. Therefore, tracing manifestations of creativity and associated proclamations of change in China could be described by what Fisher and Downey (2006, p. 4) called: "a report from the frontiers of transformation, where new technologies, shifting economic patterns, and novel symbolic systems have helped to convince people that they live on the cusp of a new age - whether that future is utopian or dystopian."

While Chinese politicians argue that citizens lack creativity, scholars in the field of Chinese Internet research suggest that individual and creative expression flourish online, *e.g.* (Barme and Ye 1997, Herold and Marolt 2011, Li 2011b, Yang 2009, Wallis 2011, Zhou 2011). Their work has contributed important insights to our understanding of the Chinese Internet as multi-

faceted and as a site through which simultaneously social norms are reworked and existing control is further extended. Much of this prior work has focused on political issues, including, for instance, censorship and political control, *e.g.* (Chase and Mulvenon 2002), political activism, the public sphere and tactics to circumvent censorship, *e.g.* (Yang 2009, Lindtner and Szablewicz 2011, MacKinnon 2012, Szablewicz 2010), and on disadvantaged populations with limited access to Internet technology or technological work-arounds such as migrant workers (Oreglia 2011, Qiu 2009, Wallis 2011).

With the notable exceptions of Andrew Ross' detailed account of white-collar workers in the high-tech industries in China and Taiwan (Ross 2007) and Lorraine Justice's work on contemporary Chinese product design (Justice 2012), the experiences and practices of those who work in the high-tech and creative industries in China today have received less attention. Especially rare in the growing field of Chinese Internet Research[4] is work that involves long-term, on the ground ethnographic engagement with people involved in the creation and design of technologies.

My work with China's DIY hackers and makers fills this gap by providing exactly such an in-depth account of a collective of technology designers. In this paper, I explore in particular how the hackers and DIY makers I worked with in China simultaneously critique and relate to the calls for social change put forward by Chinese politicians. In what follows, I will illustrate how they propose that innovation and creative production are core for China's cultural development, while following a path that differs from the one the government has taken.

Remaking Creativity & Innovation

Members of China's DIY maker scene frequently write about their work in journals, books, on Internet blogs, manifestos. Figure 1 displays one such publication. It is a volume edited by Joi Ito with contributions by Lawrence Lessig, Howard Rheinhold, Yochai Benkler, Cory

[4] The annual Chinese Internet Research Conference (CIRC) has brought together and given visibility to this growing scholarly field investigating the phenomenon of the Chinese Internet: http://circ.asia.

Doctorow and Isaac Mao, one of the key members of the free and open source tech scene in China.

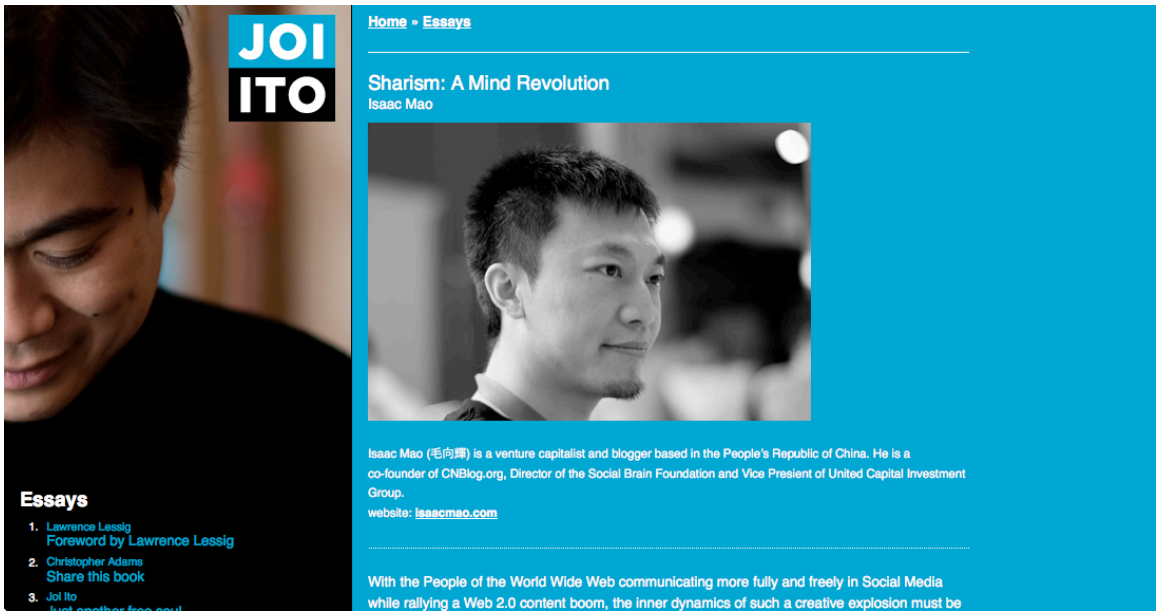

Figure 1 Cover "Free Souls" edited volume by Joi Ito

In there, Mao, proposes that through the open use and design of digital technologies citizens and users becoming co-creators not only of technologies, but also of businesses, economies and society—through digital participation creativity will be liberated. He argues that this social and economic change is inadvertent and only temporally interrupted through the limits of what he calls "a closed culture."

With a "closed culture" Mao refers both to the regulation of creative production and reproduction with copyright law AND to the limitations to free expression through censorship. In their call for social change the DIY makers I worked with aligned with Chinese government officials, who argue for the cultivation of a new creative society in order to move the nation forward. They differed however where they located China's lack. People like Mao repeatedly emphasized that China's lag in international comparison was not due to the low quality of its people as government officials argue, but is caused by the lack of infrastructures and support networks that enable youth, artists and entrepreneurs to become empowered individuals and global citizens.

Rather than proposing a move away from hardware production like government officials, they propose to take advantage of China as an authentic site of make, because of its hardware workshops on the streets and its factories that produce for the world.

David Li, one of the co-founders of the hackerspace in Shanghai described this to me as "DIY out of necessity," rather than motivated by countercultural ideals, which he associated with DIY "maker culture" in the US and Europe. The broader vision of the growing hackerspace scene in China is to align these two maker cultures, one that emerged out of necessity and the other out of countercultural sentiments, to remake what maker and innovation mean in the first place. I now show how this vision to align two maker cultures and remake innovation was implemented in practice.

Shanzhai—open source of another kind.

Shenzhen is most widely known as home to the Foxconn factories, where firms like Apple, Hewlett-Packard, Intel, and Microsoft produce their products. What is receiving less news coverage than Foxconn's controversial labor practices is that many Shenzhen factories have adopted a model of open source sharing in order to lower production costs. They have informally organized a peer-to-peer database for sharing hardware design schematics and the bill of materials (BOM), a list of materials used in manufacturing a particular product. The open sharing of these resources allowed the factories to lower production costs to stay competitive in a global market.

This form of open source manufacturing has co-evolved with the formation of new production sites, including, for example, counterfeit/copycat design houses. Over the years, these copycat productions have adopted their process and moved beyond simply copying popular brands such as Nokia or Apple. Today they often produce new, consumer-specific products such as mobile phones with additional features tailored to particular customer segments or location-specific demands. Examples include dual-SIM-card mobile phones that support two operator networks on one device—such as the G5 phone, a made-in-Shenzhen brand for the Indian market—and phones with built-in compasses that are shipped to consumers in the Middle East who may need to know the direction of Mecca during prayers

(Keane 2012, Jeffrey 2011). Many of these innovations were later re-appropriated by mainstream mobile manufacturers; for example, in 2010 Nokia launched two dual-SIM mobile phones.

Copycat productions from Shenzhen are often described with the term *shanzhai* (山寨). However, in the hackerspace community, shanzhai now speaks to a new form of innovation based on the principle of open source manufacturing and continuous remaking. The literal translation of *shanzhai* is "mountain village" or "mountain stronghold," the home to bandits or Robin Hood–like figures who oppose and evade corrupted authority. China's hackerspaces invoke this image of subculture in order to argue for an alternative take on the meaning of copying through the lens of remaking.

The examples of shanzhai phones cited above, for example, are used to challenge ideas of innovation promoted by politicians and corporations. Since China's entry into the WTO in 2001, a new line of reforms stresses the need to transcend China's reliance on manufacturing. Through redirecting social and economic development toward the creation of ideas, services, and knowledge, China should evolve from the image of "made in China" to "created in China." Drawing upon shanzhai innovation, China's hackerspaces argue for an alternative version of "created in China." Rather than proposing to overcome manufacturing for the sake of knowledge production, they offer a view that China's existing manufacturing infrastructure could be used to accomplish in practice what so far has been a political vision.

When two maker cultures meet

China's hackerspaces use shanzhai innovation not only to challenge political approaches toward economic change in China, but also to offer a broader remaking of innovation, redefining what counts as innovation and where it originates. Depicted in Figure 2 are two promotional flyers for HAXLR8R[5], a 15-week mentorship program that invites foreign hardware-based start-ups to China in order to realize their ideas in direct collaboration with manufacturers in regions such as Shenzhen.

[5] HAXLR8R stands for Hardware-related accelerator, a hardware-focused incubator. It was founded by Cyril Ebersweiler and Sean O'Sullivan through their SOSventures fund. Operational partners in China are Chinaaccelerator, Seed Studio and Dragon Innovation. See more at http://haxlr8r.com.

Figure 2. Promotional flyers for the HAXLR8R program.

HAXLR8R uses China's hackerspaces as local hubs to facilitate this collaboration. During their time in China, the invited start-ups are based out of hackerspaces, where they brainstorm and build prototypes. The staff of the hackerspaces facilitate connections with local manufacturers to implement the ideas. HAXLR8R merges maker creativity with the open source manufacturing of Shenzhen's shanzhai factories. The idea is that both sides benefit: Hardware manufacturers find new clients as mass-scale production demands from big corporations decrease; at the same time, small start-ups are able to affordably produce and test their products.

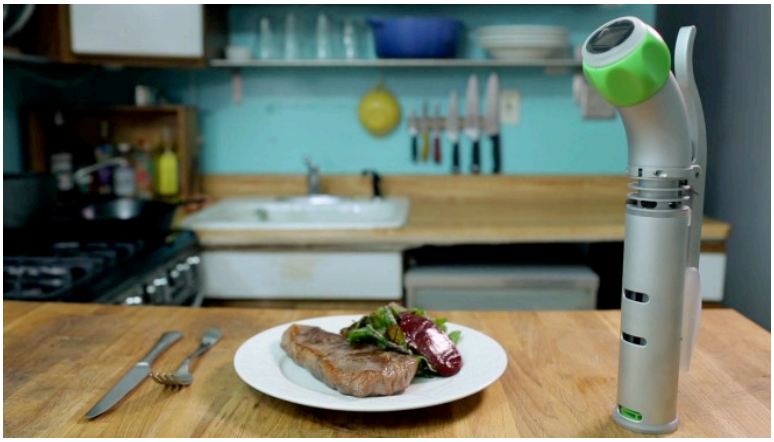

Figure 3. Nomiku promotional photograph

Nomiku, one of the projects that took shape during the latest HAXLR8R, illustrates this idea of merging maker and shanzhai culture. Nomiku, depicted in Figure 3, is a Kickstarter project that received crowd-sourced funding to make an affordable and easy-to-use device for sous vide cooking—a technique popular among high-end chefs that uses water, airtight plastic bags, along with precise temperature control to cook dishes. During the HAXLR8R program, the Nomiku team learned how to turn their sous vide DIY kit, which they had developed with help from U.S.-based makers like Mitch Altman, into a compact consumer product that is more affordable than most competing versions on the market. Nomiku not only uses open source manufacturing in Shenzhen but in many ways also reflects the maker-culture ethos. The device is the brainchild of a couple of passionate home cooks who gave birth to the idea while they sat at home watching *Top Chef*. Nomiku was designed to function on simple, cheap components, and rather than being financed by a large corporation or investor, it was sponsored through Kickstarter, a crowd-funding website that has become emblematic as a DIY and maker business model. With Kickstarter, anyone—a geek working out of a basement, or a passionate home cook—can become inventor and producer by seeking financial support from the Kickstarter community. This is how the Nomiku founders described their original idea: "Our goal is to create the best immersion circulator for home cooks so everyone can have sous vide in their kitchen arsenal. Eating and sharing perfect food shouldn't be out of reach"[6].

[6] http://www.kickstarter.com/projects/nomiku/nomiku-bring-sous-vide-into-your-kitchen?ref=live

HAXLR8R projects like Nomiku and China's hackerspaces together demonstrate that "created in China" is already a reality, but it takes a slightly different form from how politicians, policy makers, and large corporations envision the future of innovation.

Concluding Thoughts

What I have attempted to show then in this paper is that China's nascent DIY maker and hacker culture is not directed at escaping the system, but at making use of it, making fun of it, altering it, provoking it - it's parasitic. The DIY makers in China align with "maker culture" in the US and with political promotions of China's remake into a place of innovation. They questioned and exploit both, in order to develop alternate ways of thinking about and doing work and innovation.

Projects like the HAXLR8R illustrates that hackerspaces in China are on the verge of transitioning a hobbyist movement into a mode of living and working amidst (not against) capitalist production. DIY making once could have been described as what Rachel Maines (2009) calls "hedonizing technology." By this Maines spoke to the re-appropriation of activities that were previously considered labor as leisure or creative practice. While DIY and hardware hacking has traditionally been associated with hobbyist practice by geeks, eager to hack away on their weekends, HAXLR8R recombines pleasure of production *with the value of the product*.

Broadly, China's technology sector is often assumed to inherently lack innovation and creativity. Contributing factors often named are China's historical development, its educational system, and its culture or focus on manufacturing following the years of economic reform. James Landay, for example, reflected on his work and teaching experiences at Microsoft Research Asia and Tsinghua University in Beijing in a blog post in response to a New York Times article on China's innovation goals by John Markoff and David Barboza. He argued that "the level of innovation and creativity in this cohort is much lower than in similar cohorts in the U.S. And in fact, the ones that are the best on the 'creativity' scale almost invariably are folks who received their Ph.D.s in the U.S./Europe or worked in the U.S./Europe"[7]. Comments such

[7] http://dubfuture.blogspot.com/2011/12/china-will-overtake-us-in.html

as Landay's often contribute to cultural stereotypes and extend existing systems of power. We have attempted to show that the hackerspace and maker culture in China challenges dominant views that define regions other than "the West" as inherently lacking creativity or the capacity to innovate. Cross-regional collaborations on DIY and open-source development such as HAXLR8R projects provide alternative takes on what innovation means in the first place. China's hackerspaces demonstrate that "created in China" already exists and that it has emerged from grassroots communities committed to a maker ethos and DIY. These spaces demonstrate that making and remaking is as much about forming community across cultural boundaries and engaging critically with political debates as it is about hacking together a low-cost sous vide cooking tool.

The DIY makers I worked with in China were oriented towards making their own economies, companies, communities, platforms and connections; their own versions of work, labor and innovation; and their own ways of doing work and technology production. This has implications not only for the ways in which we think about maker and DIY culture but also about knowledge production. For them knowledge production and critical analysis is as much about writing hardware or software code as it is writing a journal article or a hackerspace manifestos. In doing so, they challenge not only powerful stories that construe innovation as inherently located in places such as Silicon Valley – they also call upon us to rethink how we have construed forms of knowledge production, cultural analysis and critical theory.

DIY makers and thinkers are perhaps the contemporary scholar's trickster reminding us how our position is not too dissimilar from their own – a parasitic relationship with our interlocutors, funders, and academic institutions, both taking from them and challenging their status-quo.

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