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Making Subjectivities

How China's DIY Makers remake Industrial Production, Innovation & the Self

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Abstract This article shows how the visions and practices of DIY (do-it-yourself) maker culture are taken up in China. It analyzes how maker ideals of open-ness, resourcefulness and individual empowerment are formulated in relation to China's project of building a creative society and economy. To demonstrate, Lindtner draws from long-term ethnographic research, including the set-up of China's first hackerspace and the proliferation of hackerspaces, maker events, and partnerships between makers and manufacturers. China's makers are driven to remake what creativity and industrial production mean today, simultaneously exploiting and challenging political rhetoric. By setting up hackerspaces, designing open technologies and starting up businesses, they craft alternative subject positions, for themselves and others. The contribution of this work is three-fold. First, it fills a gap in prior research by providing an account of a culture of technology production. Second, it proposes the analytical lens of "making subjectivities" to open up the concept of the netizen, illustrating the importance for Chinese Internet research to consider not only technology *use*, but also the culture and materials of its *production*. Third, it demonstrates that makers alter the system from within, contributing to our understanding of the relationship between technology use, production, society, activism and the state.

Keywords DIY making, hackerspaces, technology production, open source, netizen, manufacturing

Author affiliation omitted for blind review.

The contemporary landscape of information technology is one that has been profoundly influenced by the emergence of the so-called "hacker culture" in the 1960s/70s. From the computer you might be using in this very moment to online services you use frequently to communicate, the technology landscape is full of products that depend on alternative models of technology production that were driven by this early hacker culture. These alternatives are variously known as "open source," "open innovation," "peer production," "free software", and the like. The vision that drove these open forms of technology production depicted the emerging digital world in revolutionary terms and as antithetical to the technologies and social structures powering the Cold War state and its defense industry[1]. Members of this hacker culture were committed to designing technologies, which are open and modifiable by their users. Their approach towards technological "makings" evolved out of an "orientation toward the computer as a tool of empowerment and discovery"[2].

Today, we find ourselves in the middle of a new hacker culture (or "maker culture") that both harkens back to this model of technology production as individual empowerment and departs from it in significant ways. This contemporary maker culture is concerned not only with open Internet technology and digital things, but also with physical things such as hardware designs, sensors, and networking devices that bridge between the digital and physical world. While the earlier movement was concerned with the workings of software code and the workings of the Internet, this contemporary maker movement is also concerned with hardware designs and the workings of the Internet of things (IOT)[3]. Chris Anderson (2012), the former editor in chief of *Wired* magazine, suggests that this contemporary "maker movement" is driving forward the "third industrial revolution"[4] – a generation of technology producers that expands from the earlier Internet and Web 2.0 techniques to make innovative products and remake industrial production.

In this paper, I explore the unique manifestations of this maker movement in China. The two main questions I set out to explore are: how do maker ideals of individual empowerment and open knowledge production unfold in relation to China's politico-economic project of building a creative society? What can a study of a culture of technology producers tell us about the relationship between identity, collectivity and digital technology in China?

I begin to tackle these questions by centering in on debates over creativity in China such as its supposed lack and/or the opportunities that lie in its nurturing. For instance, politicians argue that Chinese citizens lack creativity and that as a consequence China lags behind in international comparison in terms of innovation output. In contrast, scholars in the field of Chinese Internet research found that individual and creative expression flourish online[5]. 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. However, much of this prior work has focused on political issues, including, for instance, censorship and political control[6], online activism, the public sphere and tactics to circumvent censorship[7], as well as on disadvantaged populations with limited access to Internet technology or technological work-arounds such as migrant workers[8]. With the notable exceptions of Andrew Ross' (2007)[9] detailed account of white-collar workers in the high-tech industries in China and Taiwan and Lorraine Justice's (2012)[10] work on contemporary Chinese product design, 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 is work that involves long-term, on the ground ethnographic engagement with people involved in the creation and design of technologies. With my research on DIY making, I hope to begin fill this gap by providing exactly such an in-depth account of a culture of technology producers. It is important to note, here, that my goal is not to predict, "if DIY making is really going to make a big difference" for China's project of creativity, as one of the reviewers of this article challenged me to articulate. Rather, I provide a situated account of a unique moment of industry and social development in China, as new alliances between makers and established industries are established. The goal is not to speculate whether or not this "is going to make a difference" (a question to be answered in historical retrospect), but to illustrate how makers in China *today* are both messing with and extending the status-quo.

Making Subjectivities

An important analytical category deployed in the broader field of Chinese Internet Research to describe the relationship between individual expressions, collective identity and digital technology in China is the notion of the netizen. It is predominantly understood as a new form of citizen engagement enabled by the increase of Internet technologies and proliferation of access in China[11]. The perspective of the netizen has allowed us, for instance, to account for new forms of individual and collective expression, in particular in regards to political debates. It has lead to important insights about playful approaches towards censorship and creative workarounds[12], and has uncovered the many shapes of contentious activities and activism associated with the *use* of the Internet[13]. This idea that Internet technologies in China, despite censorship, contribute to the empowerment of citizens (when they act as netizens) has been taken up widely beyond the field of Chinese Internet research, for instance in communication studies and popular tech discourse. Most of this work has approached the notion of the netizen through the lens of technology *use*. However, we know relatively little about the *production* of digital technology in China and its role for individual and collective expression.

In this article, I argue for opening up the concept of the netizen to include practices of both use *and* production of technology. As China's technology landscape is changing, so is participation in its production changing. Think, for instance, of social networking applications such as Weibo and Weixin that have enabled new forms individual and collective as well as new measures of control. These platforms are shaped significantly both by user and system developers, designers and content managers. Opening up our focus towards technology production, then, provides new insights into how netizens are co-designing and co-producing the technologies they use.

For the purposes of this project of reopening the concept of the netizen, I bring together Chinese Internet research with work on dividual subjectivity in anthropology (Strathern 1988, 1996, Boellstorff 1997). So far, the netizen has largely been understood as personhood enacted through technology *use*. This is based on the idea that the use of the Internet enables people to express themselves in new ways. While I consider it crucial to identify such emergent forms of expression and citizen engagement, the netizen as an analytical tool has in many ways turned into what anthropologist Marilyn Starthern (1988, 1996) terms a stable ontological category[14]. Strathern illustrates how between the 16th and 18th century Europe a new mode of governance emerged, that made sense of diverse people and populations by classifying citizens into discrete entities based on statistical analysis. People began to think in disparate entities that made up the natural and social world, *i.e.* "persons became like data entities thought of as individuals, and society defined as the connections between them"[15]. Strathern argues that ever since, we have understood identity as an ontological given that remains stable across time and space. Strathern's insights allow us to see how the netizen identity runs risk of functioning as an ontological given, classifying people in online users (netizens) versus the rest (the state, the non-user, the citizen, etc.). For instance, the term netizen as it is used today generalizes across diverse values and practices in order to articulate the potential impact of Internet technology on social and political change. How can we account for diverse technology practice in China beyond just use and the enactment of citizen-state relations?

Strathern proposes the analytical lens of the "dividual" in order to account for the multiplicity of selfhood through which a person acts, positions herself, and makes meaning of others' actions. This concept has been taken up widely in both anthropology and digital media studies. For instance, building on Strathern, Boellstorff (1997) describes how the notion of the "flexible worker" in contemporary tech business and political rhetoric is exactly such a closed identity, predicated on a single selfhood, that Strathern describes[16]. Boellstorff urges not to re-inscribe dominant subject positions such as the flexible citizen, but to focus on how people make meaning out of tenuous, glancing, fragmentary, and half understood engagements.

Building on this prior work, I propose the analytical sensitivity of "making subjectivities" to open up the notion of the netizen. Making subjectivities draws attention to the ways in which one's position in society is continuously in the making. It means paying attention to the work performed when we position ourselves in relation to others. It also acknowledges that our position is never singular and predicated on a single goal or purpose (*e.g.* to make money or to resist state control), but multiple, fractal, and heterogeneous. With making subjectivities, I wish to shift our focus from single identities such as the activist, the nationalist, the Internet users, and so on, to the multitude of a subject position. With making subjectivities, then, I point to prior research that has highlighted the diversity of technology use[17] and apply it to the study of technology production. As such, I do not propose a move away from what we have gained through our explorations of netizen practice, but to open up the concept of the netizen itself to include the many positions people craft for themselves and others, when they use *and* produce technology.

In what follows, I illustrate how DIY makers in China understood technology production and starting-up tech businesses as intervening in the status-quo from within. By designing open technologies and developing new businesses, they repositioned themselves in relation to others. Their efforts were not directed at escaping the system, but at making use of it, making fun of it, altering it, and provoking it. In that sense, the subject positions they crafted were parasitic. With parasitic, I draw from Geremie Barme's use of term to resist common analytical binaries such as "the dominant social order" versus "subculture" or "counterculture"[18]. Providing a detailed historical account of China's 1980/90s avant-garde and pop art scene, Barme suggests recognize the mutual dependencies and alliances between artists and the state. Illustrating how the state leveraged dissident artists for claims over national cultural production and how artists in turn exploited state support, Barme argues that:

> nonofficial culture can also be spoken of as a parallel or even parasitic culture. As such, it is neither nonofficial nor necessarily anti official. Much of it was and still is produced with state funding and certain (often low-level) official or state involvement. It may not be directly sanctioned or beholden to the overculture, and it cannot simply be classified as oppositional[19].

China's DIY maker culture is neither straightforward countercultural nor pro-system. DIY makers align with start-up culture and hackerspaces in the US, do not hesitate to take advantage of foreign venture capital[20], and exploit political promotions of China's remake into a creative economy. They bring together and align often contradictory ideas such as copycat and open source, manufacturing and DIY, individual empowerment and collective change; and in doing so craft a particular kind of subject position for themselves and others in China.

DIY Making & Creativity in China

China's maker culture emerges from a growing network of hackerspaces, *i.e*. physical spaces that expand ideas and practices of the Web generation into hardware and manufacturing. Hackerspaces are community spaces created by people committed to new approaches towards technology use and design, based on the open sharing of software code and hardware designs. A typical space is equipped with computing tools that allow for experimenting with the physical/digital boundary – computer controlled laser cutters, 3-D printers, and microcontroller kits. Hackerspaces also often host educational workshops, where these tools are used to teach others about manipulating the physical environment through software, or vice versa.

China's first hackerspace opened in Shanghai in the fall 2010 under the name *XinCheJian*[21] (新车间, new workshop). I was able to witness this moment while I conducted research with a collective of entrepreneurs, designers, bloggers, and artists active in and around the coworking space *XinDanWei*[22] (新单位, new workunit). About 3 months into my ethnographic research with *XinDanWei*, a small sub-community formed lead by David Li, Min-Lin Hsieh and Ricky Ng-Adam, interested in DIY and open hardware. They equipped a room of XinDanWei with a 3D printer, sensor toolkits, soldering irons – and China's first hackerspace was born. Only six months later, *XinCheJian* had grown to such an extent that it moved into its own building. Today, there are hackerspaces across several cities in China; Shanghai, Beijing, Shenzhen, Ningbo, Huangzhou, and Guangzhou.

Hackerspaces are not unique to China. With an estimated 700 to 1,100 active spaces in existence worldwide, hackerspaces are a significant global phenomenon[23]. The proliferation of hackerspaces around the world has helped promulgate a DIY maker culture that revolves around both technological and social practices of peer production, creative tinkering, a commitment to open source principles, and a curiosity about the inner workings of technology[24]. The significance of hackerspaces goes well beyond the leisure-time activities of a bunch of geeks (however interesting those might be). Large corporations currently make money from open source, while inventing new business, organizational models, notions of property, ownership and innovation along the way[25]. According to Stephen Weber, "by experimenting with fundamental notions of what constituted property, this [open source] community has reframed and recast some of the most basic problems of governance"[26]. Powell (2012), similarly, argues that open source communities and market structures are dialectical, demonstrating how "major software companies are now core contributors to open source projects, recuperating the processes that hackers originally linked with radical politics."[27] It is this confluence of a countercultural ethos with corporate culture, and how it plays out in China, that this article sets out to explore.

Just one year after the founding of *XinCheJian*, the Chinese government announced a call for proposals to build 100 "innovation houses" to be supported by government funding. Although the official document[28] 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 hackerspace community. What is going on here? How do DIY makers and Communist politicians come together in their believe that hackerspaces are the way of the future for creativity and innovation in China?

In popular discourse, when it comes to elaborating on the meaning of creativity, the quintessential example commonly used is Silicon Valley tech entrepreneurialism and start-up culture. Silicon Valley has not only produced technologies we all use today—think of applications like Firefox or Microsoft Word that you might be using to read this article—but also a particular way of thinking about what counts as innovation, good design and creativity[29]. 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. Apple products, for instance, are labeled as "designed in" California and "assembled in" China (see Figure 1).

Figure 1 Apple iPhone: designed by Apple in California Assembled in China

It is exactly this image that "assembled" or "made in" inherently refers to China and that "designed" or "created in" inherently refers to California that Chinese politicians are driven to remake, when they promote the cultivation of creativity. For example, in 2004, Liu Shifa from the Chinese 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"…"[30].

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). Politicians and policy makers present this remake into a creative economy as the ultimate path to train a "quality" workforce that would enable China move ahead in a global market oriented towards knowledge production. This notion of quality (or 素质[31] in Chinese) is a common rendering of social status and class, often also linked to ideas of what counts as "civilized" and "modern" especially in comparison to the West. Politicians, here, enlist citizens as co-creators in the cultivation of creative China, tethering neoliberal politics and free market ideology to Confucianist values. They call upon Chinese citizen to develop techno-

entrepreneurial thinking and become adaptable and flexible "quality" workers. Anthropologist Susan Greenhalgh (2011) describes this as "an embrace of human-centered techniques of governance that have become the hallmark of the Hu Jintao–Wen Jiabao administration…, which like the neoliberal methods of good governance used elsewhere, work in part by promoting entrepreneurial, self-directed private selves"[32]. With the emphasis on creativity, politicians like Liu Shifa invoke an older discourse based on the principle that China's development rests on the development of a high-quality workforce[33]. In a book entitled "How Creativity is changing China," Li Wuwei (2011), one of China's leading policy makers, mirrors this larger discourse, promoting creativity as a new economic development strategy accomplished by the cultivation of a new society[34]. For China to become creative, Li Wuwei asserts, requires a remake of both its economy *and* its people. This call for creative development is exemplary of several official documents, by and large produced since China's entry into the WTO in 2001, drawing upon the idea that the world economy has reoriented from the production of materials to the production of immaterial goods, ideas, knowledge and services. The underlying tenor of these documents is that it is still the "low quality" of China's citizenry and the failure of Chinese people to modernize that holds the nation back from cultural leadership in international comparison.

Such comparisons to an international market, which mostly refers to the United States and the so-called tiger economies in Asia, have been central to modernization discourse since the 1920/30s, in which China's progress was tied up with technological and civil standards elsewhere, in particular the West[35]. China's culture was rendered as lagging behind in international comparison, because of China's state of civility or *wenming* (文明) in Chinese[36]. Prior work[37] suggests that *wenming*, although invoked at different historical moments and out of different motivations, defines China's state of civility and cultural development a-priori *in comparison* with the West, rendering China's modernization as a project of catching up with the West. Contemporary discourse mirrors this by presented China again as a place of inherent lack and lagging behind[38].

Wenming, when invoked in contemporary creativity discourse, attributes China's lack of creativity yet again to the failure of its people to modernize. However, the very meaning of "modernization" has shifted. "To be modern," now refers to a "disciplined" citizenry in China that should also embody virtues of globality such as entrepreneurial thinking, technological ingenuity and stature in international relations. Taken together, the cultivation of creativity is envisioned to lead to the necessary technological innovation and scientific advancements *in China* in order to turn the nation into both an economic and cultural leader *on a global stage*. *Wenming* is placed as the crucial piece at the heart of this process, casting China's future development as resting once again on its people.

In their call for societal change in order to cultivate creativity, 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, who have taken theories of the "post-industrial society"[39], "knowledge economy"[40] and "creative class"[41] to their hearts. These theories, developed since the 1970s, have called forth a new class of workers such as the self-made entrepreneur, the flexible worker, the creator and innovator of technology. Prior research[42] has traced how political discourse and managerial literature across North America, Asia and Europe have taken up this idea in order to promote the training of tech-savvy, self-reliant and inventive

citizens. These articulations call upon individuals to become creators of culture, technologies and profitable subjectivity.

The remainder of this article shows how China's makers simultaneously critique and relate to these calls for social change. They align with government officials, when they propose that innovation and creativity are crucial for China's development, however differ in how they envision this change to unfold. While politicians argue that creative industry development will make China into a cultural leader of the 21st century, China's makers believe that individual empowerment and a bottom-up approach will lead to social and economic transformation. I will show that we cannot neither fully understand DIY maker culture nor IT development in China more broadly, if we neglect such parasitic alignments between seemingly opposing actors such as makers and politicians.

Fieldwork with makers

The work presented here is based on in-depth ethnographic research I have conducted with China's DIY maker scene since 2010. Its members understand DIY making as an orientation towards computing as creative expression and individual empowerment achieved by engaging with the inner workings of technology. They identify as members of a global "maker movement"[43] with roots in early Internet and technology counterculture and committed to open source principles. My ethnographic research includes participant observation at Chinese hackerspaces, at maker-related events, and at a China-based hardware incubator program. While mostly representing the middle and upper-middle classes, China's DIY maker scene is diverse, including Chinese who have never left China, transnational Chinese who frequently travel to present their work or collaborate with others abroad, and expats who live and work in China. Their world, which I came to know through my ethnographic fieldwork is a fascinating one and one whose contours confound any simple generalization about China being a place where there is little or no creativity. Through my ethnographic research, I have become engaged as a close collaborator and co-producer in their cultural analysis, maker and business projects.

As part of my research, I also accompanied them to events they helped organize or attended such as TEDx conferences, BarCamps, Dorkbots, Hackathons, Startup Weekends, creative industry conferences, Arduino workshops and Maker Faires. I participated in the event organization of some of these, as well as in the production of digital materials that unfolded at the hackerspaces on a daily basis[44]. In addition to participant observations and interviews with people affiliated with the DIY maker scene, I conducted archival research on policy documents on creative industry development, technological and urban development in China as well as interviews with other relevant stake holders such as urban planners, policy makers, founders of Chinese start-ups and international design firms.

Making as Individual Empowerment

For the people I worked with, DIY making meant, among other things, to utilize computational tools for creative expression and individual empowerment. Many shared a

commitment to the open and free sharing of software code, hardware designs, ideas and resources, with the goal to reflect on and rework dominant social and economic frames. As in open source communities elsewhere, there is no single ideology or narrative that dominates the maker scene in China. Rather numerous and at times conflicting ideas and values animate them. Some people, for instance, are committed to starting up firms or grassroots communities, others are eager to rethink contemporary meanings of technology production through topics of re-use and open sharing while working for larger corporations, and yet others are driven to invent new organizational models or alternative approaches to the legal system. Anthropologists Gabriella Coleman and Alex Golub (2008), based on their research on free and open source software, describe this multitude of goals and motivations in open source communities as "a mosaic of ethical positions"[45].

China's maker scene received international visibility, when its members hosted a local version of the trademarked Maker Faire in Beijing in spring 2012, called Maker Carnival. Maker Faire is a large-scale festival that is usually organized by the Make Magazine Group at O'Reilly Media[46] and features hundreds of exhibitors to celebrate arts, crafts, engineering, technology and science projects with a DIY mindset. Maker Faire is typically an event located in the United States (although more recently there have been smaller Maker Faire events in Canada, Europe, South America and Asia). It serves as a cultural meeting point and catalyst for a maker community that presents itself as acting globally and providing broadly the opportunity for people to exploit their creative capacities. The mission statement on the Maker Faire website, for instance, reads: "Maker Faire offers the opportunity for us to see ourselves as more than consumers; we are productive; we are creative. Everyone is a maker and our world is what we make it."[47] Although the Maker Carnival in Beijing was not officially supported by O'Reilly Media and as such could not be branded under the licensed name "Maker Faire," the event nevertheless was crucial for China's makers in demonstrating their belonging to the global "maker movement."

Many of those who attended the Maker Carnival, no matter if Chinese or from abroad, told me that they believed that a maker approach towards creativity would place China at the center of global development today, or as one maker from San Francisco described it: "all of the world economy today is based on a creative economy. And if China is going to be part of this economy, people have to be able to take risks and be encouraged to be creative." In this call for social change, makers aligned with official rhetoric, arguing for the cultivation of a new creative society. They differed however in where they located China's lack. Many stressed that China lacked necessary infrastructures such as educational programs for children and youths, funding programs and independent organizations that support artists, entrepreneurs or generally anyone who works outside traditional frames and large institutions. They repeatedly emphasized that China's lack in international comparison was not due to the low quality of its people and lack of *wenming* as government officials argue, but was caused by the lack of such important infrastructures and support networks. This is how one of the co-founders of the coworking space XinDanWei put this once at a TEDx Shanghai event:

> People say that Chinese have no creativity. That's bullshit! There are lots of very great ideas, some of them are almost too incredible to believe. We are not in shortage of people with good ideas. What we lack are the ability to execute, to extend and the power of influence and resources. Where can you get those things?... if there is a place where people can meet each other and contact all those resources, what will happen then?

Establishing a hackerspace in China, then, was in part motivated to address this lack and create a space that helps others in China think of new career paths (*i.e.* for instance, to become a freelance developer or designer, to start-up your own business, or simply to work with physical materials). During the first months of the Shanghai hackerspace *XinCheJian*, the co-founders organized a series of workshops to introduce others in China to maker culture and its commitments to creative play, DIY and open sharing. During one of the first workshops, the co-founders assembled participants around a big table that they had placed at the center of the hackerspace, introducing the tools they thought to be quintessential for any hackerspace: a 3D printer, Arduino boards, a laser cutter, some wires and electronic components, and soldering irons (see Figure 2). Coming together around a table that displayed "lots of cool stuff," as one of the co-founders put it, made visible what working in a hackerspace meant in practice *and* what it symbolized. The co-founder further explained this as:

> there is a new maker movement that's emerging right now. It builds on the DIY culture, to get people excited again. To build some stuff. It's anti-consumerism... it's affordable today to do it for fun and that's of course driven by the power of open source. The iPhone is fun, but it's more fun to do it yourself. This is part of the maker movement.

Figure 2 Table with tools during first maker and Arduino workshops at xinchejian.

Such introductory workshops provided resources also for the co-founders to identify what maker culture could mean in and for China. Many makers were particularly sensitive to the issue that a hackerspace could be associated with the image of *heike* (黑客, hacker, black professional) engaged in illegal activity. As stories of Chinese hackers breaking into Google servers circulated widely in mass media outlets in 2010, the term *heike* became the widely used term to describe this practice of hacking into a system. And so many makers were anxious to come up with a term that did not have any immediate associations with *heike* or hacker. It was during the planning stages of the first international maker carnival in Beijing, when China's makers settled on an alternative term: 创客 (c*huangke*, creative professional). 创客 has the advantage of connoting creativity 创意（*chuangyi*) and innovation 创新 (*chuangxin*), which are employed in positive terms within the wider creativity discourse, as elaborated earlier.

Through these early efforts, makers negotiated how to best position themselves and their work in China. XinCheJian, and the other hackerspaces and maker events that spun out of it, produced not only a wider imaginary of DIY making *in China*, but also with makers elsewhere. International attention brought with it legitimacy as well as access to a transnational network of like-minded tinkerers. More importantly though, the maker imaginary nourished a new subjectivity that existed simultaneously in relation to China's creativity discourse and in its opposition. While government officials argued that creativity would flourish through rather top-down creative cluster development[48], Chinese makers urged that creativity was stimulated, when people follow a DIY mentality, guided by their own passions and working beyond rigid institutions and large corporations. DIY makers questioned one central pillar of creativity discourse in China – the stipulation of China's low quality citizenry – by reformulating ideals from another one, self-governance. Their businesses and daily work processes were centered around the idea that technology production can lead to individual empowerment and freedom of expression, ideas common to the free and open source software movement. Their businesses were targeted towards helping others in China to become creators not only of technologies, but also of a new position in society beyond rigid institutional frames and against a political rhetoric that renders citizens of low quality. This orientation towards computation as individual empowerment goes back to the early days of personal computing and the Internet[49]. Drawing upon Steven Levy's writings on the "hacker ethic"[50], Mimi Ito, for instance, describes how a group of computer enthusiasts at MIT in the early 1960s began to think about technology as open and modifiable by its users. Rather than the contemporary perceptions of the "hacker" as somebody engaged in unlawful activity breeching security leeks, this earlier approach towards technological "makings" evolved out of an "orientation toward the computer as a tool of empowerment and discovery"[51].

In what follows, I elaborate how China's makers on the one hand identified with this idea of open technology production as individual empowerment, and on the other hand challenged what they believed to be a Western-centric interpretation of open-ness.

China's authentic maker culture

Many makers I worked with shared the belief that their work in China was uniquely positioned: at the heart of a pre-existing maker culture emergent from the hardware repair

workshops on the streets and from factories that produce for the world. David Li, one of the co-founders of XinCheJian, often described this to me as an authentic maker culture, driven by necessity rather than countercultural ideals, which he associated with maker practice in the West. The last two years have seen a rise in hardware start-ups working with this manufacturing scene in China in order to turn their DIY maker ideas into consumer-end products. One of the regions central to this development is the Pearl River Delta in the South of China, and Shenzhen in particular, home to factories such as Foxconn that produce for companies like Apple and HP. Shenzhen has long been a particularly unique region in China; declared a Special Economic Zone (SEZ) upon its inception, it was designed and built with the goal to encourage foreign investment and economic growth. Foreign corporations, for instance, received tax reductions and other benefits when they opened a production site in the region. Today, Shenzhen also attracts a new generation of entrepreneurs; DIY makers, who described to me their experience of Shenzhen's downtown area electronic markets as "a life-size Digikey" and Shenzhen as a whole as "China's most open city." Many of the makers who started up businesses and moved to Shenzhen in order to manufacturer their products explained to me that the region's open-ness in manufacturing was central to its uniqueness.

What does open manufacturing as employed by makers mean? To begin answer this question, I first turn to the region's history of *shanzhai (*山寨, copycat) production. *Shanzhai* traditionally stands for counterfeit products and low-quality copycat productions of well-known brands ranging all the way from retail such as Gucci bags to electronic products such as the iPhone. The literal translation into English is "mountain fortress" and carries connotations of self-reliance and resourcefulness. In this formulation, copying, re-use, and innovation are not mutually exclusive. For example, *shanzhai* factories in Shenzhen not only produce copies of the latest tablet or mobile phone. They also remix functional but discarded components with new parts in order to produce novel products, often tailored towards niche markets in China, India and Africa. Often-cited examples include mobile devices for Chinese migrant communities that allow users to send remittances easily, or phones with built-in compasses that point users in the direction of Mecca.

Makers referred to this second meaning of *shanzhai* when they described to me an efficient open manufacturing system that has formed around these small-scale factories in Shenzhen over the last 20 years. Open manufacturing means that many small factories, and in particular *shanzhai* factories, have informally organized a peer-to-peer database for sharing hardware design schematics and their bill of materials (BOM), a list of materials used in manufacturing a particular product. Sharing these resources allowed the factories to lower production costs and to stay competitive in a global market. Bunnie Huang, an acclaimed member of the international maker movement and regular visitor to Shenzhen, described *shanzhai* in a blog post as China's open source. Suggesting that the phenomenon has grown beyond the original *shanzhai* practice, he proposes the term *gongkai* to account for a "self-sustaining innovation ecosystem… just as the Galapagos Islands is a unique biological ecosystem evolved in the absence of continental species, *gongkai* is a unique innovation ecosystem evolved with little western influence, thanks to political, language, and cultural isolation"[52].

Many other makers, similarly, foregrounded *shanzhai*'s workings through open sharing and remix-as-innovation. Many also believed that by focusing on this unique open source culture the image of Chinese manufacturing can be revamped from a site of cheap, copycat production to one

that highlights the more creative connotations *shanzhai* shares with the international maker movement. Let's look at a specific example of a business model built on this idea of bringing together an international DIY maker culture with China's open manufacturing system.

In 2008, Eric Pan founded Seeed Studio[53], a small-scale manufacturing and design house located in Shenzhen. Seeed Studio designs and manufacturers products for an emerging niche market: DIY Makers. Its products include, for instance, open hardware platforms, hardware developer kits, hardware hacking tools, and custom-made PCBs (Printed Circuit Boards). Today, Seeed Studio is internationally renowned in international maker circles and amongst design professionals, with 98% of its revenue steaming from product sales and contracts with clients in the US and Europe. Seeed Studio might not exist today, however, if it wasn't for Shenzhen's *shanzhai* production, Eric Pan told me; before Seeed was established, he discovered a copycat Arduino board during a stroll through Shenzhen's *Huaqiangbei* electronic markets. The Arduino is essentially an easy-to-use microcontroller, a single-chip computer that supports the design of hardware-software-material interaction, and accompanying programming environment. Invented in 2005 in Italy at the Ivrea Design School, it has popularized the design of interactive systems and DIY making, by simplifying the process and greatly reducing costs. After Eric Pan had bought the *shanzhai* Arduino, he turned to the Internet and discovered an international network of makers connecting hackerspaces across the world. It was then, when the idea formed to partner with members of Shenzhen's manufacturing ecosystem in order to invent new open hardware products and cater towards this growing international market of makers. One of the first products that Eric designed was a board that builds on the Arduino board—in an open source spirit—by making it significantly better, and offering it at a lower price, made possible by the partnerships he had established in Shenzhen.

Figure 3 Seeeduino v 3.0 Atmega

Seeed Studio is based on a business model that fruitfully merges maker ideals with China's manufacturing expertise. It works, because new ideas for products come out of strong partnerships with both Shenzhen's manufacturing world and DIY makers. For Eric, this notion of partnership is more than a business model, but about shaking up and remaking our very idea of manufacturing, innovation, and copy. This is best exemplified, when we take a closer look at the label of Seeed Studio products. For instance, rather than the common "made in China" tag that adorns most of the products we use on a daily basis, Seeed Studio's products are labeled as "innovate with China" (see Figure 3). "Innovate with China" illustrates the potential that lies in approaching China as a partner in the creation process rather than just a cheap producer. For Eric Pan, as for many other makers, *shanzhai* and the process of copy is better seen as a productive force, rather than as something inherently negative, or in his words:

> *shanzhai* is… you learn from something and you are redoing it in your own way and it could be shabby at times, but also interesting at other…it's the same when you learn a new language. You have to write the sentence again and again, copying from your teacher. The *shanzhai* makers learn from their teachers like Apple and Samsung to create a mimic first. So they have the basic skills and develop the basic infrastructure to create. After you have learned how to write a word, a sentence, you remember it. From words you can create sentences and grammar, then you can write a whole article. You can develop your own style. It's a very natural process, it's the same with *shanzhai* production, it's nothing to be ashamed of or to be blamed for. It's a very important learning process.

Figure 3 "Innovate with China" Product Label by Seeed Studio.

Similarly, many other makers considered *shanzhai* not as something negative or to be avoided. On the contrary, they often described it to me as a form of creativity and resourcefulness. *Shanzhai* stood for a form of ingenuity many considered intrinsically Chinese: a do-it-yourself mentality, inventive ways of working with materials, and adaptability to local shortages and rapid changes to the physical and social environment. By aligning *shanzhai* with DIY making, Seeed Studio repositions Chinese manufacturing, challenging dominant associations of "made in," cheap and low quality. It promotes a version of creativity that differs drastically from what the

Chinese government has been promoting over the last years, as I laid out at the beginning of this paper; a move away from "made in" and China's reliance on manufacturing. Seeed Studio's products and processes demonstrate that the long-term manufacturing know-how with its unique open-source spirit could be the very seed for China's remake.

Conclusion

In this paper, I have shown how China's DIY makers are remaking industrial production, common understandings of innovation and creativity, and in doing so craft a subject position beyond the common rhetoric of Chinese citizens lacking creativity. I have also shown that makers believe that technological innovation and social change can be enabled by setting up physical spaces such as hackerspaces and/or starting hardware businesses as interfaces between a wider public, potential investors, like-minded makers, Chinese manufacturing and officials. What drives their open approach towards technology production is the believe that it will lead not only to new forms of innovation, but also to individual empowerment in a climate of rapid change on a global scale.

Throughout the paper, I develop the analytical lens of "making subjectivities" to illustrate that the social meaning of technology in China is shaped by technology use *and* production. Makers are promoting the importance of a maker approach for China's future development. However, to be a maker was not understood in distinction from other aspects of their lives. Rather DIY making was not only a mode of technology production, but also a way of being and acting in the world through which other aspects of life were tackled. For instance, being a maker did not mean that one couldn't be a parent, rather it meant being a parent differently, committed to teach one's child to act in the world in a hands-on and engaged manner. Similarly, being a maker was not perceived in distinction from being an entrepreneur, designer, programmer, engineer, artist, geek, blogger, citizen, or netizen, and so on. Identifying as a maker meant constructing a multifaceted position in society that exists in relation to many other spheres of life. Entering partnerships between diverse stakeholders, the makers I worked with positioned themselves in a world they perceive as in flux. They refused to be caught up in urban, economic, technological and social transformation in China. DIY making as a mode of living and working was central to this refusal. As the site of individual empowerment within unstable and shifting worlds, DIY making enabled my interlocutors to remake the very societal norms and material infrastructures that undergird their work and livelihood. Their technology productions and businesses were neither straightforward countercultural nor pro-system. In order to account for these at times symbiotic, at other times parasitic practices, analytical categories such as tactics versus strategies, state (or corporation) versus netizen, or official versus counterculture are clearly insufficient. For instance, I have shown in this article how Seeed Studio simultaneously appropriates and remakes industrial production in China and international ideas of creativity and innovation. Members of hackerspaces in their formulations of creativity both align with and critique official discourse.

The lens of making subjectivities allows us to see how people actively craft a position for themselves and others, and how this process is neither just resistance nor just acceptance of the status-quo, but a continuous play at the borders in between.

What I wish to emphasize, finally, is the importance for researchers of Chinese Internet and technology to reflect on our own form of participation in both the use and design of technologies in China. Speaking of netizens as the other, ontological category out there for us to observe, that we should speak for (or about) as scholars and researchers, separates "us" or "the observer" from the practices we study. Taking a position removed from the "network" we study is complicated by our position within the same technological and social infrastructures, or as Lisa Riles put it so poignantly, "We lack an outside today. We are all in the network." As politicians across regions are calling upon all of us (technology producers, educators and researchers alike) to become creators of innovation, flexible and innovative workers, it is ever more important to understand how people craft positions in relation to this discourse and how they partially resist and exploit it. DIY makers exemplify this process, as they embed themselves in (and simultaneously challenge) political and market processes directed at involving all of us as potential producers of things, economies, and knowledge.

Notes

[1] Thomas Douglas, *Hacker Culture*, Minneapolis, MN: University of Minnesota Press, 2002. Christopher Kelty, *Two Bits: The Cultural Significance of Free Software and the Internet*, Durham, NC: Duke University Press, 2008. Fred Turner, *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Catalogue, and the Rise of Digital Utopianism*, Chicago: University of Chicago Press, 2006.
[2] Mizuko Ito, *Engineering Play. A Cultural History of Children's Software*, Cambridge, MA: MIT Press, 2009. Steven Levy, *Hackers: Heroes of the Computer Revolution,* New York: Anchor Press, 1994.
[3] IoT refers to the embedding of sensing technology into physical artifacts. An early example is RFID technology.
[4] Chris Anderson, *Makers. The New Industrial Revolution,* Crown Publishing Group, New York, 2012.
[5] E.g.: Geremie *R.* Barme and Sang Ye, The Great Firewall of China, *Wired Magazine, http://www.wired.com/wired/archive/5.06/china.html, 1997*. Herold and Marolt (eds). *Online Society in China. Creating, Celebrating and instrumentalizing the online carnival,* New York, NY, Routledge, 2011. Li, F. *Urban Youth in China: Modernity, the Internet and the Self,* New York, NY, Routledge, 2011. Guobin Yang, *The power of the Internet in china: Citizen Activism Online,* New York: Columbia University Press, 2009. Cara Wallis, New Media Practices in China: Youth Patterns, Processes, and Politics, *International Journal of Communication*, Vol. 5, 406-436, 2011. Baohua Zhou New Media Use and Subjective Social Status*, Asian Journal of Communication*, Vol. 21, No. 2, pp. 133-149, 2011.
[6] E.g.: Chase, M.S. and Mulvenon, J.C. *You've got Dissent! Chinese Dissident Use of the Internet and Beijing's Counter Strategies*, Santa Monica: Rand, 2002. Perry Link and Xiao Qiang From Grass-Mud Equestrians to Rights-Conscious Citizens. Language and thought on the Chinese Internet*,* in Perry Link, Richard P. Madsen, Paul G. Pickwicz (eds) *Restless China*, Rowman & Littlefield Publishers, Inc., 2013.
[7] E.g.: Guobin Yang Ibid. Silvia Lindtner and Marcella Szablewicz, M. China's many Internets: Participation and Sites of Game Play Across a Changing Technology Landscape*,* in Herold, D.K. and Marolt, P. (eds) *Online Society in China: Creating, celebrating, and instrumentalizing the online carnival*, London & New York: Routledge, 89pp., 2011. Rebecca MacKinnon *Consent of the Networked: the Worldwide Struggle for Internet Freedom,* New York: Basic Books, 2012. Marcella Szablewicz, The Ill Effects of Opium for the Spirit: A Critical Cultural Analysis of China's Internet Addiction Moral Panic, *Chinese Journal of Communication* 3(4): 453-470, 2010.
[8] E.g.: Elisa Oreglia, Liu, Y., Zhao, W. Designing for emerging rural users: experiences from China*, Proceedings of the ACM Human Factors in Computing Systems*, 1433-1436, 2011. Jack Qiu, *Working-Class Network Society. Communication Technology and the Information Have-Less in Urban China*, Cambridge, MA: The MIT Press, 2009. Cara Wallis *Technomobility in China. Young Migrant Women and Mobile Phones*, New York University Press, 2013.

[9] Andrew Ross *Fast Boat to China: High-Tech Outsourcing and the Consequences of Free Trade: Lessons from Shanghai,* Random House Digital, 2007.
[10] Lorraine Justice *China's Design Revolution,* Cambridge, MA: MIT Press, 2012.
[11] E.g.: Herold, D.K. and Marolt, P. Ibid., Rebecca MacKinnon Ibid. Jack Qiu *Working-Class Network Society. Communication Technology and the Information Have-Less in Urban China*, Cambridge, MA: The MIT Press, 2009. Guobin Yang. Ibid. Perry Link and Xiao Qiang Ibid.
[12] Ibid.
[13] Guobin Yang. Ibid.
[14] Marilyn Strathern *The gender of the gift: Problems with Women and Problems with Society in Malenesia* (Berkeley: University of California Press, 1988).
[15] Ibid., p. 38
[16] Tom Boellstorff, *The Gay Archipelago: Sexuality and Nation in Indonesia,* Princeton, NJ: Princeton University Press, 2005.
[17] Guobin Yang Ibid.
[18] Geremie R. Barme *In the Red. On Contemporary Chinese Culture,* New York: Columbia University Press, 1999.
[19] Ibid., p. XIV
[20] Silvia Lindtner and David Li. Created in China. The Makings of China's Hackerspace Community, *Interactions*, XIX. 6 November + December 2012.
[21] http://www.xinchejian.com
[22] http://www.xindanwei.com
[23] See http://hackerspaces.org/wiki/List_of_ALL_Hacker_Spaces
[24] Gabriella Coleman *Coding Freedom: The Ethics and Aesthetics of Hacking,* Princeton, NJ: Princeton University Press, 2012. Christopher Kelty Ibid. Matt Ratto, A Practice-based Model of Access for Science: Linux Kernel Development And Shared Digital Resources*, Science and Technology Studies*, 20, 1, 73-105, 2007.
[25] E.g.: Lakhani, K. and von Hippel, E. How Open Source Software works: "free" user-to-user assistance, *Research Policy*, Vol. 32, No. 6, pp. 923-943, 2003. Powell, A. Democratizing production through open source knowledge: from open software to open hardware*, Media, Culture & Society*, 34 (6), 691-708, 2012. Walt Scacchi, The Future of Research in Free/Open Source Software Development, *Proceedings of FoSER*, 2010. Steven Weber *The Success of Open Source,* Boston, Mass: Harvard University Press, 2005.
[26] StevenWeber Ibid.: vii
[27] Andrew Powell Ibid.
[28] http://www.stcsm.gov.cn/jsp/xxgk/zhtz/content.jsp?id=2267 , last accessed June 2013.
[29] Barbrook and Cameron (2001) have described this way of thinking about technological progress as the California Ideology that merged narratives of a free market ideology with the region's 1960s post-war countercultural sentiments.
[30] 柳士发: 实施创意世纪计划 开展创意中国行动 (2004)
[31] For a detailed discussion of the concept see: Ann Anagnost *National Past-Times. Narrative, Representation, and Power in Modern China*, Durham and London: Duke University Press, 1997. Susan Greenhalgh and Edwin Winckler, *Governing China's population: From Leninist to neoliberal politics,* San Franscico, CA: Stanford University Press, 2007. Hesmondhalgh T*he Cultural Industries*, London and Thousand Oaks, CA: Sage, 2007. Aiwah Ong *Neoliberalism as Exception: Mutations in Citizenship and Sovereignty*, Durham, NC: Duke University Press, 2006.
[32] Susan Greenhalgh *Cultivating Global Citizens: Population in the Rise of China*, Cambridge, MA: Harvard University Press, p. xii, 2011.
[33] Greenhalgh (2011) Ibid. Ann Anagnost (1997) Ibid. Aiwah Ong, *Flexible Citizenship. The Cultural Logics of Transnationality*, Durham, NC: Duke University Press, 1998. Lisa Rofel, *Desiring China. Experiments in Neoliberalism, Sexuality, and Public Culture*, Durham, NC: Duke University Press, 2007.
[34] For more details on creativity discourse in China see Michael Keane's extensive body of work, e.g.: Michael Keane *Creative Industries in China. Art, Design and Media*, Queensland University of Technology Press, 2012. Michael Keane, Reclaiming China's former soft power, *Journal of the Oriental*

Society of Australia, 42, 50-65, 2010. Michael Keane, *Created in China: the Great New Leap Forward*, London: Routledge, 2007.

[35] Ann Anagnost (1997) Ibid.; Susan Greenhalgh (2011) Ibid.; Andrew Jones, *Developmental Fairy Tales. Evolutionary Thinking and Modern Chinese Culture*, Boston, MA: Harvard University Press, 2011. Leo Lee, *Shanghai Modern: the Flowering of a New Urban Culture in China, 1930-1945 (Interpretations of Asia)*, Boston: MA: Harvard University Press, 1999. Aiwah Ong (1998) Ibid. Carolyn Cartier, Transnational Urbanism in the Reform-era Chinese City: Landscapes from Shenzhen*, Urban Studies*, 39:9*,* 1513-1532, 2002. Justin O'Connor, Shanghai Modern: Replaying Futures Past, *Culture Unbound: Journal of Current Cultural Research*, Vol 4, 15-34, 2012.

[36] Scholars have stressed the historical significance and complexity of the term *wenming*. Ann Anagnost (1997) Ibid. documents that *wenming* stands for multiple things, including modernity, westernization as well as civilization as an advanced stage of historical development. Ralph Litzinger (Litzinger, Tradition and the Gender of Civilty, in Brownell, S. and Wasserstrom, J. (eds) *Feminities and Chinese Masculinities*, Berkeley: University of California Press, 2002) differentiates between *acting wenming* and *wenming as a marker of progress* and national belonging. Andrew Jones (Jones, *Developmental Fairy Tales. Evolutionary Thinking and Modern Chinese Culture*, Boston, MA: Harvard University Press, 2011) traces *wenming* back to late Qing, where it came to serve as an emblem of all that was advanced.

[37] Ibid.

[38] Justin O'Connor (2012) Ibid.

[39] Bell, D. 1973. *The Coming of Post-Industrial Society: A Venture in Social Forecasting*, New York: Basic Books.

[40] Niko Stehr *Knowledge Societies*, London: Sage, 1994.

[41] Florida, R. 2002. The *Rise of the Creative Class: And How Its Transforming Work, Leisure, Community and Everyday Life*, New York: Basic Books.

[42] E.g.: Arif Dirlik *Postcolonial Aura. Third World Criticsm in the Age of Global Capitalism*, Boulder, CO: Westview Press, 1998. Susan Greenhalgh (2011) Ibid.; Emily Martin *Flexible bodies,* Beacon Press, 1995. Melissa Gregg, *Work's Intimacy,* Polity Press, 2011.

[43] Chris Anderson *(2012*) Ibid.

[44] Silvia Lindtner. Cultivating Creative China: Making and Remaking Cities, Citizens, Work, and Innovation. (PhD diss., University of California, Irvine, 2012)

[45] Gabriella Coleman and Alexander Golub Hacker Practice. Moral genres and the cultural articulation of liberalism, *Anthropological Theory*, 8 (3), 255-277, 2008.

[46] O'Reilly is a technical publishing house with a strong connection to the DIY maker community. O'Reilly publishes the technical documentation for major and emblematic open source tools and platforms.

[47] http://makerfaire.com/mini/#creating

[48] Michael Keane (2012) Ibid. Michael Keane (2010) Ibid. Michael Keane (2007) Ibid.

[49] E.g.: Christopher Kelty (2008) Ibid. Fred Turner (2006) Ibid. Gabriella Coleman (2012) Ibid.

[50] Steven Levy, *Hackers: Heroes of the Computer Revolution,* New York: Anchor Press, 1994.

[51] Mizuko Ito, *Engineering Play. A Cultural History of Children's Software*, Cambridge, MA: MIT Press, 2009, p. 145.

[52] http://www.bunniestudios.com/blog/?p=3040

[53] http://www.seeedstudio.com

References

Anderson, C. (2012) *Makers. The New Industrial Revolution.* Crown Publishing Group, New York.

Anagnost, A. (1997) *National Past-Times. Narrative, Representation, and Power in Modern China*, Durham and London: Duke University Press.

Barbrook, R. and Cameron, A. (2001) The Californian Ideology. *In Crypto Anarchy, Cyberstates, and Pirate Utopias*, ed. Peter Ludlow. Cambridge, MA: MIT Press, 2001, 363-87.

Barme, G.R. (1999) *In the Red. On Contemporary Chinese Culture.* New York: Columbia University Press.

Barme, G.R. and Ye, S. (1997) The Great Firewall of China. Wired Magazine, http://www.wired.com/wired/archive/5.06/china.html, last accessed August 2012.

Bell, D. (1973) *The Coming of Post-Industrial Society: A Venture in Social Forecasting*. New York: Basic Books.

Boellstorff, T. (2005) *The Gay Archipelago: Sexuality and Nation in Indonesia.* Princeton, NJ: Princeton University Press.

Boellstorff, T. (2008) *Coming of Age in Second Life: An Anthropologist Explores the Virtually Human*. Princeton, NJ: Princeton University Press.

Chase, M.S. and Mulvenon, J.C. (2002) *You've got Dissent! Chinese Dissident Use of the Internet and Beijing's Counter Strategies*, Santa Monica: Rand.

Coleman, G. (2012) *Coding Freedom: The Ethics and Aesthetics of Hacking.* Princeton, NJ: Princeton University Press.

Coleman, G. and Golub, A. (2008) Hacker Practice. Moral genres and the cultural articulation of liberalism. *Anthropological Theory*, 8 (3), 255-277.

Dirlik, A. (1998) *Postcolonial Aura. Third World Criticsm in the Age of Global Capitalism*, Boulder, CO: Westview Press.

Douglas, T. (2002) *Hacker Culture*. Minneapolis, MN: University of Minnesota Press.

Florida, R. (2002) The *Rise of the Creative Class: And How Its Transforming Work, Leisure, Community and Everyday Life*. New York: Basic Books.

Greenhalgh, S. (2011) *Cultivating Global Citizens: Population in the Rise of China*. Cambridge, MA: Harvard University Press.

Gregg, M. (2011) *Work's Intimacy,* Polity Press.

Han, B-C. (2011) Shanzhai 山寨. Dekonstruktion auf CHinesisch. Merve Verlag Berlin.

Herold and Marolt (eds) (2011) *Online Society in China. Creating, Celebrating and instrumentalizing the online carnival.* New York, NY, Routledge

Hesmondhalgh, D. (2007) *The Cultural Industries*. London and Thousand Oaks, CA: Sage.

Ito, M. (2009) *Engineering Play. A Cultural History of Children's Software.* Cambridge, MA: MIT Press.

Jones, A. (2011) *Developmental Fairy Tales. Evolutionary Thinking and Modern Chinese Culture*, Boston, MA: Harvard University Press.

Justice, L. (2012) *China's Design Revolution.* Cambridge, MA: MIT Press.

Keane, M. (2012) *Creative Industries in China. Art, Design and Media*. Queensland University of Technology Press.

Keane, M. (2010) Reclaiming China's former soft power. *Journal of the Oriental Society of Australia*, 42, 50-65.

Keane, M. (2007) *Created in China: the Great New Leap Forward*, London: Routledge.

Kelty, C. M. (2008) *Two Bits: The Cultural Significance of Free Software and the Internet.* Durham, NC: Duke University Press.

Lakhani, K. and von Hippel, E. (2003) How Open Source Software works: "free" user-to-user assistance, Research Policy, Vol. 32, No. 6, pp. 923-943.

Lee, L. (1999) *Shanghai Modern: the Flowering of a New Urban Culture in China, 1930-1945 (Interpretations of Asia),* Boston: MA: Harvard University Press.

Levy, S. (1994) *Hackers: Heroes of the Computer Revolution.* New York: Anchor Press.

Li, F. (2011) *Urban Youth in China: Modernity, the Internet and the Self.* New York, NY, Routledge.

Li, W. (2011) *Creativity is Changing China*, ed. M. Keane, Bloomsbury Academic, London.

Lindtner, S. (2012) *Cultivating Creative China: Making and Remaking Cities, Citizens, Work, and Innovation.* PhD diss., University of California, Irvine.

Lindtner, S. and Szablewicz, M. (2011) China's many Internets: Participation and Sites of Game Play Across a Changing Technology Landscape. In: Herold, D.K. and Marolt, P. (eds), *Online Society in China: Creating, celebrating, and instrumentalizing the online carnival,* London & New York: Routledge, 89pp.

Lindtner, S. and Li., D. (2012) Created in China. The Makings of China's Hackerspace Community, *Interactions*, XIX. 6 November + December.

Link, P. and Qiang, X (2013) From Grass-Mud Equestrians to Rights-Conscious Citizens. Language and thought on the Chinese Inernet, In: Perry Link, Richard P. Madsen, Paul G. Pickwicz (eds) *Restless China*, Rowman & Littlefield Publishers, Inc.

Litzinger, R. (2002) Tradition and the Gender of Civilty. In: Brownell, S. and Wasserstrom, J. (eds), *Feminities and Chinese Masculinities*, Berkeley: University of California Press.

MacKinnon, R. (2012) *Consent of the Networked: the Worldwide Struggle for Internet Freedom,* New York: Basic Books.

Martin, E. (1995) *Flexible bodies.* Beacon Press.

Maines, R. (2009) *Hedonizing Technologies: Paths to Pleasure in Hobbies and Leisure*. The Johns Hopkins University Press.

Raley, R. (2009) *Tactical Media*. Minneapolis: University of Minnesota Press.

O'Connor, J. and Gu (eds) (2012) Culture Unbound. *Special Issue, Journal of Current Cultural Research*, Vol 4.

O'Connor 2012. Shanghai Modern: Replaying Futures Past, *Culture Unbound: Journal of Current Cultural Research*, Vol 4, 15-34, 2012.

Ong, A. (1998) *Flexible Citizenship. The Cultural Logics of Transnationality*. Durham, NC: Duke University Press.

Ong, A. (2006) *Neoliberalism as Exception: Mutations in Citizenship and Sovereignty*. Durham, NC: Duke University Press.

Oreglia, E., Liu, Y., Zhao, W. (2011) Designing for emerging rural users: experiences from China, *Proceedings of the ACM Human Factors in Computing Systems Conference CHI'11*, pp.1433-1436.

Powell, A. (2012) Democratizing production through open source knowledge: from open software to open hardware. *Media, Culture & Society*, 34 (6), 691-708.

Qiu, J. L. (2009) *Working-Class Network Society. Communication Technology and the Information Have-Less in Urban China*. Cambridge, MA: The MIT Press.

Ratto, M. (2007) A Practice-based Model of Access for Science: Linux Kernel Development And Shared Digital Resources. *Science and Technology Studies*, 20, 1, 73-105.

Riles, A. (2001) *The Network Inside Out.* Ann Arbor: University of Michigan Press.

Rofel, L. (2007) *Desiring China. Experiments in Neoliberalism, Sexuality, and Public Culture.* Durham, NC: Duke University Press.

Ross, A. (2007) *Fast Boat to China: High-Tech Outsourcing and the Consequences of Free Trade: Lessons from Shanghai.* Random House Digital.

Scacchi, W. (2010) The Future of Research in Free/Open Source Software Development, In *Proc. of FoSER*.

Stehr, N. (1994) *Knowledge Societies*. London: Sage.

Strathern, M. (1988) *The gender of the gift: Problems with Women and Problems with Society in Malenesia*. Berkeley: University of California Press.

Strathern, M. (1996) Cutting the Network. *Journal of the Royal Anthropological Institute*, 2:517-535.

Szablewicz, M. (2010). The Ill Effects of Opium for the Spirit: A Critical Cultural Analysis of China's Internet Addiction Moral Panic, *Chinese Journal of Communication* 3(4): 453-470.

Turner, V. (2006) *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Catalogue, and the Rise of Digital Utopianism.* Chicago: University of Chicago Press, 2006.

Wallis, C. (2011) New Media Practices in China: Youth Patterns, Processes, and Politics. *International Journal of Communication,* Vol. 5, 406-436.

Weber, S. (2005) *The Success of Open Source.* Boston, Mass: Harvard University Press.

Yang, G. (2011) *The power of the Internet in China: Citizen Activism Online.* New York: Columbia University Press.

Zhan, M. (2009) *Other-Worldly: Making Chinese Medicine through Transnational Frames*. Duke Durham, NC: University Press.

Zhou, B. (2011) New Media Use and Subjective Social Status, *Asian Journal of Communication*, Vol. 21, No. 2, pp. 133-149.