

Justin Marshall; Catherina Rossi

## Making with China. Craft-Based Participatory Research Methods for Investigating Shenzhen's Maker Movement

2017

<https://doi.org/10.25969/mediarep/1095>

Veröffentlichungsversion / published version  
Zeitschriftenartikel / journal article

### Empfohlene Zitierung / Suggested Citation:

Marshall, Justin; Rossi, Catherina: Making with China. Craft-Based Participatory Research Methods for Investigating Shenzhen's Maker Movement. In: *Digital Culture & Society*, Jg. 3 (2017), Nr. 1, S. 127–138. DOI: <https://doi.org/10.25969/mediarep/1095>.

### Erstmalig hier erschienen / Initial publication here:

<https://doi.org/10.14361/dcs-2017-0108>

### Nutzungsbedingungen:

Dieser Text wird unter einer Creative Commons - Namensnennung - Nicht kommerziell - Keine Bearbeitungen 4.0 Lizenz zur Verfügung gestellt. Nähere Auskünfte zu dieser Lizenz finden Sie hier:

<https://creativecommons.org/licenses/by-nc-nd/4.0>

### Terms of use:

This document is made available under a creative commons - Attribution - Non Commercial - No Derivatives 4.0 License. For more information see:

<https://creativecommons.org/licenses/by-nc-nd/4.0>

---

# Making with China

## Craft-Based Participatory Research Methods for Investigating Shenzhen's Maker Movement

*Justin Marshall and Catharine Rossi*

### **Abstract**

*In January 2015, Li Keqiang visited Chaihuo makerspace in Shenzhen, the Chinese city that is the world's electronics manufacturing capital. The visit expressed the significance of China's fledgling but fast-growing maker movement: while its first makerspace was set only up in 2010, in 2016 there are over a hundred, and Keqiang's visit is part of a bigger governmental push on makerspaces, positioned as sites of creative and technology-led innovation key to the country's economic growth. Amidst growing research into the social, politico-economic and cultural significances of makerspaces in the UK and Europe, the specificity of China's maker movement remains under-researched. Yet understanding the on-the-ground lived experience, rather than the promotional rhetoric, of China's maker movement is crucial to its future: while lots of makerspaces are opening, many lack makers, and there are fears that China's maker movement is an artificially fuelled bubble about to burst. Contemporaneously, the future of other types of making in China, such as its craft traditions, urban manufacturing networks, and shanzhai production, is being threatened by an assemblage of fiscal and state forces. Investigating China's maker movement was the focus of two British-based and British-funded network, research and knowledge exchange projects in which the authors participated during 2015 and 2016: Living Research: Making in China and China's Creative Communities: Making Value and the Value(s) of Making. This paper considers their research methodologies and initial findings. Specifically, it focuses on the craft-based participatory methodology developed in China's Creative Communities, as seen in a "Digital Craft" workshop. Informed by social anthropology, its empirical, immersive and inclusive approach gave a voice to makers themselves. While still in a developmental stage, we believe this "craft anthropology" approach has value for future research into the maker movement in China and in other cultures and contexts.*

## Introduction

In January 2015 Li Keqiang visited *Chaihuo* makerspace in Shenzhen, the Chinese city and global electronics manufacturing capital (Saunders/Kingsley 2016: 5). The Chinese Premier's visit signalled his government's increasing spotlight on makerspaces, positioned as accelerators for creative and technology-led innovation central to the country's economic future. A few months later Keqiang positively described "makers coming thick and fast" (2015), an upsurge encouraged by state financing that has fuelled China's fledgling but fast-growing maker movement: while China's first makerspace, Shanghai's *Xin Che Jian*, was only established in 2010, the numbers doubled in 2015 to stand at over a hundred in 2016 (Saunders/Kingsley 2016: 6).

This growth has been accompanied by rising research activity around the maker movement (e.g. Dougherty 2012; Sleigh/Stewart/Stokes 2015). Yet little of this has been systematic (Saunders/Kingsley 2016: 5, 11) or sensitive to the specificity of China's maker culture. The maker movement is largely understood as it appears in countries such as the United States and the United Kingdom where the maker's rise is informed by a post-industrial knowledge economy fuelled by a nostalgic desire to make with your own hands (Sivek 2011: 200, 201). This characterisation is seemingly inapplicable in China, given its continuing dominance in industrial production (Shirky 2015).

China's intimacy with manufacturing is just one feature that needs greater understanding to recognise its composite and complex maker movement. Such contextualisation is crucial: while many makerspaces are opening, lots lack makers, and there are fears that China's maker movement is an artificially fuelled bubble about to burst (Shoesmith 2016). Contemporaneously, the future of other types of making in China, such as its craft traditions, urban manufacturing networks and *shanzhai* production, is being threatened by an assemblage of fiscal and state forces.

Such a contextualising interest in China's maker movement was the subject of two British-based and British-funded research projects in which the authors participated during 2015 and 2016, and which are the subject of this article. Both projects promoted research methods to understand the on-the-ground lived experience, rather than the promotional rhetoric, of China's maker movement. The first, *Living Research: Making in China*, took place in October 2015.<sup>1</sup> This self-declared "pilot, [an] exploratory programme" aimed to "gain a deeper, more human understanding of the differences between making in the UK and China" (British Council, AHRC 2015: n. p.). The project immersed nine UK-based makers and academics for a fortnight in different types of makerspaces in Shenzhen and Shanghai. The project would inform "new ways of carrying out research" into

---

1 This project was sponsored by the British Council and Arts Humanities Research Council (AHRC).

China's maker movement (British Council, AHRC 2015: n. p.) and engender other, longer-lasting collaborations and exchanges.

In 2016 the authors followed up *Living Research* with their instigation of *China's Creative Communities: Making Value and the Value(s) of Making*.<sup>2</sup> This three-month cross-disciplinary research and scoping project brought together practitioners and academics in China and Britain to network, research and exchange knowledge around the different values and types of making in China.<sup>3</sup> The project was centred in London and Shenzhen, each nation's maker capitals; the latter is also the gateway for Western makers into China's maker culture (Saunders/Kingsley 2016: 9). *China's Creative Communities* sought to develop *Living Research's* methodology by employing immersive, participatory and practice-based methods that emphasised empirical understanding and giving a voice to makers themselves; both aspects deemed desirable and effective in the first project.

This article will focus on the participatory research methods used in these projects. While the levels and nature of participation varied across our activities, participatory research defined our overall approach and aspirations (Bergold/Thomas 2012). This ethos was partly determined by ODA Compliance<sup>4</sup> and the need for the project to explicitly benefit the Chinese participants. It also aligned with our interest in craft making as a research subject, a method and a mechanism for generating and communicating knowledge (Gray/Malins 2004; Dean/Smith 2009; Marchand 2010). We see craft as offering a participatory, user-led approach that responds to the situation at hand. This follows social anthropologist Tim Ingold's identification of craft practitioners as wayfinders (2006), with an approach to making that is open and intuitive. This approach is what Pohlner, Wilde and Underwood describe in their Ingold-influenced, craft-based design research:

Just as craftspeople calibrate the motions of their work in direct response to the work just performed, researchers also need to be open to where the data, research, design enquiry, and participant reactions might lead them. (2014: 368)

In this article we will use research from both craft-based design practice and social anthropology (Marchand 2010; Ingold 2013) to critically reflect on our craft-based participatory methodology. This methodology is unusual in maker research yet valuable for its inclusive and empirical nature and particularly relevant in China given the divorce between its digital technology-orientated maker movement and

---

2 This project was funded by the AHRC/Newton Fund. Launched in 2014, the Newton Fund is a British government development assistance program to support economic development and social welfare in a series of partner nations, including China.

3 Further details of the project can be found at <https://chinascreativecommunities.wordpress.com>.

4 See <http://www.newtonfund.ac.uk/about/what-is-oda>.

craft traditions. We aim to interrogate the possibilities of craft-based and participatory approaches for our own ongoing research into China's maker culture and any future research into making cultures in other contexts.

The article is organised into two parts: the first outlines an overview of research methods used in *Living Research* and *China's Creative Communities*; the second focuses on one example of our methods, a 'Digital Craft' workshop. While we will consider this method independently, it is important to note its existence as part of a larger suite of methods in this project. As Gray and Malins argue, this triangulated 'multi-method' approach enables creative practice researchers to 'understand more fully the complexity of issues by examining them from different perspectives, and by generating data in different ways by different methods' (2004: 31).

## From *Living Research* to *China's Creative Communities*

*Living Research* was an intense introduction to China's maker culture. In October 2015 the researchers visited twenty sites related to the maker community, including nine makerspaces, a design studio, a factory, two maker fairs and two urban villages.<sup>5</sup> While the project's ambitions for working in makerspaces with makers were curtailed, due to the challenges of an unfamiliar environment and very short lead-time available, its value was clear. The group's cross-disciplinary composition and the time spent in spaces using equipment and talking with makers offered an anthropological emphasis on participant observation, what Ingold calls 'knowing *from the inside*' (2013: 5). This included an empirical understanding of sites created and run by makers (Marchand 2010: 10). The result was a first-hand and multi-perspective understanding of Shenzhen's maker culture, one arguably richer than insights gleaned from desk-based research or purely ethnographic observation (Ingold 2013: 3). It also offered what Ingold identifies as social anthropology's greater *transformative* possibilities in comparison to ethnography (Ingold 2013: 3), chiming with our desire to support and future-proof China's multiple maker communities.

The benefits of this method included witnessing first-hand the lack of people in some government and privately sponsored makerspaces. This contrasted to makerspaces such as the self-funded *Litchee Lab* in Shenzhen, a welcoming and lively site established by Lit Liao in 2014, or Shanghai's *Xin Che Jian*. Such emptiness, seen by several makers we spoke to as the result of ill-implemented government funding, also contrasted with the richness of making we encountered outside of the narrowly defined maker movement. This was particularly notable in groups financially and politically marginalised in China: be it communities continuing craft traditions such as bamboo weaving and pottery, who have been ejected from

---

5 Urban villages are Shenzhen's low-rise, high-density communities threatened by the city's development programmes.

studios and struggle to assert their value on the marketplace; the small-scale businessmen in the micro business card industry in Cai Wu Wei urban village threatened with demolition for commercial redevelopment; or participants in the *shanzhai* “copying” phenomenon long derided but increasingly recognised as “a prime example of Chinese grassroots creativity” (Lindtner/Greenspan/Li 2015: 5). All these groups typify the creativity, innovation and entrepreneurialism China’s government advocates, as well as the qualities of community and sustainability promoted by the international maker movement (Sleigh/Stewart/Stokes 2015: 1, 11; Saunders/Kingsley 2016: 4, 27).

*China’s Creative Communities* sought to develop *Living Research’s* immersive and multi-perspective characteristics. This included maximising the range of expertise and perspectives by assembling academics, creatives and industry specialists from both the UK and China. Led by the two authors, with the assistance of investigator Guy Julier, a design culture specialist and *shanzhai* expert at the University of Brighton and London’s Victoria and Albert Museum, we were joined by three UK-based experts in different aspects of the maker movement. They were Daniel Charny, co-founder of making-based social design initiative Fixperts<sup>6</sup> and creative director of the *Maker Library Network*<sup>7</sup> that connects makers internationally; Nat Hunter, director of *Machines Room*<sup>8</sup> and advocate of makerspaces’ role in the circular economy; and Martin Hennessey, an entrepreneur and *Living Research* participant<sup>9</sup> who is based at *Makerversity*,<sup>10</sup> a co-working space and innovation hub for makers in central London. All three were involved in organising and participating in events in both the UK and China for the project. They were joined by two China-based consultants: Liao, *Litchee Lab* owner, and David Li, co-founder of both *Maker Collider* and *Xin Che Jian* makerspaces and a highly influential figure in China’s maker movement. Li and Liao were vital to the project, assisting in organising workshops and talks and participating in events in both Shenzhen and the UK.

*China’s Creative Communities* project consisted of four stages: an initial period of literature review and planning; a round table held in London to introduce participants, present the project and discuss its research methods and agenda. The discussion included confirming the identity of four values whose relevance and merit we wanted to investigate in China’s maker movement. They had been selected

---

6 See [www.fixperts.org](http://www.fixperts.org).

7 See <http://design.britishcouncil.org/projects/makerlibraries>.

8 See <http://machinesroom.org>.

9 The other *Living Research* participants involved were Asa Calow and Rachel Turner (MadLab, Manchester); Elizabeth Corbin (Institute of Making, UCL); Fiona Dowling (KWMC: The Factory, Bristol); Molly Price (Pervasive Media Studio, Bristol); Joel Trotter (Imperial College & RCA, London); and Sara Robertson (Duncan of Jordanstone College of Art and Design).

10 See <http://makerversity.org>.

for their presence in, and contribution to, the UK's lively making communities: *community, creativity, entrepreneurialism and sustainability*. Stage three consisted of a five-day visit to Shenzhen and consisted of visits to makerspaces, design studios and other related making sites, making-based workshops and a public-facing salon. Stage four was a reciprocal trip by Li and Liao to visit makerspaces and related sites in London, Bristol, Manchester and Amsterdam and participate in a workshop and salon with the authors and other project participants.



Figure 1: Distressed optical fibre “drawing”, outcome of “Digital Lace” workshop co-created by Marshall and Rossi

The main research activity occurred in stages three and four. Both were multi-method stages consisting of visits and workshops and talks open to the public. The four workshops aligned with the organisers' expertise and the selected values: “Digital Craft” led by Marshall and discussed below; “Maker to Market”, an enterprise session run by Hennessey; “Circular Economy” led by Hunter; and a “Digital Lace” workshop on craft and innovation led by textile researchers Sara Robertson (who was also a *Living Research* participant) and Sarah Taylor at *Makerversity*. The three talks were “Fixperts and the Maker Library Network” by Charny and two “Design Culture Salons”, one in Shenzhen and one in London.<sup>11</sup>

While different in approach, and with varying levels of active participation, these methods all emphasised participant observation, involved participants in organising and leading activities, and took place at makerspaces and associated sites. As such the work can be seen as situated within a participatory research framework (Bergold/Thomas 2012). Documented through note taking, photog-

<sup>11</sup> The Salons were based on a format Julier has been organising at the V&A since 2012 and which offers a public platform for critically discussing contemporary design issues (see <https://designculturesalon.org>).

raphy, audio recordings and video, the events were all designed to gather as well as share knowledge and ideas about making.

The next section focuses on one of these workshops, the craft-based and explicitly participatory “Digital Craft” workshop, which we believe represents our most original and useful contribution to Maker movement studies.

## “Digital Craft” workshop

“Digital Craft” centred on using co-creative making activities in a makerspace. The aim was to understand the motivations and values of makers as both individuals and community members. The workshop focused on making and built on our research affinity with Ingold’s identification of the inclusive nature and research benefits of social anthropology’s participatory approach (2013: 4). This is what Wilde, Underwood and Pohlner recognise in their Ingold-influenced approach: “The social and performative nature of craft to be a rich site for inviting and opening up exchanges of ideas [...] [and] an inclusive and non-threatening space for people to engage [...] [and] the ideal way to scaffold an open, responsive research structure” (2014: 366).

The three-hour evening workshop took place at Litchee Lab, which prioritises affordable access to analogue and digital design and making facilities and space for Chinese and international makers to meet and education. It was co-designed and delivered by co-director James Simpson.



Figure 2: Laser-engraved printing blocks derived from participants’ drawn designs

The workshop was advertised through social media as an opportunity “to learn and work together to craft a traditional block printed poster, aided by digital tools and



augmented with digital content that celebrates what makerspaces such as *Litchee Lab* do and mean to their makers”.<sup>12</sup> It involved translating digitally generated or hand-drawn imagery onto digitally engraved plastazote<sup>13</sup> blocks (see Figure 2). Coated in conductive “electronic paint” produced by *Bare Conductive*, we then used these blocks to co-create a touch-sensitive poster. This paint allows users to create continuous connected designs that become simple physical sensors. Using the same principal as a touchscreen on a mobile, capacitive sensing is utilised to recognise when any part of the painted design is touched (see a single “robot parade” being touched in Figure 4).

Participants recorded short audio clips in which they described their motivations for being a maker and what *Litchee Lab* means to them. Using a “Touch Board”,<sup>14</sup> these clips were then connected with their different printed elements on the poster. When an element was touched, the associated clip was played. The activity echoes Pohlner, Wilde and Underwood’s use of craft as “both a process and a product” (2014: 366), creating the poster was a methodological approach that resulted in a physical outcome with embedded research content.

With six female and four male participants, the workshop had a near-even gender balance, something that Marshall has experienced as difficult to achieve in technology-focused workshops (Briscoe/Mulligan 2014). Participants ranged from experienced software users to those with no technical experience. Everyone managed to create his or her own design and translate this into a printing block and audio clip. Significantly, only a few participants (all male) produced technology or tool-related imagery – most participants created abstract, diagrammatic or human-centred images to express the values they associated with *Litchee Lab* and making (see Figure 3).



Figure 3: A selection of designs developed by workshop participants

<sup>12</sup> Excerpt from workshop promotional material (unpublished).

<sup>13</sup> A polyethylene foam that can be easily and quickly engraved to a range of depths using a laser cutter.

<sup>14</sup> A “Touchboard” is an Arduino board developed by Bare Conductive (<http://www.bareconductive.com/>), the developers of conductive ink that provides a simple way to associate conductive ink designs with audio clips.

The audio samples were similarly varied, ranging from commending the technical resource that *Litchee Lab* provided, to being enthused by the community and culture it offered. We also used the workshop to conduct semi-structured interviews, asking participants about the meanings and motivations they assigned to making and makerspaces. These reinforced the ideas articulated in the poster project. One individual commented: “that’s what makerspaces mean to me – community”, while another noted “I don’t have many opportunities to make things in daily life. [...] I can’t remember the last time I used a saw.” The former asserted the maker movement’s community ethos (Dougherty 2012: 14), while the latter was a useful reminder that not all of China’s population is involved in manufacturing, and that their engagement with the maker movement is informed by the same distancing from production seen in Western post-industrial economies.

While the tight timescale impacted the poster’s final development and production, the workshop was well received. As Simpson reflected:

In your workshop, we used the laser cutter to make stamps, and then the stamps to make a poster, and lastly the poster to tell a story. Too many times in life do we identify a problem and then seek to address it as directly as possible. The benefits of exploring the use of tools, community, and creativity is, in my opinion, when people shine most brightly in a makerspace.<sup>15</sup>

Simpson recognises the benefits of a dialogical, open-ended, “crafty” approach that perhaps can be contrasted with design workshops that aim for conclusive action and closure, rather than increased communication. As a sign of its success, Li and Simpson have repeated the workshop with a group of secondary school teachers, and it was again well received.



Figures 4 and 5: Final poster including the “touch board” and speaker that enables the audio files to be played

<sup>15</sup> James’ reflections can be found on the project blogsite: <https://chinascreativecommunities.wordpress.com/china-workshops/>.

Our experiences bore out previous co-design and participatory design research (Sanders/Stappers 2014a) in which making with, rather than for, people engenders group creativity and embeds this in any outcomes. Given the workshop's positive reception and participants' insightful reflections, we believe this kind of activity can facilitate reflective thinking, produce artefacts that embody and communicate participants' feelings and encourage conversation and narrative construction to a degree that would not occur with less participatory methods. As such this generative tool (Sanders 2002) can be situated within the pre-design stage of Sanders and Stapper's (2014) design process framework (see Figure 6). Overall, this activity made clear that making-based workshops could be a valuable method for future research into different types of making communities.

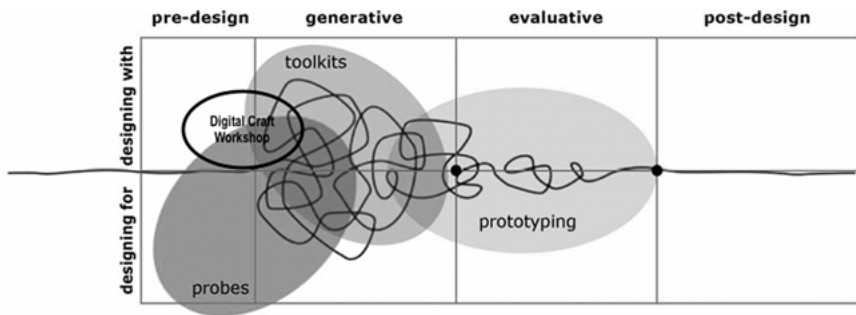


Figure 6: *Digital craft workshops* placed upon Sanders and Stappers' (2014) revised framework of the three approaches to making along the design process

## Conclusion

In this article we used social anthropological and craft-based approaches to reflect on our research. Focusing on the “Digital Craft” workshop enabled considering how craft-centred methods could contribute to field research – what could be called “craft anthropology”. This approach has its own distinct ethos and draws together methods that encourage responsiveness, empathy, co-creation and dialogical communication enabled through playful and sensitive engagement with the material world. While we are excited by the possibilities of craft and anthropology to understand the maker movement, we are just at the beginning of critically considering and contextualising this approach and its possibilities for further understanding China’s maker communities.

We also want to reassert that this was part of a larger “multi-method” approach. Ultimately it was the combination of events, voices and ways of gaining and articulating insights in *Living Research* and *China’s Creative Communities* that defined our understanding of Shenzhen’s maker culture, a combination we believe valuable for exploring the maker movement in other cultures and contexts.

## List of references

- Bergold, Jarg/Thomas, Stefan (2012): "Participatory Research Methods: A Methodological Approach in Motion." In: *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research* 13(1) (<http://www.qualitative-research.net/index.php/fqs/article/view/1801/3334>).
- Briscoe, Gerard/Mulligan, Catherine (2014): "Digital Innovation: The Hackathon Phenomenon." In: *Working Papers of The Sustainable Society Network*, Queen Mary University of London. (<http://qmro.qmul.ac.uk/xmlui/handle/123456789/11418>).
- Dean, Roger T./Smith, Hazel (eds.) (2009): *Practice-led Research, Research-led Practice in the Creative Arts (Research Methods for the Arts and Humanities)*. Edinburgh: Edinburgh University Press.
- Dougherty, Dale (2012): "The Maker Movement." In: *Innovations* 7(3), pp. 11–14.
- Ehn, Pelle/Nilsson, Elisabet M./Topgaard, Richard (eds.) (2014): *Making Futures: Marginal Notes on Innovation, Design, and Democracy*. London and Cambridge, MA: MIT Press.
- Gray, Carole/Malins, Julian (2004): *Visualising Research: A Guide to the Research Process in Art and Design*. London: Routledge.
- Ingold, Tim (2006): "Walking the plank: meditations on a process of skill." In: John R. Dakers (ed.), *Defining technological literacy: Towards an epistemological framework*, London: Springer, pp. 65–80.
- Ingold, Tim (2008): "Anthropology is not Ethnography." (Radcliffe-Brown Lecture in Social Anthropology, March 14 2007) In: *Proceedings of the British Academy*, p. 154.
- Ingold, Tim (2013): *Making: Anthropology, Archaeology, Art and Architecture*. London and New York: Routledge.
- Keqiang, Li (2015): "Full Text: Report on the Work of the Government." ([http://news.xinhuanet.com/english/china/2015-03/16/c\\_134071473.htm](http://news.xinhuanet.com/english/china/2015-03/16/c_134071473.htm)).
- Lindtner, Silvia/Greenspan, Anna/Li, David (2015): "Designed in Shenzhen: Shanzhai Manufacturing and Maker Entrepreneurs." In: *Aarhus Series on Human Centered Computing* 1(1), pp. 1–12 (<http://ojs.statsbiblioteket.dk/index.php/ashcc/article/view/21265/18742>).
- Marchand, Trevor (ed.) (2010): *Making Knowledge: Explorations of the Indissoluble Relation between Mind, Body and Environment*. Malden, MA, Oxford and Chichester: Wiley-Blackwell.
- Pohlner, Rebecca/Wilde, Danielle/Underwood, Jenny (2014): "PKI: Crafting Critical Design." In: *DIS 2014*. Vancouver, BC, Canada, pp. 365–374.
- Rossi, Catharine/Marshall, Justin/Julier, Guy (2016): *China's Creative Communities: Making Value and the Values of Making: PROJECT REPORT* (unpublished).

- Sanders, Liz (2002): "From User-Centered to Participatory Design Approaches." In: *Design and the Social Sciences: Making Connections*. London: Taylor & Francis, pp. 1–8.
- Sanders, Liz/Stappers, Pieter Jan (2014): "Probes, Toolkits and Prototypes: Three Approaches to Making in Codesigning." In: *CoDesign* 10(1), Taylor Francis, pp. 5–14.
- Sanders, Liz/Stappers, Pieter Jan (2014a): "Editorial." In: *CoDesign* 10(1), pp. 1–4.
- Saunders, Tom/Kingsley, Jeremy (2016): *Made in China: Makerspaces and the Search for Mass Innovation*. London: Nesta.
- Shoemith, Rebecca (2016): "Makerspaces – China's next big boom?" British Council, 3 April (<http://creativeeconomy.britishcouncil.org/blog/16/04/03/shenzhen>).
- Shirky, Clay (2015): "China's Version of the 'Maker Movement' Puts the U.S. to Shame." October 21 (<http://fortune.com/2015/10/21/chinas-version-of-the-maker-movement-puts-the-u-s-to-shame/>).
- Sivek, Susan Currie (2011): "'We Need a Showing of All Hands'. Technological Utopianism in MAKE Magazine." *Journal of Communication Inquiry*, 35(3): 187–209.
- Sleigh, Andrew/Stewart, Hannah/Stokes, Kathleen (2015): *Open Datasets of UK Makerspaces: A User's Guide* ([http://www.nesta.org.uk/sites/default/files/open\\_dataset\\_of\\_uk\\_makerspaces\\_users\\_guide.pdf](http://www.nesta.org.uk/sites/default/files/open_dataset_of_uk_makerspaces_users_guide.pdf)).