

## Made in China

*Technology and society: China has its own distinctive version of the maker movement, which spans electronics hobbyists and high-tech startups*

It is a drizzly October day in Shanghai, and beneath a few dozen bright orange tents, set up in the plaza of a shiny new innovation park, hundreds of electronics hobbyists and entrepreneurs are attending China's second Maker Carnival. The "maker" movement, an offshoot of do-it-yourself culture whose adherents design and build their own technology products, is more established in America: the most recent Maker Faire New York, for example, held in September, boasted some 75,000 participants and over 650 stalls. But size isn't everything, even in China.

Under those orange tents some surprisingly innovative companies that supply hobbyists and startups were strutting their stuff. There were robot-construction sets, build-it-yourself electronics kits and 3D printers galore. None of the companies that make them is a familiar name yet. But some of them could one day challenge the likes of MakerBot, an American manufacturer of 3D printers, or Arduino, an open-source microcontroller platform invented in Italy, as the darlings of the worldwide maker movement.

What gives these young Chinese firms a potential edge is their close connections with the so-called shanzhai production networks centred on Shenzhen, China's high-tech manufacturing hub. The term shanzhai is often used pejoratively to refer to Chinese copycat producers of mobile phones and other electronic devices, based on copied designs and knock-off brand names. But its literal meaning is "mountain village", and it refers to bandits who opposed corrupt rulers and hid in the countryside—much like Robin Hood in English folklore. David Li, co-founder of XinCheJian, Shanghai's first "maker space" (essentially, an open-access workshop), says the Robin Hood spirit is inspiring legitimate and often quite innovative products, as the socially progressive maker movement teams up with hard-nosed manufacturers.

Seed Studio, a startup based in Shenzhen, is a good example. The company specialises in open-source hardware, which means the design of the hardware and the software code that goes with it are both freely shared. As the success of Arduino has demonstrated, open-source hardware is ideal for quick prototyping and small-scale production runs of digital devices. But Seed goes one step further, supporting a whole ecosystem of open-source production. People pitch ideas on its website, and if they garner enough community support, Seed will manufacture them. More than 70,000 people are participating on its site, and over 130 projects were crowdsourced this way in 2012. Those numbers are expected to more than double in 2013.

Eric Pan, the founder of Seed Studio, exemplifies a new breed of Chinese entrepreneur. He quit his tech-industry job in 2008 to start making hardware with a friend, based in his apartment (the urban Chinese equivalent of a garage). Now his company employs more than 100 people, and the unassuming Mr Pan is a rock-star among young Chinese geeks. Even so, he is quick to admit that not all Seed Studio products are hits, and humble about the challenge of surviving as a business in an open-source world, where copying good ideas is not merely allowed but encouraged. Yet he is also bullish about the future: his firm is expanding its range of kit to include wearable electronics and new kinds of sensors.

Proximity to shanzhai manufacturers could make it easier for Chinese makers to turn prototypes into mass-produced products. At the same time, the maker community could boost innovation among shanzhai firms, which are in fact more inventive than is often assumed. Silvia Lindtner, an ethnographer at University of California, Irvine and Shanghai's Fudan University, notes that shanzhai producers have long adapted mobile phones to the needs of people in the developing world. For example, unlike mainstream manufacturers, they championed mobile phones with dual SIM slots, ideal for Africa and India where users often switch networks to reduce costs.

For their part, Chinese government officials are taking an interest in the maker movement because of its economic and educational potential. Shanghai's municipal government has backed a plan to build 100 maker spaces throughout the city. Four of these new spaces are already up and running, with several more to be completed by the end of the year. Each will have a 3D printer, and will also teach traditional crafts such as woodworking.

One of the attractions of maker spaces like XinCheJian, however, is that they operate independently of the state, supported by users' monthly membership fees. Although expats played a big role in initiating XinCheJian, more recent maker spaces such as Beijing's Maxpace and Shenzhen's Chaihuo were entirely home-grown. China's distinctive take on the maker movement—makers with Chinese characteristics, to paraphrase Deng Xiaoping—is worth keeping an eye on.

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