

Silicon Markets: Smart Hardware from the Streets

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The street finds its own uses for things.

William Gibson, Burning Chrome

In late November 2014, Shenzhen held its largest industrial design fair. On display was an assortment of enticing gadgets showcasing the latest wave of consumer electronics: sleek wearable devices that track your sleep patterns and activity rate, a wireless charger, black, round, and elegant, macaron-inspired power banks that double as hand warmers, a light bulb that changes both color and sound on demand, among others. At the opening ceremony, a quadcopter drone flew through the convention hall, and the images it captured were projected on a screen behind the welcoming address of the Shenzhen mayor.

Yet, despite its ambitions to insert itself into the glossy world of high-end design, Shenzhen is a cyberpunk city. Alongside the slick formality of corporate events, there is a thriving, vibrant, culture of the street. This is especially vivid in the city's famous *chen zhong cun* (urban villages) – informal neighborhoods where open air restaurants, fish and fruit vendors share their narrow spaces with pool halls, repair workshops, and mahjong rooms that spill out on to open lanes. Shenzhen's animated street culture seeps its way to every corner of the metropolis, as seen, for example in the *jiaozi* (dumpling) stands that are set up on weekday mornings just outside the slick glass surface of the convention hall and its surrounding 5-star hotels, where the aforementioned industrial design fair took place.

Street life and street markets are also key to Shenzhen's emerging identity as the "Hollywood or Silicon Valley of Hardware," epitaphs favored by the city's boosters – from local government officials to entrepreneurs and makers from all over the world. Central to this new urban imaginary are the electronic markets of *Huaqiangbei*, a 15-by-15 city block area where an enormous array of electronic components and devices are sold, recycled, and assembled. Though the markets are housed in a cluster of multi-story malls, they come from - and belong to - the streets. The *Huaqiangbei* markets are part of an open source ecosystem of manufacturing (known as *shanzhai*) that has emerged in China's Pearl River Delta in the shadows of large contract manufacturing. This open innovation model of technology production has evolved over the last 30 years, feeding off of low barriers of entry, an outlaw spirit, and a corresponding high-speed mode of copy-and-mutate design and production. In the markets, versions of the products on display at the Shenzhen industrial design fair are available at a fraction of the price. Smart watches, wearable bands, and personal drones all can be found for a few hundred renminbi.

The world of consumer electronics is at a strange phase, evoking a peculiar mix of fevered excitement and ennui. On the one hand, the plummeting costs of hardware and digital fabrication have resulted in an explosion of new tools and devices (e.g. 3D printers, household robotics, drones, wearables, and the wide variety of devices that make up the Internet of Things). Yet, exhilaration at the proliferation of 'smart' objects is tempered by the sense that, at least so far, no one is really sure what any of this stuff is for. High profile failures of celebrated gadgets like the Nike FuelBand and Google Glass make plain that the current wave of global technological production is still very much unsettled.

At the Shenzhen Industrial Design Fair, none of this ambivalence was on show. Instead, designers from around the world skillfully wrapped their seductive products in a change-the-world rhetoric. In a closed-door forum, however, it transpired that behind the hype lurks a familiar business model. Today's emerging hardware companies look to the existing giants – Facebook, Google, and Twitter – and see their money and success coming from the speculative drives of the Internet economy. What matters here is not the hardware itself but the abstraction through software, advertising, and big data analytics. As DIY makers morph into entrepreneurs, many begin caring less about the careful crafting of an object (in contrast to what the maker movement might have us believe) and begin focusing instead on the potential network effects of devices that have the capacity to extract data from a user's behavior. Misfit founder Sridhar Iyengar spoke openly about this approach in a refreshingly candid speech. Trained as a data scientist, Iyengar views the value of wearables in the data they collect. The company's goal is to create a device so appealing that customers will be compelled to wear them all the time, keeping their monitoring powers close to the skin, day and night. Tuned sharply to the promise of VC funding, this vision sees market domination as the mark of a truly successful wearable device.

In contrast, the shanzhai goods sold in the stalls of Huaqiangbei do not come with end-user license agreements or service models, and are not accompanied with big data analytics or advertising plans. Neither do they have expensive marketing campaigns or rely on the funding of venture capitalists. Instead, capital is borrowed through informal networks, and companies operate primarily with the conventional rules of trade that emerge spontaneously in highly competitive markets. Shanzhai companies do not drift far from financial fundamentals. Unlike VC funds, which choose technology companies in the hope of betting on the next monopoly, shanzhai investors are concerned only that they are repaid with the interest that was promised. This tends to encourage a culture of fierce entrepreneurialism characterized by break-neck agility, micro-experimentation, and the use of the market itself as a product testing ground. The result is a kind of low-end, "folk art" style of its own – a bracelet that is also a USB cable; a power bank modeled on an anime cat; a whole range of adaptations on the electronic unicycle; a flashlight that is also charger, a host of other creative gadgets. This is not the sleek, high-tech design of a global elite that tends towards uniformity; it's the cheap, multifaceted, and niche technology of a vast population that lives predominantly outside the cherished high-end markets of the West.

Shanzhai production constitutes an alternate global market in electronics, which has more in common with the street food hawker than it does with chain restaurants in

shopping malls. Though less visible than well-known global brands, Shenzhen's open ecosystem is enormous in scale, producing 300 million phones and 100 millions tablets per year. For instance, in 2014 alone, it released 2 million smart bracelets and 1 million smart watches to the market as white-labeled products (about 1/5 of global shipment).¹ The intensity of this mode of cutting-edge technology production has already disrupted companies like Nokia and Motorola, which cater primarily to high-paying customers. Devices created and made in Shenzhen are distributed in Africa, India, South America, Europe, and the United States. They are sold as no-name devices in Wal-Mart and Target and are also behind new disruptive brands, such as Wiko in France.

This distinction between branded high-end technology and cheaper, mutant offshoots receives abstract articulation by historian Fernand Braudel. His three-volume exploration "Civilization and Capitalism" takes pains to distinguish the capitalism of large monopoly-driven corporations from the trade of markets, which always exist in a 'layer beneath'.² Drawing on Braudel, theorist Manuel de Landa reinforces this differentiation (or even opposition) between the capitalism of large corporations (which he names anti-markets) and the self-organizing, decentralized realm of small businesses and small shops that constitute the markets of the street. Throughout his historical analysis, Braudel shows that these two economic realms – a capitalist order consisting of monopolistic corporations and a substratum of market activity – have both been at work for centuries. In addition to the monopolistic dealings of the East Indian Company, for example, there was always a vast hybrid traffic of smaller 'pirate' trade. Yet, while this more centralized and organized economic order has always been more visible, its secret is the strength it draws from the markets, which continually exist underneath and alongside it. Braudel repeatedly draws attention to "the enormous creative powers of the market" of this "lower story of exchange..."³

In Shenzhen, as elsewhere, these two economic models - capitalism and street markets - are often intertwined. Aspects of shanzhai production feed into the glossy companies on show at the design fair just as elements of high end corporate capitalism – VC funding, advertising, data analytics – seep into the markets of Huaqiangbei. In Shenzhen today, however, the interplay of these two systems is especially vivid. As designers and makers from around the world flock to the metropolis, the question of how a global technological elite interacts with, and are influenced by, the culture of the street will shape not only the future of the city but also the way in which technology's latest wave – wearables, robotics, IoT, and ubiquitous computing – gets made.

¹ Personal Interview. Liu Hui, *Huaqiang Research Group*, November 2014.

² Braudel, Fernand, *The Perspective of the World: Civilization & Capitalism 15th-18th Century*, Harper & Row, 1984

³ Braudel, Fernand, *The Perspective of the World: Civilization & Capitalism 15th-18th Century*, Harper & Row, 1984