

BAT (Baidu, Alibaba, Tencent) as a post-shanzhai phenomenon: An analysis from the perspective of antifragility and modularization

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Abstract. *Shanzhai* refers to the production of mobile phones that imitate popular brands, a practice that became widespread in China around a decade ago. This form of production is characterized by modularity: the division of products into small independent components that make it easier to update and replace parts without affecting the whole. In this article, we analyze modularization as a post-*shanzhai* phenomenon in China's largest technology companies – Baidu, Alibaba and Tencent (BAT) – in order to compare them to their Western equivalents: Google, Apple, Facebook, Amazon and Microsoft (GAFAM). Instead of exoticizing Chinese technological development or undertaking another postcolonial reading, we use the concepts of 'boundary objects' and 'antifragility' to put the revolutionary values that endure in post-*shanzhai* China (and elsewhere) into perspective. In addition, we conclude that a fuller sociohistorical understanding of the ambivalences of *shanzhai* may encourage more self-critical understandings of Western technological and digital developments.

Keywords: boundary objects; China social media; digital development; ICT in China; maker culture; political economy and technology in China.

[es] Los BAT (Baidu, Alibaba y Tencent) como fenómeno postshanzhai: Un análisis desde la antifragilidad y la modularización

Resumen. *Shanzhai* es el término que define la producción de teléfonos móviles de imitación de las grandes marcas que fue popular en China hace más de una década. Este estilo se caracteriza por la modularidad, la división en pequeñas partes independientes, más fáciles de actualizar o reemplazar sin afectar al conjunto. Analizamos la modularización en las grandes tecnológicas chinas BAT (Baidu, Alibaba y Tencent), como un fenómeno post-*shanzhai*, para comparar estas empresas con las occidentales GAFAM (Google, Apple, Facebook, Amazon y Microsoft). En lugar de exotizar el impulso tecnológico chino o redundar en una nueva lectura postcolonial de este desarrollo, ponemos en perspectiva los valores revolucionarios que perduran en la China post-*shanzhai* (entre otras geografías) con la ayuda de los conceptos *boundary objects* [objetos límite o fronterizos] y 'antifragilidad'. Concluimos que una perspectiva sociohistórica de las ambivalencias que constituyen el fenómeno *shanzhai* puede fomentar una comprensión menos complaciente de los desarrollos tecnológicos y digitales occidentales.

Palabras clave: boundary objects [objetos límite/fronterizos]; cultura maker; economía política y tecnología en China; Medios sociales en China; TIC en China.

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1. Introduction

Shanzhai logic has made an enormous contribution to China's positioning as the world's great factory. This is evident in the fact that it is now responsible for one-third of all global ICT exports (Banco de España,

2019), while manufacturing industries across the world are heavily dependent on Chinese components. This transformation has been consolidated by the Made in China 2025 national strategy that aims to make the country a world leader in technological innovation over the next few decades, with a particular

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focus on 5G. In contrast to the United States, China has the capacity to manufacture mobile hardware components, its own devices and all elements of network infrastructure. These two world powers are now in a technology race of geopolitical importance (Arteaga, 2019, p. 121). The associated tensions, which have technological development at their very center, have reactivated confrontational imaginaries based on the difference of the two countries' economic models. However, the largest Western technology companies, known as GAFAM (Google, Apple, Facebook, Amazon and Microsoft), and their Chinese equivalents, known as BAT (Baidu, Alibaba and Tencent), are actually very similar. The business models they employ – market share dominance, the maximization of the extractive value of metadata and their capacity to surveil, regulate and govern users and even whole populations – also raise profoundly important political and social questions.

In this text, we analyze *shanzhai*, the manufacture of mobile phones that imitate popular brands, which was widespread in China around a decade ago. This type of production is characterized by modularity: the division of products into small independent components, making them easier to update and to replace parts without affecting the integrity of the whole. In particular, we examine modularization in China's largest technology companies, BAT, as a post-*shanzhai* phenomenon, in order to compare them to their Western equivalents, GAFAM. Instead of exoticizing or deploying a postcolonial reading of Chinese technological development, we employ the concepts of 'boundary objects' and antifragility to argue that a sociohistorical understanding of the ambivalences of *shanzhai* permits a more reflexive and critical understanding of western technological and digital developments. This approach also allows us to put the revolutionary values that endure in the technoculture of post-*shanzhai* China (and elsewhere) into perspective. We use the term post-*shanzhai* to characterize the evolution of *shanzhai* culture, based on imitation and appropriation, in large Chinese technology companies. These enterprises now compete on the global market by leveraging their own innovations in the improvement and development of products and a wide range of digital services.

2. Copycat culture and intellectual property: East and West

As features of the Chinese worldview, flexibility, process, mutability and change are counterpoints to the logics and identity of Western society. With its emphasis on reproduction and innovation, the *shanzhai* phenomenon, also known as 'Chinese copy' or 'China fake', has been the motor of Chinese industry.

In Chinese culture, replicas or reproductions have as much, if not more, value than originals. In fact, a

well-made copy is considered a work of art in itself. Byung-Chul Han (2017) highlights the importance of reproduction among the great Western painters, who copied as a tribute to the masters. In *The Order of Things*, Michel Foucault (2005 [1970]) reminds us that in medieval monasteries producing copies was critical to the dissemination of important writings. With the arrival of modernity in Western countries, uniqueness became sacred and authenticity was equated with originality. 'Good' became associated with individuality, truth, property and authorship. The privilege of the unique, in contrast to the multiple, is sustained in practices such as referencing, quoting and even serialization, «establishing a conceptual frame that ranges from authorship to the margins of anonymity» (Carreño, 2017, p. 70, authors' translation). In the hegemonic Western worldview, copies are fraudulent, an attack on intellectual property that displaces and sequesters creative value.

Contemporary Western ideas of authorship, makers' marks and signatures emerged towards the end of the Middle Ages when the first great cities began to appear (Sennett, 2008) and a division between the major and minor arts was established (Sennett, 1996). As Jeroen de Kloet, Chow Yiu Fai and Lena Scheen (2019, p. 178) point out, in contemporary culture, «[craft workers] are frequently excluded from the prestige class and tend not to enjoy any fame». In the eighteenth century, during the Age of Enlightenment, creativity began to be seen as a person's individual ability, whereas previously it was seen as a blessing of God or a kind of fate. With the arrival of Taylorism and rational management, capitalist logic promoted the separation between manual and intellectual labor and with it the alienation of what we do from what we know (Parker, 2007; Sennett, 2006).

In China, there is no authorship of work nor idea of ownership in creation. Instead, creativity is understood as the outcome of collective effort. This individualistic model of creativity, which makes craft labor subordinate to artistic labor and does not recognize the creativity in mass production, lies at the heart of the Western imaginary of *shanzhai* production (Kloet, Yiu Fai & Scheen, 2019, p. 179). In contrast, it has been argued that in 'collectivist cultures' it is people's responsibility to share their knowledge for the benefit of all members of society (Page, 2019, p. 187). As a result, collective responsibilities are placed above individual rights, and there is no perceived need to protect intellectual property.

With digitalization, the very notion of copyright has been challenged by changes to the dynamics of cultural creation, knowledge distribution, the perpetual combining and recombining of products, and new forms of exchange and circulation of content. In this respect, the social vision of the open software movement and hacker culture stand in opposition to the intellectual property model. Open access, copyleft and maker culture are Western cultural phenomena – now global movements too – that question the

legitimacy of the concept of piracy (Stallman, 1997; Lessig, 2004; Ming, 2005; Liang, 2009).

3. The shanzhai phenomenon: Conditions of possibility

Although *shanzhai* occupies an ambiguous position between innovation and inferiority, and between imitation and artistic appropriation, it has fostered a vibrant and attractive culture based on the production of products at prices much lower than the originals. However, they are appropriations rather than copies (Pang, 2012, p. 223). Given that in China counterfeiting does not devalue a product, *shanzhai* can be understood as a subversive transformation of elite culture by citizens, particularly when it leads to surprising changes and even creative modifications. Drawing on the work of Michael Keane and Elaine Jing Zhao (2012) and Ming Dong (2015), Lukas Adel Riad (2021, p. 16) argues that «cheap but functional *shanzhai* iPhones appeal to price-sensitive consumers» at «the low-end of the market [which is] also called the ‘bottom of the pyramid’» or the «‘information have-less’». Later, *shanzhai* mobile phones also introduced many innovative features that catered to price-sensitive consumers as part of the Chinese low-cost economy.

The modern uses of the term *shanzhai* dates to the 1950s when small-scale family-run factories in Hong Kong produced cheap, low-quality household goods. The term was often used to «mark their position outside the official economic order» (Ho, 2010, p. 1). The Great Leap Forward, Mao Zedong’s transformation in the 1950s of Chinese political and economic policy towards industrialization, was based, in part, on *shanzhai* culture:

indigenous and creative (albeit primitive) techniques invented by the masses, or *shanzhai* methods, [...] became the established doctrine of problem solving, whereas more scientific methods with a focus on technological sophistication, but which were disdainful of mass creativity, were marginalized (Yuefan, 2019, p. 199).

Nowadays, the term *shanzhai* comprises a «wide range of concepts including ‘copy-and-paste’, ‘grass-roots cleverness’, and even anti-authoritarian culture» (Ho, 2019, p. 171). It is an umbrella term that encompasses an enormous variety of economic, social, cultural and developmental activities, ranging from *shanzhai* electronics to *shanzhai* films to the *shanzhai* spring festival gala (Chubb, 2014).

The hype around *shanzhai*, or copycatting, that we are familiar with today started with ‘faked’ mobile phones that flooded the Chinese market around the mid-2000s when the Shenzhen economic zone in China, adjacent to Hong Kong, became the largest mobile phone production base in the world (Wallis

and Qiu, 2012). Many of these low-cost phones, which imitated the designs and logos of popular international brands, were called *Shanzhaiji* [bandit phones].

In 2007, then President Hu Jintao pledged to transform China (Paradise 2013, p. 313). Rather than depending on developed countries, his policy envisioned the promotion of ‘indigenous innovation’, which entailed the development of «core network technologies and standards» (Keane & Zhao 2012, p. 218). In addition, the great economic crisis of 2008 gave the strategies and innovation of *shanzhai* industry even more prominence. Since early 2008, *shanzhai* has expanded beyond electronic consumer goods to penetrate ever more aspects of people’s everyday lives (Cui, 2012, p. 399), becoming the hottest buzzword online and even penetrating entertainment (Xu, 2016, p. 3). In this respect, amateur imitations of various popular television shows began to appear on the internet and to circulate widely in China, creating a popular fervor that was immediately taken up by scholars and social commentators. Comparing *shanzhai* to cultural democracy, they affirmed the positive political function of participating in *shanzhai* culture by differentiating it from *shanzhai* electronics and its association with piracy and rapaciousness (Yang, 2009).

4. Shanzhai goes global: Modularization and (dis)respect for intellectual property

Along with the deregulation of mobile phone manufacturing in 2007, the rise of MediaTek (MTK), a Taiwanese company specializing in turn-key chipset solutions for mobile phone vendors, marked a turning point in *shanzhai* entrepreneurship (Wang, 2014; Li and Zhou, 2013). MediaTek’s turn-key solution not only provided competitive products to giant technology companies, such as Sony and Samsung, it also allowed mid- and small-sized mobile phone vendors to produce high-quality smartphones with much less capital investment and with shorter turnaround times than traditional methods (Chen, 2013; Rong et al., 2011). The market impact of MediaTek chipsets and its business model, which relied on modularization, was huge, leading to major financial losses for companies such as Texas Instruments (TI), a United States based semiconductor manufacturer (Wang, 2014). Modularization enabled *shanzhai* companies to be flexible enough to adapt to new technological developments and to add their own innovations (Jason Shay et al., 2020). Modularization simplified design and development by dividing the manufacturing system into independent, yet interconnected, modules that facilitated testing and maintenance of parts. This approach led to more robust, scalable and flexible systems that allowed for updates to take place by module and for risk to be spread – when an individual module failed, the whole system was not affected.

Another condition of possibility for the rise of *shanzhai* was, according to some *shanzhai* critics, China's disregard for intellectual property (IP) rights. William Hennessey (2012, p. 645) argues that the Chinese government consciously undermines intellectual property rights in order to retain control over the economy and property ownership. Nevertheless, as Fan Yang (2016, p. 603) points out, the «Western conception of property, which serves as the foundation of IP rights, is based on the individual and as such differs from the Chinese collectivist approach». In a similar vein, Silvia Lindtner (2015) draws attention to the hypocrisy of Western countries by stating that while hacking is celebrated in the West as a future enabler of innovation, the open manufacturing processes of *shanzhai* are denounced for their lack of principles and respect for intellectual property rights.

Examining the story of journalist and entrepreneur Chris Anderson at the outset of the personal drone industry, whose manufacturing practices were similar to the *shanzhai* model, can help us to understand the ambiguity that exists around intellectual property and industrial piracy in the West. Anderson (2012) adopted 'maker' principles as the philosophy of his company, 3D Robotics, which aimed to supply robots to companies and private individuals through the community he had developed: DIY Drones and its forum DIY Drone (Anderson, 2012, June 22). He also started The Dronecode Foundation, an independent community for drone projects based on open-source code, a project that sought to resolve hardware problems and to develop software for drone applications. He envisioned pioneering uses for these drones in agriculture and for responding to natural disasters (Stuart & Anderson, 2017).

Anderson wanted to try out a *shanzhai*-style production operation based on free hardware, the Western approach that also challenged intellectual property rights. However, because the drone prototypes manufactured by companies in the United States were unstable during flight and the photographs of low quality, he decided to shift manufacturing to China. His main competitor was DJI, a Chinese company with many years of experience in modularized production, specifically with vertical integration that guaranteed production control from raw materials to sale (Xu & Muneyoshi, 2017). Very quickly, DJI became the market leader on the basis of product quality and price, but also because of its flight control software became a basic feature of unmanned devices. The *shanzhai* solution was so successful and robust that Anderson ended-up with a debt of 25 million dollars.

5. BAT: Post-shanzhai industry, culture and politics

The success of *shanzhai* industry at the turn of this century became an effective path for China's small

local companies to accumulate capital to compete with their national or international rivals (Xu, 2016, p. 3). In 2012, however, the once-booming market for *shanzhai* mobile phones started to lose its grip on the new generation of smart phone consumers. After a period of «emergence, development and stabilization» (Keane & Zhao, 2012, p. 226), the *shanzhai* manufacturing industry underwent a transition to a 'post-*shanzhai* era' (Riad, 2021).

Numerous studies propose that the *shanzhai* phenomenon was part of the first phase of Chinese neoliberal globalization (Abbas, 2008; Dong, 2015; Riad, 2021; Yang, 2016; Zhang and Fung, 2013). Though *shanzhai* industry may have its roots in piracy and open sharing and present a subversive and anti-mainstream image, various critics argue that it remains deeply embedded in the global capitalist system, particularly in terms of modes of production (Lindtner et al., 2015) and its focus on growth and profits (Chubb, 2015).

Shanzhai, however, has always contained contradictions and ambivalences. As Josephine Ho (2010, p. 2) notes «*Shanzhai* is a strange amalgam of counterfeiting, national pride and Robin Hoodism» (quoted in Zhang and Fung, 2013, pp. 404–405). In its socioeconomic and cultural dimension, the *shanzhai* phenomenon is, as such, adaptable, creative and bullish, with both positive and negative connotations. On the one hand, it is associated with illegality and low-quality. On the other, it implies a «culture of rebellion, irony and self-marginalization» (Pang, 2012, p. 222). As Montse Carreño (2017, p. 70, authors' translation) points out, it connects «high and low culture, singular and mechanized modes of production». In other words, half way between imitation and assimilation in the global commodity market.

The largest Chinese technology companies, or BAT, have transferred the production logic that was so successful in electronic manufacturing to software development. BAT companies lead in employment creation, innovation and technological development. Their strength lies in the values of *shanzhai* culture: enthusiasm for innovation, user-centered design and paying close attention to consumer needs. Baidu, the most popular search engine in China, offers services similar to Google; Alibaba grew exponentially by selling counterfeit products of well-known brands on its electronics platform; and Tencent was inspired by different messaging applications to create WeChat, the largest social media network in China.

BAT companies developed out of the *shanzhai* ecosystem, and through competition with the largest technology companies in the United States, GAFAM, they have diversified their services and establishing strategic alliances to satisfy national demand. As a result of constant innovation, they have also penetrated other Asian markets. For example, Alibaba has partnered with logistics companies to improve deliveries to end consumers, while Tencent

offers exclusive content from other entertainment companies. Baidu began as a search engine but now operates in advertising, artificial intelligence (AI) and autonomous vehicles. Its open AI platform permits developers to create and launch new functionalities quickly and efficiently, dynamically adjusting its products and services to market trends. Modularity has kept Baidu at the cutting edge of technological development and competitive in national and international markets. Alibaba became a pioneer in e-commerce by operating a modular payments system that failed to take off due to a lack of trust between vendors and consumers (Yujie Chen, et al., 2018), but which today is used to manage large-scale loans and payments. WeChat Pay, on the other hand, dominates every day and small-scale purchases. Alibaba has become a market leader in e-commerce due to the modular system Alipay, which permits developers to create functionalities and services quickly and efficiently – the same logic that has permitted Tencent to grow enormously and to remain competitive in the Chinese and global technology markets.

Tencent Holdings is a story of *shanzhai* culture. Its super application, WeChat, has modularized all sorts of services, including instant messaging, social networks with private and public accounts, video games, geolocalization, verified accounts, the development and sale of software, payments and transfers through the app, and a taxi-hailing and bicycle sharing service. For a number of years now, WeChat has also become a primary means of regulating and governing Chinese citizens.

Tencent originated in Shenzhen, and despite competition from Alibaba, *shanzhai* innovation permitted it to grow by integrating with platforms such as QQ Show, based on the Korean web saylub.com, and to launch into the mobile phone market through a partnership with Kik Interactive and its product, Kik Messenger. When WeChat emerged as a mobile phone app in 2012, it was only available for iOS and aimed to take on the established competition. At the time, WhatsApp had already achieved substantial international penetration, outpacing applications such as Facebook and QQ (Chen et al., 2018, p. 26). WeChat's modular strategy to new functionalities led to the emergence of Mini Programs in 2017, a form of software development – basically sub-applications – that permits WeChat to independently launch all sorts of product alternatives within its own app, and without any need for downloads from Google's or Apple's shop. Mini Programs, for example, allows official accounts to be linked to e-commerce accounts, to connect users to local services, and it is used by influencers and content creators to monetize conversions by integrating with payment systems such as debit/credit card payments or the virtual wallet app WeChat Pay (Chen et al., 2018). Without needing to invest in infrastructure, vendors can use a QR code payment system to generate personalized codes that do not require physical scanners, while

consumers can develop order specific codes for receipts or delivery details; a very useful alternative in a country that does not have a tradition of using credit cards.

Since 2011, WeChat has also been a visual social media network that is similar to Instagram, for example, it has a 'time capsule' function that imitates Instagram's 'stories'. Privacy is part of the app's growth strategy, so posts and likes are closed to a user's contacts in order to avoid advertising, branded and media content and other clutter (Chen, et al., 2018, p. 60). The network also operates two types of account, each focused on different user needs: subscription accounts, which are centered on everyday users and content creation, and service accounts, which permit commercial users to provide consumer services or tools to other users.

WeChat is changing interpersonal communication, not just among young people but older persons as well because voice messaging helps to overcome the difficulty of writing Chinese on a Western keyboard. In this sense, WeChat is reinforcing family ties, and young people see older members of the community in a different light. At the same time, young people can reduce the level of family control to which they no longer have to respond immediately, as tradition demands. From a cultural perspective, these changes imply a modularization of Chinese culture, shifting from collectivity towards greater individualism while still respecting tradition and intergenerational relations.

Launched in 2016, WeCounty is a Tencent application that focuses on rural areas. By 2020 it had incorporated some 15,000 small Chinese towns across nearly twenty provinces (Ye & Yang, 2020). WeCounty allows small municipalities to centralize up to 70 different services that it makes available to the residents of rural areas. Tencent created a classification of towns, called the WeCounty Index, that it has used to establish a system of incentives aimed at encouraging small towns and villages to participate. Tencent states that its aim with this strategy is to foster interaction and connections between towns and to create a common feeling of togetherness and collective energy, as well as to foster contact between urban and rural areas through the participation of migrants (Ye & Yang, 2020, p. 11).

The Chinese government also participates in WeCounty. Each town has its own page for news and information, as well as spaces where residents can express doubts, ask questions, comment, share feelings or sell products to larger urban areas. Through the design of functions and an interface that promotes satisfaction, it permits structural and psychological empowerment and distributes resources. Authors such as Lisha Ye and Huiqin Yang (2020, p. 4; p. 10) argue that WeCounty helps to reduce rural exclusion and has an important impact on rural development. They point out that *Shuren* culture, a Chinese

concept similar to ‘acquaintances’, is a key element in the application because it provides individual, interpersonal and community dimensions to enable technological development in terms of information, communication and local economics (Ye, Dai & Dong, 2022, p. 13).

6. BAT and GAFAM: Geopolitical (inter)operabilities

Software is the economic and social structure that large technology companies impose on online interactions as a system of social control (Manovich, 2014, pp. 194–195), and as a space that determines the meaning of «what is public, private and corporate» (Van Dijck, 2016, p. 170). While BAT and GAFAM companies do not own any means of production, they are the world’s most productive companies due to their centrality in so many forms of exchange and their hidden role in intermediation. Once their basic software products become established in the market, they weave together an ecosystem of payment methods and business, marketing and distribution models to create new markets based on the social imaginary of the collaborative economy (Gordo & de Rivera, 2021; de Rivera, 2021). Economically, they are so successful that the profits generated by many BAT and GAFAM companies exceeds the national economies of many countries (Benítez-Eyzaguirre, 2021). In this sense, GAFAM and BAT share many characteristics, including the modularity of *shanzhai*. Innovation is a key characteristic of the BAT companies that have integrated into global capitalism through the acquisition of holdings in foreign companies and strategic investment, which has allowed them to diversify their sources of income. In order to gain the confidence of users and commercial partners, they have also addressed issues related to international regulations on data privacy, consumer protection and fair competition.

These companies have become central to social life and exercise huge control over people’s lives. They mediate economic activity, information and communication, which are of great value to democracy and security. They also dominate entertainment, a market worth 2.3 trillion dollars and which accounts for 2.5% of world GDP (Corral, 2020, pp. 19-20). Every day, they capture around a billion gigabytes of data (Corral, 2020, p. 24), a number that is increasing exponentially. To extract this data from users, they use their software (Privacy by Design) and confusing consent procedures, and then process data with highly complex and difficult to interpret algorithms (Lipton, 2016). In the absence of any ‘algorithmic governance’ (Rouvroy & Berns, 2013), these systems are self-regulated by BAT and GAFAM (Benítez-Eyzaguirre, 2019).

In different ways, both BAT and GAFAM companies blur the boundaries between the public,

the private and the corporate. In the United States, they do this openly through political lobbying practices, while in Europe, efforts to influence policy is often more covert. In China, the government provides substantial economic support for product innovation – Huawei, for example, has received 75 billion dollars (Yap, 2019). Both groups of companies also benefit from public investment in infrastructure and research.

In both the East and West, these companies are characterized by globalization. The Chinese government leads internationalization through the Belt and Road Initiative (BRI). Inspired by the mythical Silk Road and railway transport, and launched in 2013, this digital strategy prioritizes hardware and finance. Alibaba is a prime example of this approach. Through the convergence of platforms and infrastructure, the modularization of e-commerce, payment systems, logistics and data, this company has become an enormous presence in the everyday lives of people, both within China and among the Chinese diaspora. Its ubiquitous presence across the whole continent has fostered the power of digital China and pride in Chinese innovation, contributing to a shared sense of destiny (Keane & Yu, 2019).

While BAT companies participate in global financial markets, they maintain a dominant position within China by playing a central role in state modernization projects and efforts at international expansion (Davis & Xiao, 2021, p. 107). BAT companies collect data for commercial use and for surveillance and control, similar to large Western technology companies. In this respect, WeChat has pursued capitalist growth and profit, with the same intrusive effects as GAFAM. Its mobile applications have even allowed for experimentation with the collection of vast amounts of data before users have even decided to install specific platforms (Meier & Manzerolle, 2018). Mobile phones are the primary target for data collection because they contain more personalized information and are non-transferrable devices. They are also frequently turned on and active for longer periods of time and have become one of the primary means of consuming content, services and media. As a device, it plays a key role in social control and power.

Surveillance is the logic of the connected world, and, in this regard, it is a practice that is not exclusive to the Chinese government. The United States and its National Security Agency (NSA) have been implicated in numerous scandals, creating serious mistrust in the appropriateness of its prominent role in internet governance (Arteaga, 2019, pp. 115-116). It is clear from Wikileaks publications that these are common practices among many Western governments. Min Jiang and King-wa Fu (2018) point out that mass, secret and indiscriminate collection of data, of the sort carried out by the NSA, is part of state surveillance systems in both democratic and non-democratic countries.

7. Discussion

Through copying, combining and recombining, and modular reproduction, *shanzhai* industry brings together subsystems and parts from other brands to develop its own products that are, in many cases, both creative and diversified. Modular logic allows for the division of a system into components so that each one can be developed and tested independently. Modularity can bring substantial improvements to a system by reducing its complexity to more manageable processes and parts and by making it easier to update or replace components without affecting the whole.

As the forerunner of the current giant Chinese technology companies, the strength of *shanzhai*'s informal innovation is its antifragility, which Nassim Nicholas Taleb (2012) characterizes as being flexible, integratable or standardized, modular or fragmented, and scalable. Each of these characteristics contributes to the durability of 'antifragile' concepts over time as continuous improvement or change do not affect their authenticity and identity. An antifragile system can expand, scale up or contract as needed without losing efficiency. It is flexible because it can adapt to changes, take advantage of new opportunities, and its ability to communicate and work collaboratively means it can integrate with other systems or standards. This is the case for any consumer object but is particularly relevant in the case of the type of technological disruption that occurred with the *Shenzhen* mobile phone industry. *Shanzhai* copying and adapting is a transformative and distributed process that is profoundly collective, creative and produces great diversity. Furthermore, it accommodates the tension and change required for chaos because it avoids obsolescence and can turn weakness and error into strengths. These are all common elements and conditions of possibility for the expansion of BAT companies.

Modularity also produces synergies between different economic, sociocultural and ideological levels by encouraging communication and collaboration between different social groups and sectors. Alibaba has developed initiatives, such as AliExpress and the portal Alibaba.com, to help small businesses and entrepreneurs access national and international markets. It has also fragmented its systems into smaller, more manageable parts, like the modular services Alipay, for mobile phone payments, and Taobao for e-commerce.

Shanzhai's copying and adapting seeks common ground for the exchange of information that facilitates teamwork as a highly useful characteristic in complex environments where multiple perspectives and areas of knowledge are present. This durability or ideological antifragility is similar to the capacity and adaptability of the logics of boundary objects (Star, 1990, 1996; Star and Griesemer, 1989 – See also Gordo, 1995; Gordo, 1996). Susan L. Star and James

R. Griesemer (1989, p. 393) have defined boundary objects as being

[...] both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites [...]. The creation and management of boundary objects is a key process in developing and maintaining coherence across intersecting social worlds.

Boundary objects coordinate people, knowledge and technologies in a similar way to the logics of *shanzhai*. Moreover, their material and/or symbolic nature and versatility afford the coordination and durability of political ideas over time and space. Their self-perpetuation through continuous updating can even reclaim historical meanings and practices. The concept of boundary objects may contribute to the development of other historically and materially oriented readings of *shanzhai* that look beyond exoticization or postcolonial readings of Chinese technological development. Such sociohistorical understanding of the 'ambivalences' that characterize the *shanzhai* myth may also afford inward-looking critiques of Western technological and digital developments.

Finally, as Xiao Yuefan (2019) has observed, part of the current ethos of *shanzhai* is a response to Mao's emphasis on the creativity inherent in people's everyday practices – the shortcuts, quick-fixes, accumulated knowledge –, particularly in rural areas. In fact, many intellectuals and party officials responsible for the social and cultural revolution in China had to learn from these practices after challenging inherent classist social, political and cultural logics. Often, this sociohistorical perspective is diluted or displaced by other more contemporary, even presentist, interpretations that aligned with neoliberal logics. Short-sighted in nature, these perspectives paradoxically resolve the ambivalences of the *shanzhai* phenomenon with postcolonial readings of the coexistence of two antagonistic economic systems: communism and capitalism.

8. Conclusions

Shanzhai production and its transformations have resulted in 'disruptive innovation' by adapting to the needs and preferences of consumers in areas close to manufacturing hubs (Han, 2017). Although they may appear to occupy antagonistic positions, we have proposed that there is much in common between *shanzhai* and maker culture. Both are inspired by open hardware culture and the giant technology companies, be that post-*shanzhai* BAT or their western equivalent, GAFAM.

At first, the Chinese government was critical of social media networks and platforms, but seeing how they could serve its own interests, they have allied

with platforms and supported their development. Following a period of tension with the state company China Mobile, Tencent accepted the government's request to provide user data from WeChat and QQ, establishing a strong relationship of dependency with the national administration. At a time when WeChat is so central to the Chinese way of life, this has provided the government with a means to control all aspects of its citizens' lives. For example, through WeChat city, WeChat was part of the Internet Plus project, which was launched in 2015 with almost ten thousand services related to transport, taxation, social security, education, traffic updates and municipal services for making payments to public services, penalties, administrative procedures and medical check-ups.

Given that they appear to have a symbiotic relationship, some critics believe that *shanzhai* culture, and also BAT companies, have offered little resistance to the political *status quo* (Riad, 2021). Zhang and Fun (2013) attest to the complexities and conflicting perspectives of the phenomenon, including in its cultural and political dimensions. They argue that this phenomenon reflects digital democracy in China «as 'contested', 'fluid' and paradoxical» (Zhang and Fun, 2013, p. 402). Yang (2016) draws attention to representations of *shanzhai* in state media, arguing that the state apparatus has used its media organs to reclaim it as a national brand. Through its coverage of the topic, the state reconstructs its authority by realigning itself with 'the people' and reinstating itself as their protector. Yang writes that the aim of this media strategy is to subsume «*shanzhai*'s culturally productive force into a developmentalist project: namely from 'made in China' to 'created in China'». This narrative presents China as promoting cultural power and increasing innovation (Liao, 2017) through the appropriation of popular grassroots activities (Riad, 2021). In this way, what had once been a politically subversive aspect of popular culture has been depoliticized through its assimilation by mass media (Cui, 2012, p. 402).

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In the context of the Great Firewall, which China uses to filter foreign content, local companies have developed powerful alternatives to the Western Internet (Negro, 2017; Kuang, 2018). The 2017 Chinese cybersecurity law makes it compulsory for companies to provide the government with access to their data, software and servers, reinforcing the government's control over the Internet as well as national sovereignty over cyberspace. By the time the Chinese social credit system (Sesame Credit) was launched in 2020, the entire population was dependent on payment applications, such as WeChat Pay and Alipay, that control money, the informal economy and citizens themselves.

The symbiosis of BAT companies and the government has been deepened because the government can control the financial management of these organizations. Now, BAT companies have become political intermediaries, as their sphere of operation encompasses decision-making and citizen participation in deliberative processes, as well as platforms for the consumption of both commercial and public goods and services (Creemers, 2018). By reducing its reliance on traditional information systems, the government has to worry less about guaranteeing the security and interoperability of information and the risk of conflicting interests between the political and digital sectors (Creemers, 2018). For Jiang and Fu (2018), this symbiosis between the state and market takes different forms, ranging from public contracts to the participation of companies in policy development and in the duopoly that impedes large-scale public debate.

9. Declaration of authorship

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 Angel Gordo: Conceptualization, methodology, research, analysis, writing.

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