

Cross-Cultural Study of Cultural and Political Influence on the Success of Makerspaces

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction

The maker movement represents a large and growing community in both the United States and China. According to maker space tracker, Hackerspace, in the US alone there are over 500 active or planned makerspaces, while China has gone from one active makerspace in 2010 to over 100 in 2015 (Saunders & Kinsley, 2016). At their core, the driving force behind makerspaces is innovation and creativity, but the values behind that drive vary largely, both between and within the two countries. Prominent values among makerspaces include economic mobility, 21st century education, civic innovation, community building, and for-profit technical advancement. These values, while curated by the spaces' founders and nurtured by the community that utilizes the space, are influenced by the broader cultural, and political contexts that surround the space.

A prominent cultural dualism is Western individualism versus Eastern collectivism. A review of the assumptions, limitations, and application of the individualism versus collectivism cultural traditions in other contexts will provide a starting point for my analysis. Additionally, I will explore the current literature around the history of maker movements and maker spaces in the United States and China to establish an understanding of the respective maker culture contexts.

From this launching point, I propose a case study-based investigation into how the traditional collectivist cultural tradition of China versus that of the individualist tradition of the United States has influenced the current state and future potential of their respective maker

movements. In addition, I will comment on how the current political climate has interacted with cultural tradition to support, limit, or otherwise augment the growth and future of makerspaces.

The implication of this investigation is an added depth to the understanding of the larger global tension and cooperation between China and the United States. This relationship is constantly becoming more relevant as discussion around the development and use of the next generation technology such as 5G, artificial intelligence (AI), and the Internet of Things (IoT) dominate headlines. Additionally, the interaction between the two countries differing cultures and political context have been exacerbated in the public eye by events such as the handling of SARS, COVID-19, Hong Kong, and the assassination of Iranian Qasem Soleimani.

Literature Review

Collectivism and Individualism Theory

The collectivist and individualist cultural framework describe the way members of a certain culture form groups and interact with each other. In collectivist societies, members form small in-groups held together by economic or social norms. Traditionally, the in-groups can be distinguished based on religion, family, or location. Within these in-groups, members are deeply connected to the other members of the group and see fortune and misfortune as mutual. Typically, members of various in-groups do not interact with other in-groups. Individualist societies, on the other hand, are centered more on individual members. While groups still exist, individuals may move from group to group depending on the individual's own motives and needs. Additionally, individual self-reliance and success is held in high esteem (Greif, 1994).

The collectivist-individualist framework has been studied and attributed to a wide array of psychological and cultural phenomena. Psychologically, the impact of these cultural

frameworks has been shown to have impacts in child development as early as the toddler stage. In a study looking at the cross-cultural examination of temperament in children from South Korea and the United States, researchers found that South Korean children ranked significantly different in areas of control and surgency. These differences were tied to parenting values that are informed by the collectivist-individualist framework (Krassner et al., 2017). This framework also has implications for cultural innovation. In a study analyzing innovation across 62 different countries researchers found that, generally, individualism has a significant positive impact on innovation. Collectivism's effect on innovation is not as easily defined as different political subtypes have varying results (Taylor and Wilson, 2012). This nuance will be especially important in understanding innovation in China's political climate.

Chinese Makerspaces

In order to understand the maker movement in China as a whole it is helpful to use meta-analysis. In 'Made in China: Makerspaces and the search for mass innovation,' a report by the innovation charity Nesta for the British Council, looks at several distinct makerspaces throughout China and general trends of the Chinese maker movement (Saunders & Kinsley, 2016). Some of the major trends identified by Saunders and Kinsley are the Chinese government's interest in innovation-led development, the desire for education system reform, and the importance of Shanzhai. The Chinese government has taken a vested interest in makerspaces and see them as a key instrument to their national agenda. In 2015, the Chinese government introduced 众创空间 ('mass makerspace'), a policy designed to spread the maker and entrepreneurial attitude more evenly in the hopes of optimizing China's extensive human capital (Lindtner, 2016). This same desire has been a motivating factor for educational reform. Of the 93

makerspaces surveyed by Saunders and Kinsley (2016) around 20% reported that a majority of its users are school-aged children. Additionally, over 75% of Chinese makerspaces have a relationship with a University that provides education, events, or advanced equipment. Apart from a desire to cultivate entrepreneurial attitudes at a younger age, makerspaces outside of the major cities of China's east coast, such as Zibo makerspace in Shandong, see makerspaces in schools as an opportunity to keep their students technologically competitive (Saunders and Kinsley, 2016). While the maker movement is relatively new to China, its predecessor, Shanzhai, has been an impactful part of the Chinese and world economy since the early 2000's. Shanzhai, literally meaning remote fenced mountain village, has taken on a new meaning as the manufacturing, designing, and selling of imitation or counterfeit electronics (Lindtner, Greenspan, and Li, 2015). While from a western perspective, manufacturing imitation electronics may not have an excellent connotation, the Shanzhai culture is in fact playful, creative, and oriented around a culture of sharing.

United States' Makerspaces

Similarly, an analysis of United States' makerspaces by Wolf-Powers et al. shows unique motivators for US makers. These motivations or identified maker types are place-based manufacturers, artisanal micromakers, and global innovators. These distinctions are important to the surrounding communities because they influence the decision to provide resources, connections, and advertising for the businesses. For instance, the authors suggest local governments invest in and support place-based manufacturers because of the superior industry and job generating potential they have. 'Makerspace: Towards a New Civic Infrastructure' furthers this discussion by investigating the tension between for-profit makerspaces and not-for-profit spaces (Holman, 2015). This tension is a factor of high start-up costs and low new

membership rates. To counter this, some federal funding through grants have been given to makerspace companies to expand to new locations. Additionally, Holman discusses that makerspaces take on unique identities from city to city, forming maker subsets. In this way, one makerspace that is successful in New York City may not have equal success in Austin, TX or Portland, OR. Makerspaces in the United States have also begun to be popular in the public education system (Halverson & Sheridan, 2014). At the core of this movement is the tension between traditional pedagogical methods and the desire to promote more effective STEM education. The movement of makerspaces in schools is tied to the success of public makerspaces as they look for new partnerships, funding, and members.

Case Studies

Instead of looking at a single makerspace as the basis of this case study, I will investigate maker “hubs” which serve as a collection of makerspaces and provide a better wholistic view when compared to a single space. While in many ways Shenzhen, China and the Bay Area of California are different and unique places, their similarities make them appropriate and intriguing cities to analyze. First, they both serve as the major technical hub within their respective country. In the United States, “Silicon Valley,” a region of the Bay Area, is synonymous with innovation and geek culture. Fittingly, Huaqiangbei, an area of Shenzhen, is referred to as the “Silicon Valley of Hardware.” Due to both of these cities’ reputation for STEM innovation, I assert they both go above and beyond a critical density of people interested in engineering and innovation. While there is no set number in literature for a threshold of STEM oriented people in a community needed to maintain a makerspace, it can be understood that comparing a highly technical region in the United States with an agricultural region in China would confound the analysis.

Shenzhen, Guangdong, China

In 1980, Shenzhen, then a rural agricultural river village, was declared China's first Special Economic Zone (SEZ). China's SEZs were a way for the Chinese government to experiment with market economy forces and global trade while limiting the potential widespread effects of economic policy change throughout the country. Wei Ge, in his paper "Special Economic Zones and the Opening of the Chinese Economy: Some Lessons for Economic Liberalization" characterizes SEZs as both a "window" and a "base." As a window, through SEZs the domestic economy of China could connect with the global economy while not fully opening the door to the West. As a base, SEZs became a hub for experimenting with the regulation and limits of a market economy in a central planning system. In this way, new technologies, industries, theories, and methods could be tested and controlled within the SEZs before potential spread through the rest of China (Ge, 1999). With this new economic policy, businesses, workers, and foreign investment flooded into Shenzhen resulting in massive growth from a population of 300,000 in 1980 to 10.6 million in 2013 (Ng, 2017).

Today, Shenzhen is home to companies on the cutting edge of social media, artificial intelligence, and 5G infrastructure, such as Tencent, Huawei, and ZTE. Within Shenzhen, Huaqiangbei is an electronic and manufacturing hub dubbed the "Silicon Valley of Hardware" (Yuji, 2018). Huaqiangbei is dominated by rows of shops selling electronics hardware, from resistors all the way to quadcopters and virtual reality glasses. And while most of the world's iPhones are assembled at Foxconn's Shenzhen factory, Huaqiangbei is known for the production and repairing of world-class counterfeits and the Shanzhai culture. While makerspaces were formally present in Huaqiangbei and Shenzhen since 2011, a maker explosion occurred after Premier Li visited Shenzhen's Chaihuo Makerspace on January 4, 2015 (Yuji, 2018). Chaihuo,

Shenzhen's first makerspace, translates to "The fire burns high when everybody adds wood to it," similar to the English phrase "many hands make light work." Chaihuo has always seen their mission as community building, not millionaire making. Ye Yu, the manager of Chaihuo, described his vision as being "a nursery garden of innovators" (Yuji, 2018). Chaihuo went from one of four makerspaces in Shenzhen to one of over 200 in 2016, many of which have since closed or repurposed to accelerators or internet cafes (Zhang, 2017). The SEG Maker Center was another one of the four original Shenzhen makerspaces. Located in the heart of Huaqiangbei, the makers at SEG Maker Center reap the benefits of being located in the world's largest hardware marketplace with world-class manufacturing expertise and materials within arm's reach. The Huaqiangbei market of Shenzhen is an excellent picture of Eastern culture in a STEM environment. In Huaqiangbei, it is not uncommon to see a broken phone brought to one stand to be fixed which is then passed from stand to stand as sellers with different skills fixing different parts of the phone. This sharing of work among apparent competitors is indicative of the Eastern culture in that the individual sellers in the Huaqiangbei market are actually part of an in-group, and that the individual success of its members are shared and revealed by the whole group. Huaqiangbei's premier makerspace, SEGmaker, serves as another member of this in-group. The success of the SEGmaker space and its makers are directly dependent on the resources and technical expertise of the engineers and sellers in the market. In the same way, any major invention or success to come out of SEGmaker would be seen as a group accomplishment for all members of the Huaqiangbei community.

In Shenzhen, Eastern culture would dictate the forming of makerspace communities with deeply connected and invested members that are culturally distinct from other makerspaces. China's top-down cultural and financial support for makerspaces in 2015 created a surge in

makerspace creation with no time for true in-group formation and makerspace differentiation. This counter-cultural space formation is a probable cause for the failure of the vast majority of Chinese makerspaces in 2017 and 2018. Even those spaces that haven't officially closed their doors, have been repurposed while still keeping the "maker" name. Research shows that innovation rates are elevated for nationalist "top-down" societies such as China (Taylor & Wilson, 2012). While this seems to have worked for the founding of Shenzhen and other SEZs at-large, it was a step too far against Eastern culture and tradition for more small-scale and community-oriented makerspaces.

San Francisco, California, United States

In 1855, the Mechanics' Institute of San Francisco was founded. This group's goal was the "diffusion of knowledge at the least expense to the seeker" (Holman, 2015). This institute, financed through subscription fees, represent some of the earliest makerspace ancestors in the United States. Parallel to the creation of the Mechanics' Institute which sought to educate a working-class group of mechanics and engineers, Menlo Park and Volta Laboratory were being launched on the East Coast. These labs, and the offshoots they inspired, would dominate American innovation for much of the 1900's leading to a vast amount of innovation. This innovation, however, was often shielded from the public by secrecy over intellectual property concerns and competition for government funding (Mowery, 1992). Despite this, early makerspaces were still evolving in San Francisco, where in 1940 *Popular Mechanics* advertised a workshop to "enable anyone to build a wide variety of things" (Popular Mechanics, 1940).

Today, in the Bay Area of California, this historical context is still evident. The days of the current wars and Edison have moved to the dot com boom and start-up frenzy of the Bay Area in which people are constantly vying for their own claim to fame and fortune. Today's

Edisons are Elon Musk, Mark Zuckerberg, and Jeff Bezos whose cultural glorification dominates the headlines. This Western, individualistic culture is prevalent in some of the area's makerspaces as well. A prime example is TechShop which opened its first location in the Bay Area in 2006 as a for-profit makerspace offering training and access to high-end fabrication equipment for a monthly membership. TechShop's success, owed largely to the unicorn payment company Square, which was prototyped at a Bay Area TechShop, led to the expansion and opening of multiple additional locations throughout the States and overseas. The TechShop in Pittsburgh, was even visited by President Barack Obama in June 2016 to promote innovation and entrepreneurship. This success came to an abrupt halt on November 15, 2017 when TechShop filed for Chapter 7 bankruptcy and closed the doors to all 10 of its operating US locations, including a Brooklyn location that had only been open for two weeks (Su, 2017). CEO Dan Woods stated that a "for-profit network of wholly owned makerspaces is impossible to sustain without outside subsidy from cities, companies and foundations" (Su, 2017). While in the end TechShop declared bankruptcy, its business model during the height of its success was indicative of a Western cultural mindset. By expanding to multiple locations, not only in the surrounding area but also across the country, TechShop countered the idea of a single in-group. And while separate in-groups could form at the different locations, the in-group culture could not fully form with this chain-makerspace model. Additionally, the idea of a for-profit makerspace positions the owners to benefit from the space disproportionately from its makers which is not consistent with the mutual success of Eastern culture.

Shortly after TechShop opened, a different type of maker community launched in the Bay Area under the name Hacker Dojo. Hacker Dojo, a 501(C)(3) non-profit, describes themselves on their website as "one part working space, one-part events venue, and one-part maker space."

The Hacker Dojo business model, like that of TechShop, is based on a range of monthly membership options. Members use the space for many different purposes, including co-working, studying, making, and start-up meetings. The space drives to create community with a Rec room, kitchen, and weeknight events for networking. Hacker Dojo, a space whose model is systematically a stark contrast to TechShop, is more consistent with Eastern culture and, interestingly enough, derives its name from Japanese culture. At Hacker Dojo, making and innovating are used as a mechanism to achieve their primary mission – community, or in-group, building. The space facilitates this through space creating and even has a dedicated page on their website advising shy new members on how to meet people in the space.

A final major player in the Bay Area maker scene is the company Make: which launched its Make: magazine in 2005 and shortly after held its first Maker Faire in San Mateo, California. Maker Faires describe themselves on their website as a “family-friendly celebration, showcasing innovative projects and the creative minds behind them.” Between the two flagship Maker Faires in the Bay Area and New York City there were almost 200,000 attendees every year. Additionally, over 220 independently produced Maker Faires occur around the world every year including events in Shenzhen, Seoul, Paris, and Berlin. Despite initial success and acclaim, like TechShop, Make: declared bankruptcy in June 2019 (Constine, 2019). CEO Dale Dougherty has since relaunched the company under the new name “Make: Community” with the vision of focusing on fostering the maker community online and in licensed Maker Faire events. Currently, the new company does not plan to relaunch the flagship Bay Area and New York City events. Make: is an important component of the US maker scene in that it shows how even companies with high levels of international esteem and influence struggle to remain profitable.

In the Bay Area, through these case studies, we see a political reality where government

financial intervention may be a necessary support for makerspaces. Following the traditional Western culture, one would expect to see for-profit individual focused makerspaces as the norm, but TechShop and Make: show that this approach might not be feasible. This is especially intriguing considering the international familiarity and popularity of these companies. Instead, success in the US for makers may rely on companies and spaces with fundamentally different business models, such as the non-profit status of Hacker Dojo.

Conclusion

The maker movement has been rapidly advancing separately in China and the United States over the past decade. During this time both movements have produced communities and spaces in which makers gather to build, create, inspire, and connect. Often, these spaces are deeply influenced by the cultural framework of their countries, the same framework that influences their peoples' mindsets as early as childhood. Beyond deep seeded cultural tradition, political decisions and climates can modify the affects and instincts of culture, to either positively or negatively influence maker spaces. A study of makerspaces in Shenzhen, China, identified that the community-oriented group forming and success sharing of Eastern culture has led to successful and thriving makerspaces, while efforts to expedite this process through political influence, has led to a boom and bust in the maker market. On the other hand, in the Bay Area, California, evidence shows that the individualistic success orientation of Western culture has led to makerspaces with unsustainable business models. Political intervention in the United States, through federal funding available to non-profit organizations, and the push for makerspaces in public schools, have fostered and sustained maker communities. Looking at these two different cultural and political contexts, we see that there is not one single formula for makerspace success or failure. The future of makerspaces will depend on further research into

optimized business models that account for cultural and political realities in addition to more traditional economic factors.

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