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# CHINA'S MOVE FROM FACTORY OF THE WORLD TO SILICON VALLEY OF THE EAST

## Summary

China might seem like an unlikely candidate for innovation as it is traditionally better known for contract or original equipment manufacturing. However, we argue that with its natural advantage of a vast talent pool, financing and market access, China has most of the ingredients needed to transform into the "Silicon Valley of the East".

In this report, we explore five important factors which we believe are key for any country to successfully cultivate innovation. These are: 1) access to market and location; 2) government support; 3) good ideas; 4) good staff and management; and 5) access to financing. Ultimately, we believe that China has the necessary skills and weaponry to fend off competitors and emerge victorious in the race to become the next innovation hub.

## Overview

The battle for dominance turned bloody. In a bid to muscle into the China market in 2014, United States-based ride-hailing firm Uber spent more than USD 1bn a year to attract Chinese passengers and drivers with generous bonuses. The Chinese incumbent Didi Chuxing（滴滴出行）was not about to surrender any inch of its home turf, itself reportedly bleeding 40 million yuan (USD 5.8m) a day at the height of the subsidy war. Didi was already dominant in China in that battle with more than 70 per cent market share before it delivered a stab right into its rival's belly – taking a USD 100m stake in Uber's smaller US rival Lyft in September 2015. The move put a squeeze on Uber's core business unit. Uber's relentless advance was halted. It called a truce in August 2016, selling its China unit to Didi for USD 1bn in cash, along with an 18 per cent ownership stake in the combined entity, which is valued at USD 35bn.

As Didi co-founder and angel investor Wang Gang put it, Uber was like an octopus where China was just one of its tentacles. Simply lashing out at that was useless, which was why it made a tit-for-tat move to cut into Uber's core US unit, drawing blood.

Evidently skilled in the art of war, the team at Didi, including its 34-year-old founder Cheng Wei and company president Jean Liu, an ex-Goldman Sachs managing director and daughter of Lenovo founder Liu Chuanzhi, one of the godfathers in China's technology sector, had in just five years built up the firm into a global force to be reckoned with. The company's ride-hailing app allows consumers to digitally hail and pay for taxis, private cars, limousines and commuter buses. It has 300 million users in 400 Chinese cities, and commands 85 per cent of China's ride-sharing market, estimated to be worth 286 billion yuan (USD 41.5bn) in 2018[1]. In its overseas forays, besides Lyft, Didi has also taken stakes in India's Ola, Singapore based GrabTaxi, and expanded into Latin America. Its financial backers include Chinese web giants Tencent and Alibaba, US smartphone giant Apple, Japan's Softbank and Middle East fund Mubadala Capital.

Didi Chuxing exemplifies a new generation of innovation and entrepreneurs in China with the financial muscles and global know-how to make their mark on the international arena. While China's first phase of innovation was concentrated in the manufacturing, logistics and supply chain management, its more recent advancements were concentrated in technology and healthcare. We believe that this next wave will broaden to biotechnology, artificial intelligence, security and robotics, with its move up the value chain taking place in 10-30 years – at a break-neck speed compared to the 60-70 years it took the US. Disruption will be the name of the game as future breakthroughs focus on improving efficiencies and throughput in existing industries.

From our analysis of leading innovative hubs such as California, where Silicon Valley is widely regarded as the crucible of creative technology developments, and Massachusetts known for cutting-edge drug discovery, we distilled five important factors needed to successfully cultivate innovation. These are: 1) access to market and location; 2) government support; 3) good ideas; 4) good staff and management; and 5) access to financing. We believe that countries in Asia with the potential to take on the mantle of innovation superpower are Japan, Korea and increasingly, China. The world's second-largest economy has reached such a scale that it is now able to reap the benefits of a cluster effect with a cohesive eco-system – of idea-generators, entrepreneurs, universities and capital providers – necessary for the success of innovation.

[1] Beijing research firm Analysys International

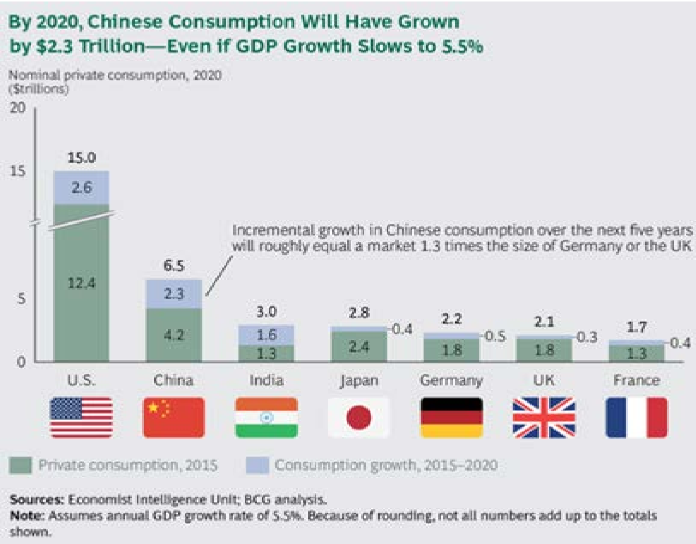
## 1. Huge domestic market to fund cash burn in overseas forays

China might seem like an unlikely candidate for innovation. After all, the world's most populous nation, is more traditionally known to churn out cheap knock-offs that line the shelves of hypermarkets around the world. However, we argue that with its natural advantage of a vast talent pool, financing and market access, China has most of the ingredients needed for success. The key factor is its large domestic market which affords companies the cash cow to fund overseas expansion. As seen in Didi Chuxing, the firm's dominant position in its domestic market enabled it to meet global competitor Uber head on in its overseas expansion. According to co-founder Wang, the company was prepared to keep bleeding subsidies for a few years were it not for Uber's call to broker a deal. Founder Cheng has also reportedly said that profitability is not an immediate goal. The company has not provided financials, though estimates on the street put the firm's 2016 revenues at close to USD 3bn.

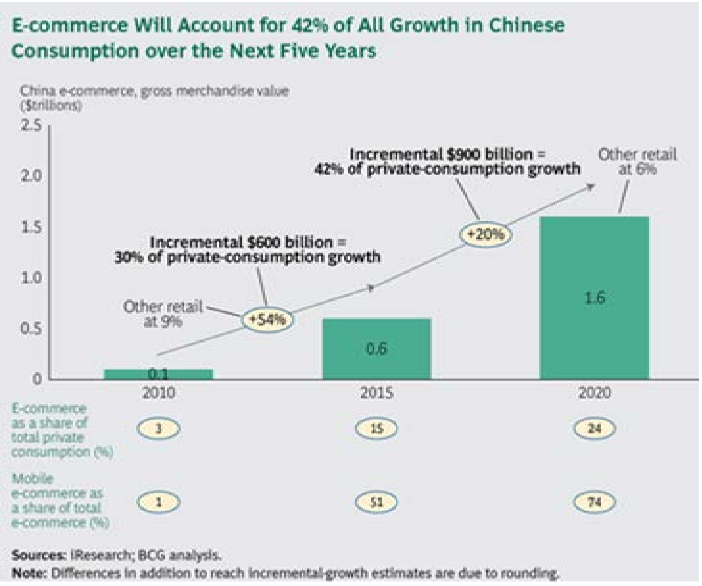
The first factor for successfully cultivating innovation is access to a huge domestic market. Japan and the US have proven this concept with its sizeable domestic reach. In the case of Korea and Taiwan, while many of its enterprises are extremely creative, they lack a large enough domestic market to incubate and grow into massive multinational companies. Entry into foreign markets require financial muscles to cushion the blows from incumbents and a fat cash cow at home to milk while enduring losses as brand recognition is built over time. Taiwan smartphone maker HTC's global expansion has been sub-par, mainly because its home market is too small to afford it the cash burn needed when going overseas to establish a name. Most mid-sized Korean firms have also had middling success, with the exception of the large chaebols such as Samsung and Hyundai.

China, on the other hand, is at the forefront with its huge and deep market where a massive 330 million[2] middle class population is willing and eager to embrace new ideas and technologies. Although termed an emerging market, its diverse consumer base provides a huge test bed for both mass and niche products that is needed for innovation. China also has the advantage of leapfrogging technology, as seen when the country moved directly to using mobile phones and skipped pagers. This advantage enables it to decisively adopt new technologies with no legacy issues. Hence the speed of adoption is rapid with 731 million Chinese having access to the internet at 53 per cent penetration and 95 per cent of internet users accessing mobile internet[3].

Chart 1: Growth of consumption and e-commerce in China




Source: Economist Intelligence Unit, BCG analysis




Source: iResearch, BCG analysts

Any prediction, projection or forecast on markets is not necessarily indicative of the future or likely performance.

## 2. Government support incubating success

We believe that government support is a second key factor for cultivating innovation. Although many of the US companies disrupting industries today are private enterprises, in our view most major technological advancements since World War II were initially driven by the government. We analyse the case of the US, Japan and Taiwan.

The poster boys of innovation in the US today are privately-run behemoths such as Amazon, Google and Facebook, but many of the biggest technological advancements in recent years have been funded initially by the government. The ubiquitous internet and global positioning system (GPS) for example were both publicly-funded with the latter developed as a US military technology for space-based radio-navigation system. These inventions were then further developed for other commercial applications at substantial cost efficiencies. The US has

[2] iResearch, BCG analysts
[3] "Statistical Report on Internet Development in China", China Internet Network Information Center (CNNIC), January 2017

reached a stage now where innovation is a 'grassroots' initiative led by private companies able to plug into an established eco-system.

Japan in its earlier years of industrialisation under its Ministry of Economy, Trade and Industry founded and financed JECC Corporation in 1961, where the company's computer leasing programme grew the Japanese computer market. The country's very large scale integration (VLSI) project in 1976 led to semiconductor market share growth and eventually created a massive cluster of semiconductor and technology parts manufacturers and brand names that dominated global markets in the 1980s/90s such as Fujitsu, NEC, Toshiba, Hitachi and NTT.

Taiwan's transition from manufacturer to knowledge-based economy was also kick-started by the government. State-owned Industrial Technology Research Institute founded several tech juggernauts which were eventually spun off into chip companies such as TSMC, UMC and Mediatek. The government established Hsin Chu Science and Industrial Park in 1980 and encouraged universities to establish significant engineering capabilities, teaming up with technology companies, while setting up a NTD 800m Executive Yuan Development Fund for Innovative Enterprises.

China is now taking a similar path with its Made in China 2025 programme having attracted billions of dollars in research. Its "Thousand Talents (千人计划 Qianren Jihua)" programme is trawling the world to entice world-class researchers to settle in China while many "sea turtles" or "海归 (hai gui)" – well-educated Chinese who had earlier left the country for better job opportunities – are now returning as prospects at home improve. To date, 115 research institutes, universities, industrial parks and companies have been identified, 77 per cent of which are found in nine provinces within China[4].

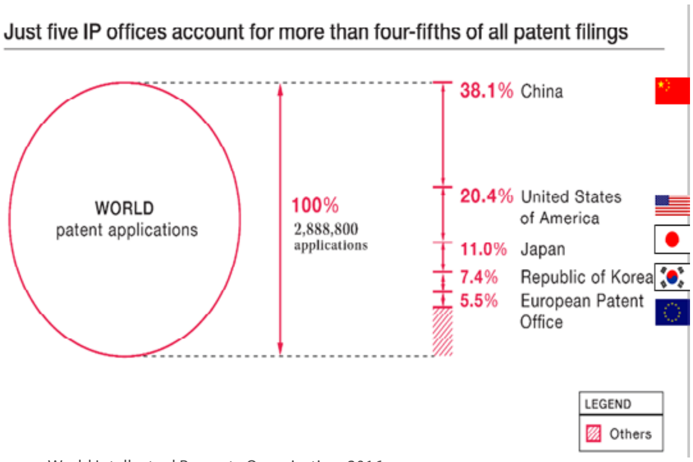
Government support has enabled Chinese companies such as Huawei to develop into the world's third-largest smartphone maker. Another lesser-known company, Hangzhou Hikvision, whose surveillance cameras are now top sellers in Europe and the US, is pushing innovation frontiers and has made headway in artificial intelligence and facial recognition technology. Its growth came on the back of support from the government bent on equipping all its train stations with video cameras after the terrorist attack by separatist groups in Yunnan. The Shenzhen-listed company, which is ultimately 42 per cent owned by the Chinese government, reported latest first half 2017 net profits of RMB 3.3 billion.

## 3. Good ideas are a necessary ingredient

A third ingredient necessary for innovation is needless to say, good ideas and we use the amount of patent registrations as a gauge of China's potential for success. Spending on research and development (R&D) is crucial and China has spared no efforts as President Xi Jinping seeks to turn the nation into an Innovative Economy.

Success begets success and now China has reached a critical mass in R&D spending with clusters quickly forming around existing and future hubs. In fact, China now tops worldwide filings for patents, trademarks and designs, with new applications exceeding the combined total of the US, Japan, Korea and the European Patent Office in 2016[5]. This perhaps foreshadows the rise of a new technology superpower.

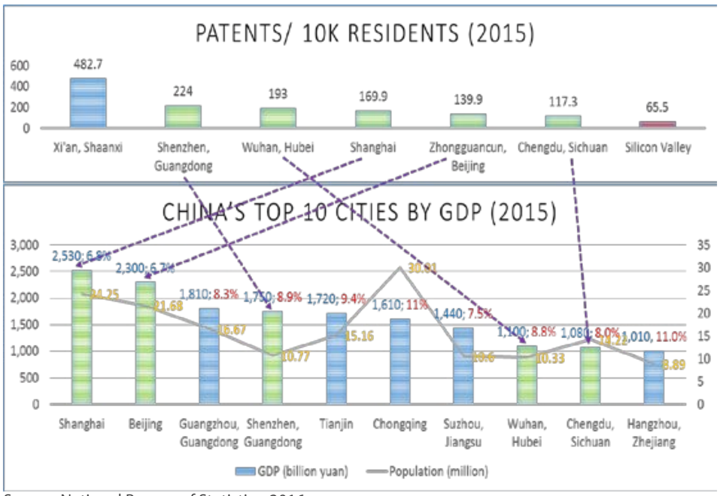
### Chart 2: Proportion of global patent filings in 2016




Source: World Intellectual Property Organization, 2016

The innovators go beyond the usual capital and financial cities of Beijing and Shanghai. In fact six Chinese cities filed more patents per 10,000 residents than Silicon Valley in 2015[6]. Unlikely candidates such as Xi'an, famed for its terracotta warriors, Chengdu, home of the pandas, and Wuhan join the ranks, with Shenzhen, Hangzhou, Guangzhou, Tianjing and Nanjing also featuring prominently. Many Chinese cities are potential innovation hubs and share the same characteristics such as the highest GDP, with the top 10 cities also under the "Thousand Talents" programme supported by the government and great universities. These cities are becoming self-sustaining and spreading.

### Chart 3: Patents filed within China's top 10 cities by GDP




Source: National Bureau of Statistics, 2016

[4] 1000plan.org
[5] 'China tops patent, trademark, design filings in 2016', Worldwide Intellectual Property Organisation (WIPO), 6 December 2017
[6] National Bureau of Statistics, 2016

## 4. Sterling management and staff

The Chinese government's courtship of returning talents has borne some fruit with many "hai guis" returning to start or head Chinese companies, lending their expertise to contribute to the fourth factor necessary for innovation success: good staff and management. Take the case of drone maker Dajiang Innovative Technology, better known as DJI, whose founder Frank Wang Tao returned to Shenzhen in 2006 from building prototypes of flight controllers out of his dorm room at the Hong Kong University of Science and Technology. The company's quest for robot dominance in the sky has seen DJI drones now taking an estimated 80 to 85 per cent of the consumer drones market share.

## 5. Rich pickings with easy access to funding

One of the key features contributing to the US market's success is its developed capital market where start-ups can easily raise funds. In the 1990s and 2000s, China relied heavily on foreign direct investment to fuel its growth. Now the situation has all but reversed with funds from China flowing overseas as newly affluent locals hunt for overseas opportunities. Foreign private equity are also now knocking on China's doors, eager to fund any decent idea unlike in the past when start-ups notoriously had to sweat it out to raise capital.

With the successful USD 25bn initial public offering of Alibaba creating thousands of overnight millionaires and companies such as Tencent awarding HKD 2.6bn in stocks to award and motivate employees, Chinese companies now have the financial cache to attract and retain top talent to work in cosy offices and not just on dour manufacturing floors.

This final factor for innovation success – access to financing – is now in abundance in China. The country attracted USD 31bn in venture capital (VC) in 2016 or 25 per cent of global VC raising, as companies are drawn by the tax breaks such as eligible deduction on 70 per cent on VC's taxable income. Provincial governments also have schemes to attract capital to their backyards such as Hubei government's USD 81bn funds for investments.

Chinese companies now have a combined market cap of more than RMB 1,000 billion[7], largely concentrated in Tier 1 and 2 cities with the Shenzhen Stock Exchange being a preferred market for innovative enterprise listings due to the prestige associated with it. Successful companies are based across all the major cities in China with notable examples being search engine Baidu, smartphone maker Xiaomi and PC maker Lenovo in Beijing; electric car maker BYD, drone maker DJI and social media company Tencent in Shenzhen while Hangzhou houses Alibaba, automaker Geely and beverage maker Wahaha. The vibrant capital market has afforded these Chinese companies the financial muscles to grow into world-class names.

## All the pieces in place

In weighing China against the innovation models of Silicon Valley and Boston, we find that the country, with its vast talent pool, financing and market access, has all the pieces in place. It has a natural advantage, chief of which being its large domestic market which affords companies their cash cow to fund overseas forays. Furthermore, China's middle class consumers are more receptive to new trends and technologies.

While in the past, the well-trodden path of bright young Chinese with good research ideas would be to apply for a scholarship at a US or European university due to the lack of funding domestically, now things have changed. The scholars of today have less impetus to venture overseas to further their research or develop their ideas as the Chinese government is pumping millions into its universities, equipping them to rival the hallowed institutions of the world, including those in Cambridge Massachusetts.

Although China at first glance seems to be an unlikely candidate, having been more traditionally seen as the factory of the world, we believe that the country is able to vault ahead and transform into the Silicon Valley of the East. While not an epic battle on the scale of the classic tale of The Three Kingdoms, we believe that in this modern-day swordplay, China has the necessary skills and weaponry to fend off competitors and would likely emerge victorious in the race to become the next innovation hub.



[7] Bloomberg, 2017

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