

# China in the Age of Bits and Bytes – Prometheus Unbound

What is the Next Big Thing? Artificial Intelligence tops the list. And our conclusion after a thorough brainstorming session at our recent biannual Asia Forum is that China will be a podium finisher here if not the outright winner.\*

We believe that China's growth engine for this coming decade will be innovation in the high technology space, especially in Artificial Intelligence. China's national strategy is to combine it with the internet of things as well as big data, to modernise the economy, improve productivity and pull away from other countries. Powered by government policy support, an abundance of capital, a huge domestic market, a large pool of seasoned entrepreneurs, and the gigantic pool of STEM (science, technology, engineering and mathematics) graduates every year, China's odds of success are very high.

Already half of the patents granted to Chinese applicants in the US are IT-related (digital communication, telecommunication, computer technology, and optics). China also published 26% more scientific research papers than the US in 2015. According to the World Economic Forum's 2016 Human Capital Report, STEM is a major part of China's flourishing universities. China had 4.7 million recent STEM graduates in 2016! In comparison, the US had just 568,000. Like the skilled tooling engineers of the very recent past, China's educational policies and infrastructure gives it a depth as well as concentration of talent that will make it a powerhouse of technological innovation from here.

Barely half a century ago, The Land of the Rising Sun was an export-oriented industrial powerhouse, with the Sony Walkman portable music player, Video Cassette Recorders, and cars like the Toyota Corolla being some of Japan's more prominent standard bearers. Beginning in the 90s and gathering momentum in the first decade of this century, the internet allowed the US to reclaim its dominance in the global arena, which led to the birth of the FAANG companies, namely Facebook, Amazon, Apple, Netflix, and Alphabet's Google.

China's recent rise has been led by champions in the areas of e-commerce, Artificial Intelligence, and FinTech that stretch beyond household names such as Alibaba, Tencent, and Baidu. However, the trio do account for a quarter of China's AI talent today. China is already globally competitive in consumer electronics, mobile handsets, and telecom equipment. In a first, Chinese telco equipment manufacturers like Huawei are participating in the formulation of international 5G transmission standards, with Beijing making the construction of a 5G network a national priority. We expect China to be an industry leader in 5G networks. The total capex in 5G infrastructure from China Telecom, China Unicom, and China Mobile will likely reach CNY1.33 tln, an increase of 60% compared to 4G. China's "New Industrials", specifically battery/electric vehicles (EVs), high-speed trains, and solar power are becoming increasingly competitive

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\* At APS, we hold annually, every January and June, an internal investment forum chaired by Raymond Lim, Executive Chairman and former Singapore Cabinet Minister and myself which involves all our investment professionals from China, Japan and Singapore to identify investment themes and sectoral trends over a 5 year time frame.

on the global stage in terms of innovation. China has a solid lead in solar and nanotech, measured both in patents and academic research. On batteries and EVs, China is well positioned to challenge the global status quo, due to its competitive technology (evidenced by patents, academic research and R&D investment), low production cost and significantly improved product quality.

Much of the innovation in China's high technology space is currently in the area of interdisciplinary business models. China had the second largest number of unicorns as of August 2017 with 53 companies, accounting for 26% global unicorns, which is the popular term for tech start-ups valued in excess of USD1 bn. Powered by the tide of Chinese capital flowing into M&As in this space, China will become an industrial superpower sooner rather than later.

The difference today is capital. As an illustration, Alibaba struggled to raise USD5 mn in capital just barely 2 decades ago. Fast forward to 2017, Jack Ma's e-commerce juggernaut raised USD7 bn in a matter of months. Some of the other deals include Swiss seeds and agrochemicals group Syngenta, UK-based chip maker Imagination Technologies that used to provide Apple with its mobile graphics components, luxury pleasure craft manufacturers Ferretti as well as Silver Yachts, German pharmaceutical packaging and equipment maker Romaco, US digital imaging chipmaker OmniVision Technologies, German aluminium extruder Aluminiumwerk Unna AG, unlisted US-based Argon Medical Devices, German industrial robot maker KUKA, and KION Group, the world's second largest forklift maker that also has a lead in high-end hydraulics.

Just a few weeks ago, Apple Inc. CEO Tim Cook had this to say about China:

"There's a confusion about China. The popular conception is that companies come to China because of low labor cost. I'm not sure what part of China they go to but the truth is China stopped being the low labor cost country many years ago...The products we do require really advanced tooling...the tooling skill is very deep here. In the US you could have a meeting of tooling engineers and I'm not sure we could fill the room. In China you could fill multiple football fields...I give the education system a lot of credit for continuing to push on that even when others were de-emphasizing vocational (expertise). Now I think many countries in the world have woken up and said this is a key thing and we've got to correct that. China called that right from the beginning."

In a similar vein, many global investors are still stuck in a mental rut, thinking of China as an abundant source of skilled manufacturing labour at best. The truth that will gradually dawn on the investment community is that many technology companies in China are rapidly leapfrogging or acquiring their competitors, powered by a combination of size, skill, savvy, and singlemindedness. The linchpin in China's rise as an economic superpower is the field of Artificial Intelligence.

### **China's Edge in Artificial Intelligence**

Artificial Intelligence could well be the fourth Industrial Revolution that will propel China to the top, sharing the load with human workers beyond sheer muscle and moving into the realm of brain work. Of the many industries where AI technologies are gaining traction, senior members of our Shanghai-based team focused on the surveillance sector and the retail sector as standout beneficiaries of the AI Era within the Chinese equity market. These two sectors can leverage on Chinese companies' existing strengths. As deep learning technology needs a variety of data, the surveillance sector can complement that endeavour.

Unmanned Retail is one of the fast-developing areas where a lot of AI technology can be profitably applied. Besides the revenue potential stemming from the sheer size of China's domestic market, its large population also means a wealth of data points that will feed the appetite of deep learning AI machines. In 2016, the smartphone users in the US, Germany, France, the UK, India, Japan and South Korea combined was only three quarters of China's 930 million!

China's State Council in 2015 announced the "Made in China 2025" plan for the nation to develop high tech products like robotics, with a wide spread of productivity and energy efficiency targets. But they didn't just stop there. In 2017, they laid out the road map for China to lead the world in AI by 2030, known as the National Development Plan on AI. This absolutely vital area for future national success isn't merely left to chance.

Based on Intel's estimates, direct AI business opportunities will reach USD1 trillion by 2030, while indirect business opportunities can reach USD10 trillion by 2030. Intel believes the surveillance sector will be the first to benefit from this trend. With almost 100 million IP cameras installed worldwide by 2020, 75% of which will be connected, the surveillance sector can monetize this huge data base. This is especially so in China, where Chinese companies can have an edge as they operate under data protection frameworks that are quite different from those that Western competitors need to adhere to. For AI, data diversity is a key success factor for machine learning. The surveillance sector collects and processes huge amounts of data such as images and videos. With massive investments in AI and related technology, huge benefits from this trend will accrue to leading Chinese security surveillance companies such as Dahua and Hik Vision, which has a 30% market share of the global surveillance market.

Voice prints and facial recognition will lead this AI revolution in smart surveillance, and private sector clients will help pioneer this technology. A lot of Chinese corporate clients have started to use surveillance services provided by industry leaders such as HikVision. A large retail group uses smart surveillance to track foot traffic flow and hence customer behaviour. A supermarket chain uses AI smart surveillance to replace on-the-ground checks on staff as well as inventory. Hik Vision has also deep learning AI that can delete irrelevant or uneventful surveillance footage from amongst the copious amounts of non-stop footage harvested from facilities with high camera densities, saving terabytes of storage space by retaining only footage deemed to be of significance. The development of such technology may face far less regulatory hurdles in China compared with Western nations, which place far more weight on privacy concerns and civil liberties.

A significant portion of retailing industry today will be replaced by unmanned retail as technology advancements in image recognition, identification verification, mobile payment and IoT converge to gradually replace human store staff. Alibaba's cutting edge Hema supermarkets already operate very much in this manner. Retailers with existing retail footprint in time-sensitive scenarios can benefit by adopting automation technology. These retailers include convenience stores, supermarkets, vending machine operators, office canteen services and fast food restaurants.

Retail outlets with capabilities like facial recognition, mobile payments, and RFID tagging can drastically reduce or eliminate checkout lines as well as labour and rental costs, while making store locations practically perpetually open for business.

**The Future is Here**

To see what the Future is – visit China. It is the world's largest unified Internet market. China spews out a ginormous amount of data in a huge market. Couple this with less sensitivity towards personal security and ethical issues, and the hunger for success, Prometheus may well be unbound here from the AI box.

**Wong Kok Hoi**

The Founder and CIO, Wong Kok Hoi, has over 35 years of investment experience, including CIO at Cititrust Japan, Senior PM at Citibank HK, and Senior Investment Officer of GIC. He was the recipient of the prestigious Mombusho Scholarship in Japan, and graduated with a Bachelor of Commerce (Honors) degree from the Hitotsubashi University (1981). Mr. Wong also graduated from the Investment Appraisal and Management Program at Harvard University (1990).

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