On the Ground in China: Technology Themes to Watch

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Key Takeaways

▶ Given the U.S. threat to cut off China's access to western technologies, China is leveraging its state-directed capitalist model toward developing its own domestic technologies in a rapid fashion.

▶ The Chinese are taking leadership positions in many industries including industrial automation transportation, shipping, as well as digital payment systems.

▶ The divergence of technologies, tech ecosystems and data availability and standards, as well as the concept of "Internet sovereignty," might lead to the rise of a "Silicon Curtain" between the East and West.

Home Grown Technology Takes Off

Western focused investors usually emphasize the problems China faces (of which it has plenty) to try to gauge the trajectory of the pending trade war, as well as its economic outlook. Supply chain disruption/relocation could prove to be significantly damaging to China. Also, the already high debt leverage at the local and national level hamstrings the central government's effort to use stimulus to counter the challenges from a full-blown trade war with the U.S.

Intellectual property protection and the strategic competition between the U.S. and China to develop emerging technologies are important elements in the current trade war between the two countries. It is important to look beyond the headlines and appreciate the factors that are enabling China to leverage its structural efficiency and vast internal resources to develop domestic products and solutions. For a long-term perspective, the divergence and isolation of technological platforms and systems of the two sides might carry significant investment implications that current conventional views might not anticipate.

Looking closer at the domestic economy, technological advances in China are mind boggling. During a recent 15-day trip to the Mainland, for the first time I saw the widespread use of facial recognition in apartment buildings, train stations and security checkpoints. The railway system in China is a good example. There are 38 cities in China that have massive subway transit systems. Beijing is now piloting facial recognition technology for fare paying and rapid entry. The system is 100% domestic technology, with accuracy at 99.8%, able to distinguish twins. The average process time is less than half a second, faster than the phone barcode scan entry or a MetroCard scan. Also in Beijing, one city transit line is now entirely unmanned. The trains wake up each morning, run self-diagnosis and tests, then move out for a full day operation, before going back to the hub for hibernation at night, all without human intervention.

In Chongqing (a second-tier city), intercity railway trains have successfully passed the test to automatically cross rail lines in peak hours, to potentially eliminate the need for passengers to change train lines (imagine in New York City, you no longer have to change subway lines to get home from work during rush hour). Engineers are also

testing a 5G based train-to-train communication system in Chongqing, so the trains will run on an app-based passenger demand, similar to the Uber concept: if there is enough real time demand, the transit train will run a route that fits the most passenger need, rather than on a fixed schedule. Those intra and intercity railway systems help the development of suburban areas, which helps facilitate the internal consumption expansion strategic plan for growing urban and suburban areas.

These are all domestic tech innovations. We used to think that the Chinese were only good at stealing or copying (they still are), but it would be foolish to think they can only replicate existing technologies. From facial recognition software to quantum satellites to hypersonic missiles, Chinese developers are engineering successful home-grown technologies. What also makes this hard to compete against is that every pilot program I mentioned above will eventually be rolled out nationwide afterwards, another example of a state-directed technology effort to optimize the R&D resources and achieve economic leverage in the shortest possible time.

Another theme is industrial automation. In Qingdao, the world's first unmanned container port has been in operation for two years, with over five million of twenty-foot equivalent unit (TEU) capacity and no human labor. For comparison, the Qingdao port total capacity is 18 mm TEU, similar to the combined capacity of the two largest container ports in the U.S. (Los Angeles and Long Beach, California). Shanghai, the world's largest container port (Exhibit 1), recently commissioned its own unmanned container terminal, increasing the total capacity in Shanghai to 44 million TEU. In those terminals, all the loading trucks are also driverless, with the heavy trucks all made by Chinese truck manufacturers. The reason we mention this is related to the issue of labor supply trends.

Exhibit 1: China Dominates Global Shipping

Rank	Port	Country	Volume 2018 (Million TEU)
1	Shanghai	China	42.0
2	Singapore	Singapore	36.6
3	Shenzhen	China	27.7
4	Ningbo-Zhoushan	China	26.3
5	Guangzhou Harbor	China	21.9
6	Busan	South Korea	21.7
7	Hong Kong	China	19.6
8	Qingdao	China	18.3
9	Tianjin	China	16.0
10	Jebel Ali	Dubai	15.0
11	Rotterdam	The Netherlands	14.5
12	Port Klang	Malaysia	12.3
13	Antwerp	Belgium	11.1
14	Kaohsiung	Taiwan	10.4
15	Xiamen	China	10.0
16	Dalian	China	9.8
17	Los Angeles	United States	9.5
18	Tanjung Pelepas	Malaysia	9.0
19	Hamburg	Germany	8.7
20	Long Beach	United States	8.1

Source: Worldshipping.org.

The conventional thinking is that a country with a young population and increasing labor supply is positioned well in its economic growth. However, the Chinese population is aging and peaking, and leadership realizes that the wave of IT advancement (Internet of Things (IoT), Artificial Intelligence (AI)) will reduce the human labor need. Industrial automation and IT upgrades will help China overcome its "becoming old before becoming rich" problem. As a result, automation has been a key theme in long-term government planning. This reminds me of other countries such as Indonesia, Nigeria and India. It appears those countries will have a very challenging time ahead of them, as the rapid population growth projected in the next few decades might become a burden as automation and AI make ample labor force supply a liability rather than an asset. China is apparently addressing that in a concerted, centrally directed way.

Digital Payment Systems Dominate Commerce

One of the biggest changes I saw this time in China is the rapid evolution in the financial and payment system. The three most popular forms of payment are cash, WeChat pay and Alipay. WeChat pay is executed on a phone, where you show a 2D unique barcode of your WeChat account (linked to a bank account), so at a retail terminal, the merchant can scan the code to deduct the money directly from your bank account. This method is used from taxi, to restaurant, to train ticket purchase, to person-to-person transfer. Alipay is more like PayPal, used for e-commerce/online payment. All three payment systems are completely isolated from the common payment systems outside the country, so I cannot help thinking about how difficult it will be for any non-Chinese traditional financial institutions to be successful in China. In China, people might soon ask, "what is a credit card"? As China has recently opened up more of its financial markets, you have to wonder why they appear to be less concerned about foreign competition. If you count on the theme that foreign financial institutions successfully enter China for your investment, your assumptions might carry risk.

Another interesting development is that the Chinese central bank announced it is ready to issue its own crypto currency. With the above-mentioned payment phenomenon, the issuance of a Chinese crypto currency is no more than digitizing the RMB, as most of the daily transactions in China are already in digital forms anyway. This could significantly minimize the risk of Bitcoin and other crypto currencies one day replacing real currencies.

National Data Capture Feeds AI Development

Civil surveillance comes first when we think about China's social/civil monitoring systems. This is true as many places I went my face was scanned and my picture taken, and when I went through checkpoints at the border and when boarding trains, my passport and visa were double checked, and at the border my fingerprint collected. Chinese citizens enjoy a smoother experience while traveling. China rolled out a biometric national ID card system years ago, so the ID card is used for any kind of ticket reservation, financial account openings and at various entry/checkpoints.

The treasure trove of data is also used for civil and community projects, including urban planning, transit optimization and crime fighting. The government emphasizes the positive aspects of data capturing. Coupled with a lack of privacy for average citizens, the ordinary Chinese have no issue being subject to this massive social project. On the contrary, most people think this is an acceptable governmental intrusion for the benefit of greater good. The massive data gathering also feeds back into Chinese AI development projects, which the U.S. and EU are keenly lacking because of our privacy laws. The concern here is that we might fall behind in the AI arms race with China not because of hardware and software, but because of the volume and quality of the data feed, as any AI system is only as good as the massive data we feed it.

Conclusion

The U.S. attempt to constrain and isolate China on the technology front should incentivize China to accelerate its self-reliance in the development of AI, IoT and other leading technologies. Mistrust between the two sides could

potentially result in two separate, parallel spheres of technological dominance and discrete technology platforms, systems and ecosystems, with China using "Internet sovereignty" as a principle to regulate and oversee Internet and other emerging technologies and data. As a result, a "Silicon Curtain" might have started to rise between the East and West, preceding a new technological "Cold War." U.S. investors in the technology industries with extensive exposure to China might have to rethink their long-term investment theses to prepare for this potential outcome.

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