

## Chapter 2

# Cloud Determinism

Technological determinism represents the idea that technology drives history and progress as a great influencer on the social norms of its times. Karl Marx had famously said “the hand-mill gives you society with the feudal lord: the steam-mill, society with the industrial capitalist” in *The Poverty of Philosophy* published in 1847. A new technology can play a catalyst of change in the social and economic behavior of developing countries, in particular, as the power of new technology can be even more magnified as the degree of communal control of a developing country is still nascent. China, with a culture that favored order and structure, has tried to choreograph the adoption of new technologies as an instrument of change to accelerate the socio-economic development in the directions it desired. That is, rather than putting it into the free play of market forces to unexpected results, China orchestrates new technology adoption as part of its central planning. For China, the state management of technology growth can deepen the impact of the technology’s influence, or determinism, on the country’s socio-economic transformation.

Since 1949, all the industries in China have been nationalized, as all business ownerships belong to the central and local government, with supply of resources and raw materials under the planning of the government. Since 1978, China reopened the country to foreign investors and then allowed private business to be established at a personal scale in some pilot cities. Since the Chinese government found that nationalized factories and companies were of low productivity and profit margin, it had initiated an economic reform to shut down a number of non-productive state owned companies. The reform consolidated major industries into 300 plus state-owned enterprises (SOE). By 2010, the central government has decided to privatize or further consolidate the SOE’s into around 125 SOE’s. All of the remaining SOE’s are engaging new technologies to strengthen their business and growing the international market with mergers and acquisitions, as well as new investment. Some of them have even accepted foreign investment. ERP systems, Big Data, Distributed systems, Mainframe, Web based systems as well as Cloud computing are being deployed. The most up to date trend is in Smart City development, with a centralized management model to orchestrate the running of Chinese cities.

An exemplary industry within the Smart City can be found in the Chinese state-owned banks, as these SOE's tend to be the forerunners in adopting enterprise-grade technology for both competitive advantages and legal compliance. Before the 1990s, a resident could only go to the bank branch where he opened a account to withdraw and deposit money; by 1995, Chinese banks have computerized their system completely to allow for transactions in other branches. The banks extended their business coverage to the collection of electricity and gas payment in 2000 to take over the previous operations from the gas and electricity companies, further integrating their functions with their customers' daily lives. In recent years, one can pay his bills through ATM, pay stations, e-banking or e-commerce portals. The banks had started their business with focus on their services to businesses and when private wealth has grown, the banks have invested equal emphasis on retail banking.

As recent as the 2000s, the Chinese banks were still following the American and European banks' footsteps in computerization. With the vast number of companies and private customers, however, the banks have found that existing configurations of distributed systems cannot handle the massive number of transactions. Chinese banks need mainframes even though their provisional branches can run on smaller machines such as IBM's RS/6000. As an example, one of the big four state-owned banks, Bank of China has only recently replaced its last VSE system running at 43XX (which has been classified as mid-range system from IBM) and fully migrated to IBM system Z (or mainframe) in 2011.

The China banking industry is interested in technology transformation since they are facing stiff competition from third-party payment systems. Baidu and Alibaba have released payment services that enable money movement; also, as a result of World Trade Organization (WTO) agreement, foreign banks will be able to enter into the market by 2015. The Chinese banks have to keep their existing customers and at the same time increase customer acquisition: e-banking, mobile banking, personal banking, wealth management, social media networking, credit/debit card business are seen as their future. New banking systems like e-banking systems are developed and run in distributed systems and linked up to mainframes. Some of the new business area, like credit/debit card systems, with the huge amount of transactions and number of card issued, are still relying on mainframe to run their business.

As for legal compliance, the Chinese Banking Authority has imposed very tight rules on banking services: any outage of more than 2 h have to be reported to China's Department of State and the banking executives have to bear personal responsibility to maintain the 99.99 % reliability of distributed systems. For the purpose of compliance then, the adoption of mainframes for its 99.999 % uptime provides an appropriate insurance for the banks and their executive staff.

In conclusion, the financial crisis that had shrunken the American and European bank's wealth and size in 2008 has enabled the Chinese banks to claim five spots in world's top ten banks. With the banks' scale, the most important factor in the Chinese banking business is reliability and stability, with advance technology engaged to enhance the reliability, availability and stability (RAS) index. Innovative

ideas can be advantages but cannot be deployed at the expense of RAS. Cloud computing, in particular, provides an opportunistic solution to handle peak transaction periods such as the Spring Festival and national holidays to help ensure RAS.

With the purposeful adoption of technology supporting the Chinese banks' continuing expansion, China looks to apply similar sets of best practice in leveraging technology for its transformation towards a more connected society. The ancient Chinese military wisdom dictates that a country is the strongest when it is anchored by the masses to increase overall tenacity, but China is no longer a country with a static population that can be easily connected. The once-predominate rural population has been steadily moving into urban areas to look for better jobs falling as a proportion of the nation's total population from 81 % in 1997 to 49 % in 2013. The once strict control of *hukou*, or resident permit, no longer prevents much-needed workforce relocating to the rapidly expanding metropolises. The once intimate communal connections have been decimated by population mobility, in the process diluting the once-strong association with one's home region. To rebuild that connection among a migrating population for stabilization, China is investing in technology where physical location is no longer a relevant factor. The advent of mobile technology has provided an economical and scalable solution. The rest of the world has already made the heavy investment in telecom 3G; China takes it one step further and invested in domestic vendors that developed China's own variant of 3G technology in TD-SCDMA, a technology with virtually no adoption outside of China. The largest and most cash-rich telecom operator was asked to adopt the home-grown products in a huge domestic bet to standardize the technology on the sole strength of the Chinese market. As unsuccessful as that gamble has been, the investment has ensured that the country retains a semblance of control on technology adoption to eventually offer a home-grown platform for mobile Internet that can eventually be free of foreign products and standards (and hence, influences).

Once connected, the population can take advantage of the proliferation of smartphones and their individual computational power to create and access content on platforms such as online chats and blogs. Popular posts routinely garner hundreds of thousands of comments. With the population able to fully participate in dialogues on social commentary to the national agenda in real-time, the converged strength of the crowd would, in time, elevate the country's voice as a whole.

A convergence of 1.4 billion voices will need a strong infrastructure for support. Beyond clusters of supercomputing in state-owned enterprises and diffused mobile computing in the hands of individuals, China looks to unify these existing technology and future investments. Cloud computing emerged as a solution. If computing is analogous to brain power, Cloud computing would be a network of intellectual capabilities working as one. Technologically, Cloud computing is a management philosophy to interconnect discrete pockets of resources (or products) to allow for centralized deployment of these resources regardless of their locale. In the command post of Cloud, spatial relations will no longer be a factor in considering where the resource is and where it can go; the products are virtualized into services and can go anywhere in the direction that the command post dictates. In its simplicity, Cloud

mirrors the state of affairs in the country, where a highly centralized brain commands discrete elements of operations in a federated state, allowing these elements to migrate in patterns that the brain controls to perform functions necessary for overall system health.

In Cloud, China sees an opportunity. Not only is the technology a good building block to unify existing and new resources, but Cloud adoption is also just taking off worldwide. China is not the only country facing resource scarcity. Many other nations have been scrambling to make more efficient use of their technology investments and reduce waste, as it has become exorbitantly expensive and environmentally taxing to meet the demands of data-hungry populations. The need for economically scalable computing drives the need for Cloud, but the maturity of its technology only allowed for wide adoption within the last 7 years. The relatively short in-market availability means that demands are still rising and many market requirements have not been fully explored and met. With China's massive user base and talent pool, it can contribute significantly to the development of the still-new Cloud technology. With its unique insight into Cloud use cases, China can conceivably develop core components that will replace or exceed those from foreign countries, providing the country with a better technological platform to compete with on the world's stage.

Furthermore, the virtuality of Cloud means that its services can be easily deployed, or exported to anywhere in the world. China has been slowly weaning itself from the capital-intensive and low-margin business of manufacturing outsourcing. While manufacturing for overseas companies has provided jobs and cash inflow, it has also polluted the country and encouraged an unhealthy reliance on unskilled labor. Exporting Cloud services that China itself defines and designs will allow the country to assert control. With control, China can innovate and produce for higher-end markets while growing a skilled workforce who would strengthen China's influence on the world.

The classic political novel, *Romance of the Three Kingdoms* begins with an observation on the evolution of states: "that which is one eventually will divide; that which is divided will once again unite." Computing has been a driving force in China's rise since the days of supercomputers, and Cloud computing will again harness the raw power from a country of 1.4 billion to act as one.

China Cloud Rising

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