

How the West can respond to China's technology surge

*The West still outperforms China in most areas of advanced technology but has much to learn about how it lost the lead in some areas. China's technology surge to dominance in a few sectors is the consequence of a set of concrete factors that either exist already in Europe, can be created, or used to exist and can be revived. **Jonathan Liebenau** writes that the West should avoid panicky responses and study Chinese companies' practices of long-term finance and planning, tolerance for failed business experiments and setbacks, and sophisticated labour market and management developments. This is the third in a series of blog posts summarising the new report '[Protect, Constrain, Contest](#)', by [LSE IDEAS](#), the foreign policy think tank at LSE.*

A significant shift in China's technology and industrial policy emerged around forty years ago with an interpretation of the 'four modernisations' of Deng Xiaoping that set the stage for a boom in private and semi-private technology companies, foreign direct investment, special economic zones and capitalist business practices over the following ten years. By the 1990s, Communist Party technology policies were clearly married to industrial policy and concrete strategies emerged to accelerate technology transfer, divert resources to build science and technology capabilities and create both domestic and export markets for Chinese high technology goods. Investments from Germany and the United States, but especially those that brought development models with them from Japan and South Korea, were especially influential in shaping both the character and the focal areas of technology development. While companies such as Siemens and General Motors were important during this period, investments by firms such as Sony (operating as Chengdu Sobey Digital Technology), Panasonic (parts of its Sanyo business were later acquired by Haier), SK and Hyundai provided models not only of efficient product assembly but also of technology transfer and innovation. American management theory began to prevail.

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The new wave of private high technology and digital services companies date from the late 1980s when Huawei was established, through to the late 1990s when Alibaba, Baidu and Tencent were built, all of which soon came to emulate mainly American firms such as Cisco, Amazon, Google, and Facebook.

During this period and shortly afterwards, a series of major technology companies were established or grew out of state-owned enterprises, such as the army-linked China Electronics Technology Group, which itself spun off one of China's two leading surveillance equipment and services firms: Hikvision. ZTE, Haier and China's three dominant telecommunications services companies, China Mobile, China Telecom and China Unicom all originated as entirely state-owned enterprises.

A further group of private companies also followed, such as Dahua Technologies—the other of the two leading surveillance equipment and services firms—and the leading drone manufacturer: DJI (Shenzhen Great Frontier Innovations Science and Technologies Company). With relatively easy access to capital from state banks, these firms grew quickly and most invested in R&D on a scale comparable to their American counterparts. While their governance ranged widely from wholly private to wholly state-owned, all have conducted business largely in step with Chinese industrial, security and technology policy.

Three features of US, European and Japanese industrial development coincided with this initial wave of Chinese business development during that 20-year period: the push to exploit outsourcing and offshoring opportunities, the associated improvements in supply chain logistics and an onset of stasis or atrophy associated with the period from the technology downturn from the end of the dot-com boom through the telecom bust that followed and beyond the financial services crisis of 2008.

While US digital services companies continued to grow, formerly world-leading US manufacturers such as Cisco and Lucent (both in telecommunications equipment), IBM computers, Corning (optical fibre), 3Com (which was acquired by another ailing company, Hewlett-Packard), Xerox, Motorola, and many others were sold, in relative decline or actually shrinking. Similar fates met the leading Canadian high technology firms Nortel Networks and BlackBerry, the major German firm Siemens, Olivetti in Italy, Alcatel in France and Britain's International Computers Ltd [ICL]. Many Japanese and South Korean technology leaders also lost their reputations as innovators during this period, with the singular exception of Samsung.

There is no simple explanation for this loss of leadership in digital technologies manufacturing outside of China. However, the coincident growth of the Chinese firms was fuelled by the dramatic rise of China's GDP and policies that supported it from many directions including domestic civil and security services procurement, easy access to finance, a boom in engineering education, direct funding through the Chinese Academy of Sciences and industrial and trade policies that favoured digital technologies. Most of these were associated with infrastructure development including advanced manufacturing (so-called industry 4.0), transport, logistics and distribution, the roll-out of 'smart city' schemes and associated surveillance and security applications. It benefitted from many experiments, failures as well as successes, in corporate management and governance. Some of these are associated with leading innovation practices such as those at Xiaomi and Huawei in knowledge management, Alibaba and JD.com in supply chain management, and a variety of company incentive schemes aimed at innovators. While nefarious activities associated with intellectual property theft, industrial espionage and anticompetitive practices have not been uncommon, they contributed in value-added relatively little to the growth outcomes of factors described above.

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What this means for international competition

China's challenge to technology dominance is focused on a short list of key areas mainly linked to infrastructure and include mobile telephony (network as well as mass market equipment), electric and autonomous vehicles, surveillance technologies, drones, mass transport and construction technologies. The last two were primarily spurred by domestic requirements and have only recently entered international competition, mainly in emerging market economies. Their dominance in surveillance technologies is motivated by both the availability of masses of data that is legally restricted or difficult to use in other countries and by the huge market domestically and abroad primarily from security services. The concomitant machine learning, control and automation technologies fuel the bid for dominance in drones, electric and autonomous vehicles and are enabling capabilities associated with 5G services and the 'internet of things'. Domestic laws and regulations, many of them at variance or even anathema for Western nations play a part, also. For this reason, these factors should be considered as interrelated and associated with skills in labour markets, business development and national R&D activities as well as technology policy. One facilitating factor is the use of technical standards, an area of engineering that had been dominated by Western and Japanese firms through multilateral organisations such as the international standards setting bodies. The recent American-led pressure to diminish the role of multilateral bodies provided Chinese firms opportunities to extend their influence within such institutions.

The UK and the rest of Europe have long been influential in standards bodies as well as institutions of law and regulation that will in the coming years form increasingly critical foundations to digital technologies. Along with the United States and Japan, European companies have also led in robotics and advanced manufacturing and still hold the lead in most areas of machine learning and the other most advanced areas of software technology. Chinese improvements in these areas, as measured by research outputs and new product introductions, are in contention for leadership but by most criteria still lag.

It is crucial for policy makers as well as industry leaders to be well aware of these factors as they consider the significance of China's competition. Panicky responses to, for example, the emergence of Huawei as the leader in 5G, overlook the fact that the firm took the technological lead in this area over ten years ago, building on the base of over 30 years of rapid growth. Even if the emergence of such effective competition, largely based on pricing, service qualities or technological leadership, was assisted by nefarious practices, Western nations cannot expect short-term policies that constrain trade, re-design standards or invoke specious security restrictions to re-establish Western technology dominance. Nor will recourse to courts, no matter how well justified legal complaints might be.

What should be done?

The first step toward re-entering competition in technology with China is to understand better how China came to this position of strength. Western nations should look beyond complaints of unfair practices and recognise that Chinese companies have enjoyed recent successes based on over twenty years of strategic practices. The West should learn better from Chinese companies' practices of long-term finance and planning, taking lessons from (and tolerance for) failed business experiments and setbacks, and sophisticated labour market and management developments. These are all found in the best of Western business practices. However, they are too rare, and they have not been allowed to dominate Western economies. Western nations should also return to an attitude toward government in its judicious use of regulations and market shaping activities that, within the West's legal and civic norms, can achieve what the Chinese Communist Party achieves through autocracy. These include judicious use of large-scale projects such as urban development, transportation, and information infrastructure that foster mechanisms likely to have spillover effects that strengthen technology businesses. Countries should find ways that advance technological applications that are the reverse of the experiments in repression such as those applied in Xinjiang: surveillance and artificial intelligence for traffic control rather than social control, monitoring individuals to effect vaccine distribution rather than withholding rights.

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It seems unlikely that short-term tax incentives and 'business friendly environment' policies will do much to address these larger, longer term requirements. Measures such as freeports do little more than redistribute resources or provide very localised boosts while the rest of industrial policy sets out on a race to the bottom.

The West still outperforms China in most areas of advanced technology. However, it should be recognised that it has much to learn about how it lost the lead in others. It is most important that democratic nations strengthen and build upon those institutions that underlie technological success. These include existing institutions of law and trade, standards, and civic virtue. They also require us to reconsider how countries should plan for their national futures, strengthen their labour force, cooperate, and find consensus to prioritise innovation. One can look to, and build upon, bodies such as the Crick and Turing Institutes in London as one kind of model, and aspects of France's transportation policy as another. German technology law is in parts exemplary. But these need to be scaled appropriately, sustained, and constantly improved.

A short-term enthusiasm for an outer-space project, a flurry of subsidies for fashion and industrial design, and great expectations of spillover from prowess in vaccine development are all well and good, but there is little room for optimism when one watches political capital frittered away in squabbles over fisheries while the foundations of our economies are undermined.



Notes:

- This is the third in a series of blog posts based on the new LSE IDEAS report '[Protect, Constrain, Contest](#)'.
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