



China's President Xi Jinping addresses delegates at the opening ceremony of the World Internet Conference in Wuzhen, Zhejiang province, in November 2020.

Whither China's technology dream?

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CHINA'S dreams of becoming a world leader in science and technology (S&T) have inspired both admirers and sceptics for years. Today, these dreams seem to be coming true. China has launched manned space flights, sent the world's first quantum-communications satellite into space, and is leading the world into the 5G era. But despite these successes, China still struggles in important respects, and the country now faces new challenges that raise questions about its S&T future.

The extent of China's high-tech

ambitions under President Xi Jinping are evident in a series of policy initiatives. Since 2014, dramatic reforms have overhauled the structure of China's science funding system. In 2015, the Made in China 2025 (MIC2025) program prioritised state support for 10 high-tech sectors and called for 70 per cent self-sufficiency in core components and basic materials by 2025. In 2017, China unveiled a new initiative to make the country the 'world's primary artificial intelligence innovation centre' by 2030.

Underpinning all these ambitions is growing investment in technology. By 2018, China's share of world research

and development (R&D) investment stood at 22 per cent—second only to the United States' share, at 25 per cent. China is now expected to take the lead before 2025. Roughly three-quarters of China's R&D investment comes from business. Still, government officials remain deeply involved in the allocation of capital, not only through state-owned banks but also through a range of other means, including the growing number of government-guided investment funds, many of which target high-tech firms.

China's growing list of S&T achievements do not simply reflect the influx of investment. In fact, China's

performance may be most impressive in basic science, even though China invests less in basic research as a share of national R&D spending than other science leaders. China's remarkable performance is evident in the Nature Index, which tracks how often scientists from different countries publish in the world's top scientific journals. While the United States still leads the world, China's score in the index has surged from 24 to 67 per cent of the US score since 2012.

China's rise in basic science reflects in part the intense pressure on Chinese scientists to publish top-tier articles within short time horizons, though this also generates a wide range of academic misconduct, including plagiarism and faked peer review. China's performance also reflects the remarkable degree of collaboration between the US and Chinese scientific communities, as reflected in student flows, academic exchanges and collaborative research. China has emerged as far and away the leading source of co-authors for US scientists.

China's performance on the corporate side is more mixed. Huawei's leadership in 5G is both impressive and well-known, though its hardware reportedly has more vulnerabilities than that of other vendors. Chinese firms also lead the way in some areas of artificial intelligence, such as facial recognition technologies.

China boasts a vibrant start-up scene, with 24 per cent of the world's 'unicorns' (private firms valued at more than US\$1 billion) as of October 2020. China's unicorn share was second only to that of the United States (48 per cent) and far more than the combined shares of India, South Korea and Japan (8 per cent). China's total included the world's two most valuable unicorns—ByteDance and Didi Chuxing.

In other regards, Chinese firms are less impressive. While tech firms are now the world's most valuable companies, China's share of the world's top listed firms has changed little over the past decade. As of 2020, 'Greater China' boasted 14 of the world's top 100 firms by market capitalisation—a modest increase from 11 in 2009. US firms, in contrast, comprised 57 of the top 100. While China did have two firms—Alibaba and Tencent—in the top 10, five of the top six were US tech firms.

China's high-tech ambitions are also facing new challenges under Xi Jinping. Tighter internet controls, for example, have prompted complaints from elite Chinese scientists about the impact on scientific research. In 2017 the Vice Chair of the Chinese People's Political Consultative Conference, Luo Fuhe, called attention to the problem only to have his remarks censored. The CCP has also tightened its grip on university campuses. In 2016, for example, the party secretary at Tsinghua University said that faculty members' political stances would be given top priority in their performance evaluations.

On the corporate front, Xi generally prioritises China's state-owned sector, even though non-state firms tend to be more dynamic and innovative. While private firms are still valued,

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particularly leading tech firms, their proverbial wings have been clipped, as shown in the recent suspension of Ant Group's IPO. More generally, private firms are being forced to accept a greater CCP presence than before and to balance business goals with those of the Party. These measures are likely to further limit the efficiency with which China turns innovation inputs into outputs.

The international environment is also becoming much less friendly to China's S&T rise. While this is most obvious in the United States, it is increasingly apparent elsewhere as well. With an eye on China, public officials from the European Union to Japan are scrutinising high-tech investments more closely. In October, Sweden became the latest country to ban Huawei from participating in its 5G networks. India has banned more than 200 mostly Chinese apps, including the video platform TikTok.

The ominous international environment, combined with China's growing high-tech capabilities, is accelerating the country's drive for technological autonomy. In October 2020, Chinese leaders vowed to focus greater efforts on 'scientific and technological self-reliance' following a high-level Party meeting. This commitment must be taken seriously given China's remarkable progress to date. Even so, China's persistent problems coupled with the new challenges it faces mean that success is by no means assured. [EAFQ](#)

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