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Opinion

Renewed US-China science pact advances cooperation, despite tech wars

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The renewal of the US-China Science and Technology Cooperation Agreement (STA) marks a pivotal moment in scientific diplomacy, in an era defined by fierce technological competition and escalating geopolitical tensions.

First signed in 1979 between US president Jimmy Carter and Chinese leader Deng Xiaoping, the STA's broad mandate provides a stable framework for long-term scientific cooperation. It has enabled nearly 100 protocols between governmental agencies, allowing collaboration across diverse fields, including agriculture, renewable energy, space, climate science, health and biotechnology.

Research shows that US-China scientific and technological cooperation is not a zero-sum game but a beneficial partnership. The United States has gained access to China's expanding scientific capabilities and talent pool, while China has benefited from exposure to cutting-edge US research and collaboration. In tackling global challenges such as climate change and public health crises, this collaboration has delivered critical breakthroughs. Efforts in clean energy and climate science underscore the partnership's value in addressing environmental and health threats.

But the past few decades have witnessed a surge in techno-nationalism, fuelled by the digital revolution, economic crises and intensifying US-China competition. Events such as the 2008 financial crisis, Covid-19 pandemic and Ukraine war have also deepened this trend.

Techno-nationalism emphasises national control over critical technologies, protection of domestic industries and reduced reliance on foreign technology, a stance that has challenged the spirit of international scientific cooperation.

Against this backdrop, the STA's future became uncertain when its last five-year term expired in August last year. The agreement received two six-month extensions, reflecting both nations' recognition of its strategic significance while signalling the need for adjustments in the changing geopolitical environment.

Finally, on December 13, Washington and Beijing renewed the STA for another five years, retroactively effective from August 27. This represents a critical step towards sustaining scientific engagement amid intensifying geopolitical rivalries. It reflects a carefully calibrated approach that balances the need for scientific collaboration with growing national security concerns, signalling that even in a polarised world, scientific diplomacy remains possible.

The intensifying US-China technological rivalry has ushered in a new phase of great power competition, where technological supremacy is a defining pillar of national power. Critical technologies have emerged as key battlegrounds, shaping economic, military and geopolitical dynamics.

Some technologies have become integral to national security and economic competitiveness, pushing states to reassess how best to safeguard critical technology ecosystems. These include digital technologies (e.g., quantum computing, artificial intelligence and blockchain), security-related technologies (e.g., cybersecurity, military and aerospace systems), clean technologies (e.g., batteries, renewable energy solutions and technologies for the sustainable extraction and processing of critical minerals), and health technologies (e.g., vaccines, genetic therapies and precision medicine).

Balancing international cooperation against the protection of domestic industries has become a central policy challenge. As industries drive much of this technological progress, governments are increasingly intervening through export controls, trade restrictions and industrial policy measures.

The US-China tech rivalry has evolved into a tit-for-tat competition characterised by containment strategies and retaliatory measures. In response to the Biden administration's sweeping export controls targeting China's semiconductor sector, Beijing has signalled its readiness to use its dominance in critical mineral supply chains and vast domestic market as leverage against US containment.

This contest has deepened the technological decoupling between the two superpowers, reshaping global supply chains and raising concerns about long-term global technological fragmentation.

Scientific advancement underpins industrial innovation. As both nations deploy economic statecraft through technological restrictions, the stakes for international research collaboration have never been higher. In a divided world, many countries are recalibrating their approach to research ecosystems, balancing openness with the need for technological sovereignty. This recalibration calls for a careful balance between proprietary and public knowledge in science - and crucially, which fields of science receive priority.

Notably, the 2024 revision represents a significant recalibration of the STA. The renewed agreement entails a narrowed focus on non-sensitive areas such as environmental science, public health and agricultural sustainability; enhanced security provisions including clauses that strengthen protections for data sharing and intellectual property rights; the explicit exclusion of critical technologies like quantum computing, AI and cybersecurity; and prioritised national security measures ensuring sensitive areas remain off-limits.

Its revision also includes strengthened provisions on researcher safety and dispute resolution. These updates reflect Washington's growing wariness of technology transfer risks, intellectual property theft and espionage.

Nevertheless, the renewal of the STA shows both countries are maintaining crucial channels for collaboration in basic research in non-sensitive areas. The updated STA reflects a pragmatic compromise designed to preserve essential scientific cooperation while safeguarding national security. It provides not only a protective umbrella for exchanges and interactions between researchers but also a critical step towards stabilising the US-China scientific partnership.

Despite the pact's renewal, a pressing question remains: can scientific cooperation endure in an era dominated by techno-nationalism and geopolitical rivalry, or will the pursuit of technological supremacy fracture global research networks beyond repair? The implications of the US-China STA renewal extend far beyond bilateral relations, influencing the broader dynamics of global technological competition. Its success will depend on commitments to transparency, data sharing and intellectual property protection.

By enabling selective engagement in non-sensitive areas while restricting cooperation on critical technologies, the STA represents a compartmentalised approach to international research. While this model sustains targeted collaboration, it also risks reinforcing emerging scientific blocs, potentially reshaping the global research landscape.

One hopes the pact's renewal serves as a diplomatic bridge, showing that scientific diplomacy can coexist alongside strategic competition. This partnership plays a crucial role in maintaining the stability and interconnectedness of the global technological ecosystem, acting as a counterbalance to technological decoupling.

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