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The Communist Party's Steering of China's Science, Technology, and Innovation System: Aspirations and Reality

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Summary

The Chinese Communist Party seeks to permeate every aspect of China's social and economic life—including the realm of science, technology, and innovation. Chinese leadership has heightened calls for technological self-reliance and boosting indigenous innovation, but still recognizes the importance of foreign expertise and international collaboration for China's domestic scientific efforts. Contradictions in the party's approach to domestic science abound, and despite a visible politicization of scientific institutions, no discernable impact on China's scientific production can be seen—yet. The Communist Party's attempts to grow its influence in domestic science institutions nevertheless pose long-term risks to the quality of the country's scientific output.



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Key Findings

- The Chinese Communist Party is reclaiming a powerful role in the country's science, technology, and innovation ecosystem. This is leading to a clash between an outward-looking scientific technocracy and an inward-looking party regime seeking to influence this critical sector of China's economy and society.
- The party's growing role in science risks negatively impacting China's research output. So far, however, the consequences appear to be relatively minor. The party's role in steering research coexists with large domains of scientific decision making done by professionals based on non-political considerations.
- Chinese leadership sends contradictory signals about how it intends to steer the country's scientific system. Official calls for technological self-reliance coincide with a recognition of the global nature of scientific endeavors. There has been no noticeable decrease in China's international scientific cooperation. It appears that, rather than isolating China's scientific ecosystem, the party wants stronger control of what happens within it.
- The party is restructuring China's research institutions to wield greater influence in domestic science, which the party sees as critical for the country's development, economy, and global power status. It is centralizing domestic science to pool leadership and resources, while also elevating party secretaries within scientific organizations. It remains unclear how much this politicization will influence the direction of research in China.
- So far, these changes are probably not enough to indicate a complete overhaul of how science is done in China. However, new regulations and the personal influence of party secretaries have a significant impact on organizational management.

Introduction

After decades of Reform and Opening Up, the science, technology, and innovation (STI) system in the People's Republic of China (PRC) is at a watershed moment. On top of policy changes that alter its goals, strategy, and resources, the helm of power on both a macro and day-to-day operational level has shifted. As in many other domains of public life, the Chinese Communist Party (CCP) under Xi Jinping's "top-level design" (顶层设计) credo is reclaiming a powerful role. This is leading to a clash between a well-oiled and adaptive science technocracy oriented toward global competition that has been in place since the 1980s, and an increasingly ossified, inward looking, isolationist, and totalitarian party regime that intends to permeate every last functional domain of China's society and economy.

Why should we care? It will be crucial to see whether increased party control will be a driving force or a roadblock for research and innovation in China. While the state's role is generally regarded as a backbone of economic and technological development in East Asia during the latter half of the 20th century, political and ideological intervention in science is mostly seen as an obstacle to innovation and progress.¹ Historical cases beyond China have demonstrated that such intervention often means that originality, expertise, and experience are replaced by overregulation, incompetence, and opportunism.²

Furthermore, foreign scientific partners are now encountering the party and its nomenclature much more visibly during interactions with and visits to China. Where before they dealt most often with professional peers, they are now confronting obvious ideological content and political actors who wield influence on scientific exchange and its outcomes. A stronger party presence in science organizations, together with Xi's call for pervasive "military-civil fusion" (军民融合)—including in research and education—is already irritating scientific partners around the world and fueling calls for reducing their engagement with China.

As a result, STI-related sectors are increasingly becoming part of the debates on "decoupling" and "de-risking" in the United States, Europe, and Australia.³

This brief analyzes the CCP's ambitions in STI policy and practice and the extent to which they are being realized. The changes appear—so far—smaller in reality than as promised on paper or in speeches. Instead of an exclusive role for the party in steering research and education reminiscent of pre-reform China, a hybrid model is emerging. Despite a stronger-than-ever presence of the party in all kinds of STI organizations since the launch of Reform and Opening Up in the late 1970s, party offices and party logic exist alongside other types of specialized, professional governance and rationalities seen in other sectors of policymaking.⁴

Current reconfigurations in China's science organizations are leading to an all-out merger between party leadership and routine management and decision making within these organizations.⁵ But this politicization coexists with large domains of decision making about scientific content and conduct that are still overseen by groups of professional actors or based on non-political considerations, which, arguably, keeps Chinese STI running on its established course. In other words, the work context for STI professionals has changed palpably because of the CCP's increasingly overarching role in organizational management and strategy. However, there is still a pragmatic acceptance of non-ideological, specialized decisions in science—with the exception of most areas of the social sciences and humanities.

While these distinctions may not be relevant for overall accounts of the CCP's totalitarian turn under Xi Jinping, they can make a difference when assessing their impact on China's STI-related productivity and scientific exchange with partners in the PRC. More data is needed, however, to judge what these changes may mean for China's STI system in the medium to long term, which provide rich opportunities for data gathering, research, and comprehensive analysis in this area in the coming years.



Slogans reading “Learn the [Xi Jinping] thoughts [to] strengthen the Party spirit. Focus on practice [to] achieve new successes” at a campus of Tongji University, Shanghai. Photo: Andrea Braun Stfelcová, 2023

“Indigenous Innovation” and “World-Class Science”: Can You Have It All?

China’s political leadership sends mixed signals concerning the STI system’s proposed trajectory, worldwide position, and the ways in which its diverse goals are to be achieved.

Xi Jinping often calls for technological self-reliance and outlines the necessity to establish science and scholarship with Chinese characteristics while at the same time promising Chinese scientific contributions to tackle humanity’s grand challenges and stressing the need for global governance of science.⁶ China, in his words, is to establish “world first-class” institutions, disciplines, and outputs (世界一流学科建设) under the farsighted but essentially nationalist guidance of the CCP. China is supposed to become a global science superpower and produce “indigenous innovations” (自主创新). Rather than being mutually exclusive, these ambitions are depicted as complementary.

Centralization is Boosting CCP Influence

Besides the rhetoric, the CCP’s desire to take more control of STI developments is evident in institutional restructurings, including the recent establishment of a Central Science and Technology Commission (中央科技委员会), a party organ that now sits hierarchically above the Ministry of Science and Technology.⁷ This shift is similar to other initiatives under the scope of “comprehensively strengthening reform” (全面深化改革) that started as soon as Xi Jinping came to power in 2012-13. The creation of this commission, together with the mentions of STI in top-level speeches and documents, highlights the importance that the party attaches to STI activities for China’s development, economy, and global power status.

Centralization aims to facilitate the pooling of skilled leaders and resources in order to enable the speedy and smooth advancing of core technologies and research fields. This strategy essentially put the previous Medium and Long-Term Plan for the Development of Science and Technology (2006-2020) and China's other national plans for science and technology with their already defined core items—such as quantum computing, aerospace, agriculture, among others—on steroids. Although this represents a significant restructuring, it appears geared toward top-down agenda setting and resource allocation for high-priority capacity building, rather than operationally changing the STI system as a whole.⁸

At the micro level, party cells and secretaries—like in other public and commercial organizations in China—are given elevated status and decision making authority in Chinese universities and research institutions.⁹ Party structures that have always existed in most science organizations—especially in universities—have recently been made more visible and potent again. Staff are required to undergo party ideology training sessions to a degree not seen since the start of Reform and Opening Up. Bringing home the message, Xi Jinping makes references to the old motto of “red and expert” (又红又专) in speeches to university students, researchers, and managers.¹⁰ Scientific organizations are also called upon to become more active in political consultation for party and government bodies and to strengthen in-house think tank-style agencies to directly conduct policy-relevant research work.¹¹ These overhauls show that the party's control of STI is to be established beyond temporary campaigns. It is less clear, however, how much the re-ideologization of China's research organizations will influence the work that they do.

The Contradictions of the CCP Approach to STI

Is there a convincing logic behind these reshuffles that would help disentangle the diffuse messaging? The short answer is no—and this is not surprising. The CCP's rule and its ideology are full of contradictions. Its STI policy reflects contemporary dynamics in other domains. Conventional motives—such as the party's primary objective of political stability and protecting its rule—and the overarching national security imperative under Xi Jinping are coupled with a strong technonationalism reflected in STI policymaking.¹² The logical contradictions are striking. While isolating domestic technological systems and thereby ending the phase of all-out globalization and the strategic import of foreign knowledge is conceivable—and the developments in China's communication technology and the national foreclosure of its digital infrastructure illustrate this point—it is impossible to imagine that China can decouple and maintain its own science system.¹³

Decoupling may not be the ultimate goal, however, as there is no tangible downward trend in China's international scientific cooperation, aside from that with the United States.¹⁴ Besides new legislation that makes it harder to collaborate in fields concerning national security, state secrets, data export, and espionage, there is no explicit call in China to drastically reduce international cooperation in the STI domain. New cooperation agreements are still being signed and international co-publications are still on the rise.¹⁵ Neither is there an apparent intention to abolish basic scientific research or to turn Chinese science organizations into solely policy-relevant advisory and technology production bodies.

It seems that, rather than isolating or curtailing China's STI sector, the CCP wants stronger control of what happens inside these organizations. But how would this supervision work? The following few examples are meant to shed light on this. They support the observation that the CCP's interference in STI goes beyond temporary campaigning and may signal attempts to institutionalize party steering and control. However, they also indicate that the party's approach to guiding STI is not the only game in town.

Reliable Steering Mechanisms? The Party's Grasp on Resources and Incentives

How does the CCP envision putting its ambitions to steer the whole STI lifecycle into practice? Excellent studies explore the macro structures of current top-down STI system reforms in the PRC.¹⁶ Since the most problematic and disruptive effects of party interference in post-reform China are often associated with micro-level attempts at disciplining and individual power plays, however, it is worth looking at them here.

Party of Professionals: Balancing Cadre Competencies and Loyalty

All organizations in China are now expected to engage in extensive “party building” (党的建设) and yield a stronger role to their in-house party secretaries.¹⁷ Scientific institutions in particular seem to answer to these requirements by means of “personal union,” accentuating the existing party function of leadership incumbents and recruiting candidates for new party posts from existing staff, rather than accepting parachuted party cadres into their ranks. In universities, where party mobilization has increased over the past decade and party-related duties and posts were ubiquitous but dormant, party building is relatively easy to implement.¹⁸

Looking at the leading personnel of China's top institutions since 2010 confirms that—as far as can be known—party secretaries are rarely random cadres from outside the organization.¹⁹ In at least three cases, a previous president or rector was made party secretary in the following term (see Figure 1). All these cases occurred in 2021-22, around the time central leadership called for a reinforced party status in universities. These shifts, therefore, often signal the elevation of the party secretary's office rather than a change in personnel—at least in the country's elite science institutions.

In January 2024, it was reported that some universities in China would formally merge party committees with the presidents' offices to form one top leadership body, similar to what is elsewhere in government termed “one institution with two names” (一个机构两块牌子).²⁰ This is an unprecedented step that reflects, in stark terms, the dedifferentiation of party matters, party member management, and ideological control with overall organizational management.

While there are many factors that influence and may distinguish research practices and organization in China from those abroad, the recent changes in personnel and functional denominations are probably not enough to indicate a complete overhaul of how science is done in the country.²¹ In many cases, the dual identity of organizational leaders as professional scientists and party cadres may balance out party influence. This seems to distinguish the STI system from many other domains of increased added party control in China—for the time being.

FIGURE 1

Three Prominent Cases in Which Former University Presidents Became University Party Secretaries in 2021-22

	Peking University		Tsinghua University		Huazhong University	
	President/ Rector	Party Secretary	President/ Rector	Party Secretary	President/ Rector	Party Secretary
2010-2015	Wang Enge (王恩哥, '13-'15)	Ju Shanlu (朱善璐, '11-'16)	Chen Jining (陈吉宁, '12-'15)	Hu Heping (胡和平, '08-'13)	Li Peigen (李培根, '05-'14)	n.a.
2015-2022	Hao Ping (郝平, '18-'22)	Qiu Shuiping (邱水平, '18-'22)	Qiu Yong (邱勇, '15-'22)	Chen Xu (陈旭, '13-'22)	Li Yuanyuan (李元元, '18-'21)	Shao Xinyu (邵新宇, '17-'21)
Current	Gong Qihuang (龚旗煌, 2022-)	Hao Ping (郝平, 2022-)	Wang Xiqin (王希勤, 2022-)	Qiu Yong (邱勇, 2022-)	You Zheng (尤政, 2021-)	Li Yuanyuan (李元元, 2021-)

Guarding State Secrets (and More Mundane Tasks)

Party secretaries are responsible for ensuring that initiatives, such as building theories and disciplines with “Chinese characteristics” (中国特色) or “telling the ‘China story’ well” (讲好中国故事), are enacted by members of their organizations.²² They are tasked with avoiding sensitive topics and undertakings and with making sure their colleagues fulfill ever-increasing mandatory ideological trainings and tests. Anecdotal evidence from exchanges with colleagues based in the PRC implies that these training activities are quite time-consuming, which alone suggests that resources are diverted from research.

Nonetheless, new regulations and legislation in the PRC might develop into harder steering tools than campaigns and initiatives. National security laws, data export controls, and accusations of political disloyalty are a sword of Damocles hanging over actors in the STI system. These tools can be evoked arbitrarily by functionaries charged with discipline and control or who are worried about excessive openness and international exchange in their organization.

Party secretaries also fulfill more routine administrative tasks in their organizations. They are now—more than before—in the position to influence recruitment, financial, and strategic decisions in China's STI institutions. This position and its expanding toolkit also enables incumbents to wield influence over peers within their organizations for purely personal motives, such as controlling professional rivals or the mere desire for power. These aspects should not be overlooked, even if they relate more to internal organizational management and political disciplining than to the core content of scientific work.

Policy Implications: Stalemate Between National Goals and Global Orientation

It is worth asking what kind of control the CCP is trying to exert over actual scientific work, with what ambition, and to what end. Since Reform and Opening Up, China's STI technocracy built a sophisticated system of performance measurement that combined global indicators with national traditions featuring extensive evaluations and rankings.²³ Over the past two decades, successes in the STI sector were almost exclusively measured in internationally recognized publications, patents, and prizes.²⁴ China's STI reputation management was globally oriented, and science organizations enforced it with enormous vigor, putting extreme performance pressure on their staff. Recently, China's political leadership began trying to alter this orientation, claiming that STI with relevance for China is equivalent to publications, prizes and patents realized in China and in Chinese. Moreover, policy-relevant reports and ideological essays should also yield academic credit.²⁵ For grant applications to government funding agencies, projects that pick up party policy slogans and strategically pursue government-promoted core research topics have a better chance of succeeding.²⁶ Yet, this new political pressure is apparently causing ambivalence for China's STI workers, who often pragmatically check off national requirements while striving for international acknowledgement of their achievements, which in turn continues to translate into local rewards.²⁷

Content control by party agencies is nonetheless affecting China's scientific publications, including those in English and in international outlets. This control is implemented with vigor, but varies widely, often hinging on local and personal factors, as confidential conversations with academics in China can confirm. Where exactly this new layer of censorship comes to fruition remains hard to grasp. Content control seems to happen on a broad spectrum, from proactive self-censorship and needing approval by departmental leadership

before research starts or is published, to being held responsible and punished for content post-publication. This control may be applied in any scientific discipline, although it is most blatantly enforced in the social sciences and humanities.

Conclusion

The structural framework for scientific production in the PRC is undergoing profound changes under the growing influence of the Communist Party. However, there are scant discernible indications so far that these reconfigurations will diminish China's general productivity in science, technology, and innovation in the short term.

The CCP and its functionaries are permeating China's STI system more than any time since Reform and Opening Up. The party's attempts at top-level steering and micro-level disciplining are documented by a small but growing body of research. While tangible effects on outputs are still difficult to identify, this politicization will make it harder for collaborating foreign entities to view Chinese counterparts as thoroughly professional partners. The increasingly pervasive nationalist ideologization of STI staff in the PRC—if translated into hard incentives and sanctions—may also increase the risk of academic malpractice, illegitimate knowledge transfer, or political instrumentalization in international cooperation. Nevertheless, strong layers of technocratic STI governance remain. China's political leadership and especially its scientific elites still consider China a part of the global system of science and measure the PRC's scientific and technological power by global standards.

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