

## TECHNOLOGY

October 11, 2023

Technology policy has emerged as a central concern for Beijing since Xi Jinping became General Secretary of the Chinese Communist Party (CCP) in November 2012. Technological innovation is an essential requirement for two of Xi's foundational policy agendas. First, Xi has identified a need to escape the "middle-income trap" by transforming China from a low-cost export powerhouse into a high value-added economy, a concern that Xi has pursued since his first term, giving it more attention than his predecessors. Second, Xi seeks to increase the country's "self-reliance" in "chokehold technologies" and reduce the geopolitical leverage of the United States and its allies, a concern that grew more pressing during Xi's second term following the proliferation of US tariffs, sanctions, and export controls directed at China. Xi's administration has increased funding for scientific research, reformed the institutions that govern science and technology, promoted technological experts to senior political positions, and made enormous investments in strategic high-tech industries, all with the goal of transforming China into a "science and technology superpower" by the middle of the century. Xi believes this goal demands better regulation, and his second term saw the emergence of a technology governance regime centered around the Cybersecurity Law of 2016, the Data Security Law of 2021, and the Personal Information Protection Law of 2021.

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### Institutions

The top institution in science and technology policymaking, below the party's elite 24-member Politburo and its top 7-member Politburo Standing Committee (PSC), will be the **CCP Central Science and Technology Commission (CSTC)**, which was announced as part of the party-state institutional reforms of March 2023. The CSTC is intended to strengthen party leadership over science and technology policies and has responsibility for decision-making, discussion, and coordination of work in these areas. More specifically, it is charged with building the national innovation system; reforming the science and technology system; researching major policies for

national science and technology development; resolving major strategic and directional issues in the science and technology sphere; determining strategic science and technology missions and major research projects for the national government; coordinating the layout of strategic science and technology forces, including national laboratories; and coordinating the development of civil-military fusion in science and technology. Beijing has not publicized either the leadership or membership of the CSTC, but Xi's political commitment to these policy areas makes it possible he will serve as Director, several PSC members will serve as Deputy Directors, and many Politburo members will have ordinary seats. The CSTC General Office will reside in the Ministry of Science and Technology, which could see the Minister of Science and Technology concurrently serving as Director of the CSTC General Office, a significant elevation of the position's bureaucratic power and political influence.

The CSTC also gained responsibility for the National Science and Technology Advisory Committee (NSTAC), a secretive group of experts convened by the party in 2019 to advise the top leadership on major national policies, and the National Science and Technology Ethics Committee (NSTEC), another enigmatic expert group established in 2019–2020 to strengthen professional norms, governance mechanisms, institutional supervisions, and the legal and regulatory framework related to scientific ethics. The CSTC absorbed the former CCP Central Leading Group for the Construction of National Laboratories, National Leading Group for Science and Technology, National Leading Group for Science and Technology System Reform and Innovation System Construction, and National Leading Group for Medium-to-Long-Term Science and Technology Development Planning Work. These changes significantly weakened the State Council's role in science and technology policy relative to the central party apparatus led by Xi.

The **CCP Central Comprehensively Deepening Reforms Commission (CCDRC)** is arguably the country's most influential policymaking, coordination, and implementation body, as it is the institution that Xi uses more than any other to implement top-level policy changes to the economic system (see "Economy and Trade" and other sections). The CCDRC has discussed several policy documents related to the science and technology system, including reforms to research evaluation mechanisms and innovation progress indicators and programs to focus on key technologies, promote research commercialization, incentivize talent, improve talent, and reduce waste. Xi is the CCDRC Director, and the Premier, Chairman of the Chinese People's Political Consultative Conference, and CCP Secretariat First Secretary have served as Deputy Directors. The CCDRC's current membership is unclear, but it is thought to include around 20 deputy national-level leaders.

The **CCP Central Military-Civil Fusion Development Commission (CMCFDC)** is responsible for making, coordinating, and implementing policies related to the integration of civilian technology into the Chinese military. Formed in January 2017, the body replaced several leading groups with a similar focus. At the CMCFDC's first meeting in June 2017, Xi emphasized the importance of

technological innovation in making China a “self-reliant” great power. Xi serves as the CMCDFC Director, and the Premier, CCP Secretariat First Secretary, and Executive Vice Premier serve as Deputy Directors, a leadership lineup that significantly elevated the political priority of dual-use technology compared with previous leading groups. The Executive Vice Premier also heads the CMCDFC General Office, assisted by a ministerial-level Executive Deputy Director who runs day-to-day policy operations. Important institutions in military-civil fusion include several defense-related central state-owned enterprises (SOEs) and the Central Military Commission’s Equipment Development Department (which houses the China Manned Space Agency) and Science and Technology Committee, both of which were founded following Xi’s sweeping military reforms in 2015 (see “Military” section for more details.)

The **National Development and Reform Commission (NDRC)** is arguably the most powerful ministerial-level constituent department of the State Council and plays a pivotal role in coordinating governance matters on both energy and the environment. Formerly the State Planning Commission and the State Development Planning Commission, the NDRC oversees China’s economic development planning process, which at its highest level produces the national Five-Year Plan. The NDRC is the macro-level control department and has responsibility for formulating a broad range of economic and social policies, which often overlap with the mandates of other ministries and agencies. The main functions of the NDRC, and especially its Department of Innovation and High-Tech Development, include promoting innovation-driven development in economic planning and working with other ministries to formulate policies related to innovation, entrepreneurship, industrial upgrading, high-tech industries, strategic emerging industries, and the national layout of science and technology infrastructure. In March 2023, it acquired responsibility for formulating plans for science and technology to promote economic development from the Ministry of Science and Technology. The NDRC is part of the Inter-ministerial Joint Conference for the Digital Economy, together with the Cyberspace Administration of China and the Ministry of Industry and Information Technology.

The NDRC manages the National Data Administration (NDA), a new deputy ministerial-level State Council bureau announced in the party-state institutional reforms of March 2023. The NDA will oversee building the data infrastructure system; coordinating the integration, sharing, development and utilization of data resources; and overall planning of Digital China, the digital economy, digital social regulation and construction, and similar policy areas. The NDA takes oversight of the economic applications of data from the security-focused Cyberspace Administration of China by acquiring its responsibilities for smart cities, the digitization of public services, cross-department government data sharing, and the development and use of nationally important information. It also takes on the NDRC’s previous responsibilities for the national big data strategy, digital economy, and digital infrastructure. Early conjectures suggest that the NDA will chiefly focus on nurturing the market for data as a “factor of production,” with the consolidation of data oversight under one

agency potentially helping to rectify inefficiencies that arose from the fragmentation of regulatory jurisdictions across many agencies and ministries.

The **Cyberspace Administration of China (CAC)** is the ministerial-level General Office of the CCP Central Cyberspace Affairs Commission (CCAC), which is the policy formulation, coordination, and implementation body that holds sway on censorship, propaganda, security, and technology related to the internet. Xi established the CCAC as a leading group in February 2014 and upgraded it to a commission in March 2018. He serves as the CCAC Director, and the Premier and CCP Secretariat First Secretary serve as Deputy Directors. The CAC has emerged as an unusually prominent policy actor, compared with the General Offices of other central party commissions, because it simultaneously functions under both the CCP Central Committee and the State Council as the country's chief internet regulator. Its original remit to manage online content and enforce online censorship has been expanded to include rulemaking and punishment powers over cybersecurity (including network equipment and security reviews), data security (including the export of important data), and online privacy (including the export of personal information). The CAC usually plays the leading role in Beijing's regulatory response to emerging online technologies, such as AI chatbots, deepfakes, livestreaming, and recommendation algorithms. These changes have transformed the CAC into a super-regulator with potential jurisdiction over virtually all online activity. The most infamous display of its formidable powers came in mid-2021, when the CAC investigated the initial public offering (IPO) of rideshare giant DiDi on the New York Stock Exchange, retroactively declaring the need for a (now mandatory) cybersecurity review, during which time it blocked the app and suspended new registrations. DiDi eventually delisted. The CAC also controls the China Internet Investment Fund, which owns minority stakes, or so-called golden shares, acquired under government pressure from in top Chinese tech firms such as ByteDance and Weibo. The National Radio and Television Administration (NRTA), a ministerial-level agency directly under the State Council that is led by the CCP Propaganda Department, retains oversight of approval for new audiovisual products such as movies and television shows, but the CAC retains the authority to censor such content online.

The **Ministry of Public Security (MPS)** is a constituent department of the State Council that is mainly responsible for the country's police force, but has several other duties, including for the security of information on public internet networks (see "Security" section for more details). It oversees and enforces a broad and complex cybersecurity standard known as the Multi-Layer Protection Scheme (MLPS), which virtually all domestic and foreign companies operating in China must comply with and get certified for. Due to the overlap between this MPS function and the purview of the CAC, Beijing may force the MPS to relinquish its cybersecurity powers or collaborate closer with CAC and MIIT, but the MPS's significant enforcement capacity at local levels will ensure its relevance for tech regulation.

The **Ministry of Industry and Information Technology (MIIT)** is a constituent department of the State Council that is a powerful force in China's technology policy. It is responsible for industrial development; industrial policy; industrial standards; industry operations monitoring; indigenous innovation; information technology; national information security; the development of major equipment industries for manufacturing and transportation; the development of high-tech industries such as biomedicine, new materials, and aerospace; and the management of communications industries such as internet infrastructure, software, telephones, television, radio, airwaves, satellites, and the knowledge economy. In the March 2023 institutional reforms, MIIT acquired new responsibilities for high-tech industry development, local science and technology zones and industrial parks, science and technology service industries and intermediary organizations, and technology markets.

MIIT administers the deputy ministerial-level State Administration of Science, Technology, and Industry for National Defense (SASTIND), a State Council bureau that manages the national defense science and technology industries, supervises civil-to-military technology conversion efforts, organizes international cooperation in defense industries, and manages arms exports by military enterprises. It has specific responsibility for the planning and management of the nuclear, aerospace, aviation, shipping, and armament industries, as well as managing the military electronics industry, nuclear power plant construction, isotope production, and the production and circulation of civilian explosives. Many leading cadres in the technology field, including several who became provincial or even national leaders (such as Ma Xingrui and Zhang Guoqing), have worked there. MIIT administers two other deputy ministerial-level State Council bureaus: the China National Space Administration (CNSA), which manages the civilian space industry and international space cooperation, and the China Atomic Energy Authority (CAEA), which manages the nuclear energy industry and international nuclear cooperation.

MIIT houses the General Offices of several technology-related State Council policy coordination bodies: the State Leading Group for the Development of the National Integrated Circuit Industry, founded in 2014; the State Leading Group for Building a Manufacturing Power, founded in 2015 to oversee the Made in China 2025 strategy to enhance the country's dominance of key advanced manufacturing industries; the State Leading Group for the Development of the New Materials Industry, founded in 2016 to manage issues such as nanotechnology and rare earths; and the State Council Leading Group for the Promotion of Small- and Medium-Sized Enterprises, founded in 2009, which has become more relevant as Beijing increasingly focuses on smaller but more specialized technology firms. The latest public records suggest that all these leading groups are headed by the Vice Premier with the industry portfolio, who is currently Zhang Guoqing; the MIIT Minister and others serve as Deputies; and an MIIT Deputy Minister leads the General Office (although this inference is speculative for the last-named group).

MIIT oversees the China Academy of Information and Communications Technology (CAICT), an official think tank that is an influential player in China's telecommunications and digital economy sectors, including with respect to standards, technical trials, and emerging technologies. It also oversees seven universities that are among China's leading STEM institutions, including four elite institutions that produce many of China's leading engineers, scientists, and technologists and are important enough for the CCP's Organization Department to appoint their party secretaries and presidents: Beijing University of Aeronautics and Astronautics ("Beihang"), Beijing Institute of Technology, Harbin Institute of Technology, and Northwestern Polytechnical University. Other STEM heavyweights include Tsinghua University in Beijing and the University of Science and Technology of China in Hefei.

The **State Administration for Market Regulation (SAMR)** is a ministerial-level agency directly under the State Council with responsibility for registering market entities; creating social credit systems for market entities; and regulating market operations, market competition, monopolies, advertising, multilevel marketing, intellectual property, food safety, equipment safety, measurement, national standards, industrial product quality and safety, and commercial inspection and testing. Established by the merger of several regulators in March 2018, the SAMR has emerged as an influential actor in regulatory politics, especially during Xi's rectification campaign against China's large platform technology firms, which it leveraged to increase its bureaucratic resources and issue sizeable fines on top companies.

SAMR operates several deputy ministerial-level State Council bodies with important regulatory functions in the technology sphere. The Standardization Administration of China (SAC) oversees technical and industrial standardization work and represents China in international standardization bodies (although MIIT interfaces with the United Nations International Telecommunication Union). TC260 is a particularly influential standard-setting body under the SAC and is responsible for standards related to cybersecurity and online personal information protection under Xi's new cyber-governance regime. The China National Certification and Accreditation Administration (CNCA) is responsible for certification and accreditation related to industrial quality, industrial safety, and public hygiene. The National Medical Products Association (NMPA) regulates, supervises, and formulates standards for medical devices, cosmetics, and pharmaceuticals (including those used in Traditional Chinese Medicine).

SAMR is a pivotal actor in the implementation and enforcement of the recently amended Anti-Monopoly Law. The National Anti-Monopoly Bureau (NAMB), founded in November 2021, consists of three SAMR departments that investigate and handle administrative monopolies and unfair competition; investigate monopolistic collusion and abuse of market power; and review the concentration of business operators. The NAMB also functions as the General Office of the State Council Anti-Monopoly Commission, which was established in 2008 to coordinate state

competition policies and regulatory frameworks, and the National Leading Group for Combating Intellectual Property Infringement and the Production and Sale of Counterfeit and Inferior Goods; both bodies are led by the Vice Premier in charge of market regulation, currently Zhang Guoqing. SAMR also provides guidance to the China Consumers Association, a state-affiliated “social organization” that is often used by the government as a mouthpiece to publicly target both domestic and foreign companies whose business practices create political problems.

The **Ministry of Science and Technology (MOST)** is the constituent department of the State Council that oversees science and technology in China. Its main responsibilities include national plans for science and technology, innovation-driven development, and basic research; science and technology system reform and national innovation system construction; major national basic research and applied basic research; major national science and technology projects; national laboratories; regional science and technology development; the national technology transfer system; international science and technology cooperation; and the creation of a unified mechanism for managing and evaluating national science and technology projects. MOST was empowered in the March 2023 institutional reforms to focus more on these core missions of vital national interest, shedding its responsibilities for rural science and technology, science and technology for social development, high-tech industrial development, and foreign talent management. MOST administers the deputy ministerial-level National Natural Science Foundation of China, a State Council public institution that allocates over US\$5 billion annually to thousands of scientific research projects that advance Beijing’s policy goals, and the deputy ministerial-level *Science and Technology Daily*, a newspaper focusing on science and technology issues. MOST may not be involved in regulating the technology industry, but it is set to become a more influential player in science and technology policy because it will host the CSTC General Office.

The **China National Intellectual Property Administration (CNIPA)** is a deputy ministerial-level organ directly under the State Council that is responsible for protecting intellectual property rights; handling foreign intellectual property matters; and registering and adjudicating patents, trademarks, and geographical designations of origin. Before the 2023 institutional reforms, CNIPA was managed by SAMR, which still has enforcement responsibility for patent and trademark issues.

The **State Administration of Foreign Experts Affairs (SAFEA)** is a deputy ministerial-level agency absorbed by the State Council’s Ministry of Human Resources and Social Security (MHRSS) in the March 2023 reforms. SAFEA is responsible for the recruitment of foreign experts to work in Chinese institutions, including overseas Chinese and people from Hong Kong, Macau, and Taiwan. Its activities include the long-running Thousand Talents Program that recruits foreign-trained STEM experts to advance China’s high-tech sector (now known as the National High-end Foreign Experts Recruitment Plan), which has allegedly facilitated intellectual property theft and illicit technology transfer from Western countries. The top policy coordination body dedicated to human capital is

the CCP Central Coordination Group on Talent Work, which was established in 2003 and reportedly is led by the Director of the powerful CCP Organization Department.

The Chinese government operates two national academies that support advanced research in science and technology, which function administratively as ministerial-level organs directly under the State Council. The **Chinese Academy of Sciences (CAS)** is a national center for promoting academic research in the natural sciences and high-end technology that advances China's modernization goals. It is the largest research institute in the world, featuring a dozen branches around the country, several dozen research institutes, and even two universities. It also invests in hundreds of companies that aim to commercialize basic academic research. The title of "academician" of the CAS is granted to the country's top scientists; currently, there are more than 700 Chinese academicians and over 50 foreign academicians. The **Chinese Academy of Engineering (CAE)** is like the CAS in that it is the national center for promoting research in engineering science and technology, but it is much smaller in its research operations and advises the central government and local governments on engineering-related policies and plans.

Legislative work related to science and technology issues is supervised and evaluated in the National People's Congress (NPC) by the ministerial-level **NPC Education, Science, Culture, and Public Health Committee**, which has existed since 1983. United Front work related to the science and technology sphere in the Chinese People's Political Consultative Conference (CPPCC) is overseen by the ministerial-level **CPPCC Education, Science, Health, and Sports Committee**, founded in 1988, which liaises with the scientific community and consults on related policies.

The **China Association for Science and Technology (CAST)** is a purportedly nongovernmental "people's organization" that represents China's scientists and technologists. CAST sits atop a sprawling network of provincial associations and several dozen academic and professional associations dedicated to different branches of science and technology. CAST is part of the CCP's United Front system for co-opting members of important social groups who are not party members; its purpose, according to its constitution, is to propagate party policies to and solicit policy suggestions from science and technology workers. CAST is led by a ministerial-level CCP Secretary and a President. It plays a role in recruiting foreign STEM talent to work in China, allegedly helping to facilitate illicit technology transfer.

The State Council's State-owned Assets Supervision and Administration Commission (SASAC) oversees several central SOEs that are major players in domestic and international telecommunications technology (see the "Military" and "Environment" sections for SOEs involved in those policy areas). The China Electronics Corporation and China Electronics Technology Group Corporation manufacture telecommunications equipment such as network infrastructure, integrated circuits, computers, displays, antennae, software, and other high-tech electronics; the



latter is focused on supplying electronics to the Chinese military. China Mobile, China Unicom, and China Telecom provide a variety of telecommunications services in China. China Hualu Group focuses on audio and video electronics and associated technology. Private firms such as Huawei, Lenovo, and HikVision are also important forces in technology development and often work closely with the government.

Various Chinese government agencies also operate “government guidance funds” that aim to stimulate growth in domestic high-tech industries through direct state investments and through signaling to private investors which sectors and firms are favored by Beijing. Perhaps the most famous is the roughly \$45 billion National Integrated Circuit Industry Investment Fund, also known as the “Big Fund,” which invests in major Chinese semiconductor firms. The fund is co-managed by MIIT and the Ministry of Finance, which is also its largest investor. It was recently revived following a monthslong hiatus after several fund executives were charged with corruption in their investment decisions.

Provincial leadership is also important in China’s technology governance, especially in recent years, since Xi adopted an organizational and personnel measure mirroring the deputy provincial governor arrangement previously used for financial regulation. Many provinces now have deputy governors responsible for science and technology; this is especially true for provincial-level localities with huge research and development capabilities within their geography, such as Shanghai and Guangdong. Many of those posts are held by younger officials who could become senior leaders in the coming decades.

## People

**Xi Jinping** (born June 1953) is the most influential person in China’s technology policy because of his position as General Secretary on the Politburo and its PSC. **Li Qiang**, **Cai Qi**, and **Ding Xuexiang** are also relatively influential PSC members in technology policy given their Deputy roles on the CMCDFC and likely on the new CSTC. Executive Vice Premier Ding Xuexiang is likely to be an especially important policymaker because he is the State Council executive member responsible for science and technology, education, intellectual property, the Chinese Academy of Sciences, the Chinese Academy of Engineering, and the China Association for Science and Technology. In previous administrations, these assignments were held by Vice Premiers or lower-ranked State Councilors, suggesting that Beijing has elevated its focus on building an innovation ecosystem that can withstand geopolitical competition with the West. Ding is one of Xi’s most trusted aides and brings a technocratic background to these roles—he studied mechanical engineering before working for a decade and a half at the Shanghai Research Institute for Materials. (See “Top Leadership” section for more details.)

**Zhang Guoqing** (August 1964) is the Vice Premier and Politburo member with oversight of industrial policy (MIIT), state-owned enterprises (SASAC), and nonfinancial market regulation (SAMR). The last two policy areas were previously assigned to a State Councilor; this change indicates that they are now seen as higher priorities than in the past. Zhang is a military-industrial technocrat, having studied electrical engineering and then international trade before embarking on a 26-year career at Norinco, the state-owned arms manufacturer and exporter, including a three-year stint in its Tehran office, and a string of executive roles that culminated in his appointment as General Manager. Zhang also earned a part-time doctorate in economics from Tsinghua University in the early 2000s, when Xi's former Tsinghua roommate and now outgoing CCP Organization Department head Chen Xi was the university's Party Secretary.

**Zheng Shanjie** (November 1961) is the Chairman of the NDRC. Hailing from Fujian Province, he studied chemical equipment corrosion at Nanjing Tech University. Zheng spent the first 15 years of his career at the Xiamen Cod Liver Oil Factory, where between 1982 and 1997 he rose from working in equipment maintenance to become a successful factory manager. He won promotion to district leadership roles in the city of Xiamen before serving as a top political secretary to the city leadership and as Director of the Xiamen municipal and then the Fujian provincial development and reform commission (DRC). Zheng was a factory employee in Xiamen when Xi was Deputy Mayor from 1985 to 1988 and a district-level official in Xiamen for most of Xi's tenure as Deputy Party Secretary of Fujian from 1995 to 2002. Zheng's most important political connection is likely as a protégé of Xi confidant He Lifeng, who was his predecessor at the NDRC and is now a Vice Premier. Zheng's achievements at the Xiamen Cod Liver Oil Factory in the mid-1990s would have caught the attention of local authorities, and He was a city official from 1984 to 1995 and a Deputy Mayor from 1992 to 1995. He Lifeng's return to Xiamen as Party Secretary from 2005 to 2009 made him Zheng's superior when the latter was Xiamen DRC Director. He may also have used his position on the provincial party standing committee to help Zheng win promotion to the provincial DRC in 2008. Zheng enjoyed a rapid series of promotions after Xi came to power, winning a relatively late promotion to the deputy ministerial level as a Deputy Governor of Fujian in 2015, before becoming the Director of the National Energy Administration, Deputy Director of the State Council Taiwan Affairs Office, Governor of Zhejiang, and Party Secretary of Anhui. He did all this without a seat on the CCP Central Committee, which he finally won at the 20th Party Congress before becoming the NDRC Director as one of the very few new State Council ministers appointed at the Two Sessions in March 2023.

**Liu Liehong** (October 1968) is the inaugural Director of the National Data Administration. He trained as an electronic engineer and spent his early career working in various government-affiliated electronics technology research institutes. He then held leadership roles in several state-owned electronics technology enterprises during the 2000s and 2010s. He served as a Deputy Director of the Cyberspace Administration of China from 2018 to 2020, a Deputy Minister of

Industry and Information Technology from 2020 to 2021, and Party Secretary of China Unicom from 2021 to 2023. He is a technocrat whose appointment appears to recognize the significant technical dimensions of data policymaking.

**Yin Hejun** (January 1963) is the Minister of Science and Technology. Yin is an expert on electromagnetic field theory, microwave technology, and remote sensing who has significant experience in government aerospace projects. His appointment suggests that political attention and budgets for aerospace innovation and military modernization will continue to rise, notwithstanding recent corruption scandals in the PLA. Yin earned a doctorate in electromagnetic field and microwave technology from the Institute of Electronics at the Chinese Academy of Sciences (CAS) in 1995, before embarking on a 20-year career at CAS. He served as Director of the CAS Institute of Electronics (2001-2006), Director of the CAS High Technology Research and Development Bureau (2006-2008), and a CAS Vice President (2008-2015). During this time, he also served as a Deputy Commander of the Shenzhou 7 manned space flight, which launched in 2008, where he worked closely with aerospace engineer turned Politburo member Ma Xingrui, and as a Deputy Commander of the Lunar Exploration Project during the Chang'e 3 mission, which launched in 2013, where he worked alongside current Politburo members including Ma, **Yuan Jiajun** and PLA general **Zhang Youxia**. Yin then moved into national politics with appointments as Deputy Minister of Science and Technology (2015-2017), Deputy Mayor of Beijing (2017-2018), Deputy Party Secretary of Tianjin (2018-2020), and ministerial-level CAS Vice President (2020-2023). Yin served in Beijing when top Xi ally Cai Qi was Party Secretary of Beijing and in Tianjin under the leadership of Xi supporter **Li Hongzhong**, connections that may have aided his rise to ministerial rank. **Dou Xiankang** (January 1966), a space physicist who headed Wuhan University, is a MOST Party Leadership Group member who serves as the Director of the National Natural Science Foundation of China.

**Jin Zhuanglong** (March 1964) is the Minister of Industry and Information Technology. He studied missile design at the prestigious Beihang University in Beijing, where he overlapped with Politburo member Yuan Jiajun, then studied and worked at the Shanghai Academy of Spaceflight Technology for 15 years before serving as a senior executive at the China Aerospace Science and Technology Corporation. There, he worked closely with several other members of the "aerospace gang" who have won high office under Xi, including Ma Xingrui, Yuan Jiajun, and Zhang Qingwei. Following stints at the CNSA and SASTIND, he spent 2008 to 2017 as Deputy and then Head of the Commercial Aircraft Corporation of China (COMAC) in Shanghai, where he would have worked with top Xi allies such as Ding Xuexiang, Li Xi, and Zhong Shaojun. Most recently, Jin was the ministerial-level Executive Deputy Director of the General Office of the Xi-led CMCDFC from 2017 to 2022, where he played a leading role in China's military-civil fusion policies. His appointment to lead MIIT suggests a rising focus on improving dual-use technology and upgrading the technological achievements of SOEs. Jin replaced Xiao Yaqing, a protégé of former security czar

Guo Shengkun, who was himself a protégé of top Jiang Zemin ally Zeng Qinghong; Xiao was purged in July 2022 as part of an anti-corruption purge that Xi used to crush Zeng's once-strong influence in the technology sphere. **Zhang Kejian** (July 1961), a nuclear physicist whose career focused on nuclear weapons research at the Chinese Academy of Engineering Physics, is the MIIT Deputy Minister who serves as Director of CNSA, SASTIND, CNSA, and China Atomic Energy Authority.

**Zhuang Rongwen** (February 1961) is the Director of the Cyberspace Administration of China and serves concurrently as a ministerial-level Deputy Director of the CCP Propaganda Department. He spent most of his career in his native Fujian, working as a senior bureaucrat and Deputy Director in the provincial planning commission while Xi was a Deputy Party Secretary and then Governor of the province. Zhuang overlapped in the provincial government with top Xi allies Cai Qi, Chen Wenqing, and Zheng Shanjie, but especially with Xi confidant He Lifeng, who was the Deputy Mayor of Xiamen while Zhuang was Deputy Director of an investment zone in the city. Zhuang then worked at the State Council Overseas Chinese Affairs Office in Beijing before he was tapped to serve as CAC Deputy Director in 2015 and Director in 2018, the year he began his role at the Propaganda Department.

**Luo Wen** (December 1964) is the Director of the State Administration for Market Regulation. He studied philosophy at Wuhan University and then taught at the Electronics Industry Management Cadre College, helped lead a couple of electronics SOEs, and worked variously as Deputy Director then Director of the MIIT-affiliated CCID Consulting Company and China Center for Information Industry Development between 2000 and 2015. He then moved to MIIT proper, winning promotions to MIIT Deputy Minister in 2017, NDRC Deputy Chairman in 2019, Deputy Party Secretary of Sichuan in 2020, and finally SAMR Director in 2022. Luo is a technocrat with deep expertise in the information and electronics industries. **Gan Lin** (October 1963), a veteran of the former State Administration of Industry and Commerce who is a Vice Chairman of the satellite China Zhi Gong Party, is the SAMR Deputy Director who serves as Director of the National Anti-Monopoly Bureau. **Tian Shihong** (September 1964), a policy expert who spent his entire career in the central bureaucracy focused on technical standards and regulations, is the SAMR Deputy Director who serves as Director of the Standardization Administration of China. **Shen Changyu** (June 1963), an expert on plastic molding and former President of Zhengzhou University and Dalian University of Technology, is the Director of the China National Intellectual Property Administration and sits on the SAMR Party Leadership Group.

**Cao Shumin** (July 1966) is the Director of the National Radio and Television Administration (NRTA) and a Deputy Director of the CCP Central Propaganda Department. She is the youngest female ministerial-level leader in China. A leading expert on technology and innovation, Cao earned bachelor's and master's degrees in electronic engineering from Beihang University, and then

worked as a professor at the MIIT-affiliated China Academy of Telecommunications Research. She went on to serve as the academy's Director, Director of the China Academy of Information and Communications Technology, and as a CAC Deputy Director, before her most recent promotion.

**Hou Jianguo** (October 1959) is the President of the Chinese Academy of Sciences. An acclaimed chemist, he became a CAS academician in 2003, during an illustrious career spent mostly at the prestigious University of Science and Technology of China in Anhui, where he earned his doctorate, worked as a professor, and climbed the administrative ranks to serve as President from 2008 to 2015. He then became a MOST Deputy Minister; Deputy Party Secretary of Guangxi; Party Secretary of the General Administration of Quality Supervision, Inspection and Quarantine; CAS Vice President in 2018; and then CAS President in 2020.

**Li Xiaohong** (June 1959) is the President of the Chinese Academy of Engineering. He studied the application of water jet technology to mining engineering, earning a doctorate from Chongqing University before teaching there for several years and serving as President from 2003 to 2010. Li was the President of Wuhan University from 2010 to 2016, Deputy Minister of Education from 2016 to 2017, and then Party Secretary and President of the CAE. He has been a CAE academician since 2011.

**Luo Shugang** (May 1955) is the Director of the NPC Education, Science, Culture, and Public Health Committee. Luo does not have a background in science and technology, having studied scientific socialism. He worked at the leading ideological journal *Seeking Truth* and then spent over two decades in the CCP Propaganda Department, serving as its Executive Deputy Director from 2008 to 2014 before becoming Minister of Culture and then Minister of Culture and Tourism from 2014 to 2020.

**Chen Baosheng** (May 1956) is the Director of the CPPCC Education, Science, Health, and Sports Committee. He spent most of his career as a cadre in the provincial government of his native Gansu, where he worked in proximity to Xi's PSC ally Li Xi for a couple of decades before working with him directly on the provincial party standing committee for several years during the 2000s. Chen left Gansu to become a Vice President of the CCP Central Party School (CPS) from 2008 to 2013, working directly under Xi when he was CPS President from 2007 to 2012. He was then Party Secretary of the National Academy of Governance and Minister of Education before retiring from frontline leadership in 2021.

**Wan Gang** (August 1952) is the Chairman of the China Association for Science and Technology and a member of the China Zhi Gong Party. Wan became the first noncommunist State Council minister of the post-Mao era when he was appointed Minister of Science and Technology in 2007, a position he held until 2018. He served as a CPPCC Vice Chairman from 2008 to 2023, making him a

deputy national-level official and outranking most other ministers. Wan is a mechanical engineer who studied in Germany and became a senior engineer at Audi before returning to China to pioneer new energy automobiles in the early 2000s at Tongji University in Shanghai. The role of CAST Party Secretary is currently vacant.

## Policy

Xi's third term will focus on using industrial policies and political tactics to advance technology innovation and address technological chokepoints, following a second term focused on establishing a cyber-governance regime centered around security, privacy, and competition. The high-level design of this regime is complete, but the implementation of various regulatory guidelines, plans, and standards, will continue to unfold at the working level into his third term and beyond. Digitization and the digital economy will also remain a key focus, especially in domains beyond e-commerce such as cloud computing, digital RMB, e-government, and rural digitization.

Xi's authoritative report to the 20th Party Congress in October 2022 altered the highly formulaic structure of this authoritative policy document by adding a new section dedicated to science, education, and human capital—a strong signal of the increased political priority of these areas. He introduced “Western technology chokeholds” to the top strata of challenges facing the party; said that achieving a “visible improvement in science and technology self-reliance capabilities” was a top goal for 2027; and changed one of the party's targets for “basically realizing socialist modernization” by 2035, first laid out in his report to the 19th Party Congress in October 2017, to “achieving high-level scientific and technological self-reliance.” Xi identified new growth drivers on which the government will focus its policy support: next-generation information technology, artificial intelligence, biotechnology, green industries, high-end equipment manufacturing, new energy, and new materials. This list of high-tech industries differs markedly from the consumer-oriented growth drivers identified in Xi's 2017 report.

While Xi has focused on “innovation-driven development” since the start of his leadership and announced his ambition for China to become a “science and technology superpower” as early as 2016, technology did not become central to the country's growth strategy until the publication of the 14th Five-Year Plan for Economic and Social Development (2021–2026) in March 2021. That Five-Year Plan declared that “self-reliance in science and technology” would become a “strategic pillar” of national development—stronger language than the “indigenous innovation” that China has sought to foster for many decades—with a focus on global scientific frontiers, economic battlegrounds with the West, domestic political priorities, and people's livelihoods. It introduced a new “primary target” for the “digital economy” to contribute at least 10 percent of gross domestic product by 2026, up from 7.8 percent in 2021.

Such language reflected a judgment that China must adapt its development strategy to become more self-reliant in key technology inputs given its increasingly hostile international environment. In a March 2023 speech to the Jiangsu provincial delegation at the NPC, Xi said that “the key to whether or not we can comprehensively build ourselves into socialist modern power on schedule is self-reliance and self-improvement in science and technology” and that China must “put effort into creating industrial science and technology innovation centers with global influence.” Xi has overseen a shift in thinking about the purpose of innovation, from the economic framing of the Made in China 2025 strategy in 2015, which set targets for increasing China’s global market share in several high-tech industries, to the more security-focused resilience outlined in the Five-Year Plan, which aimed to address geopolitical weak spots by improving domestic production (and demand) for critical but import-dominated tech products. The innovation-driven development pushed by the Five-Year Plan also intertwined with Xi’s broader focus on prioritizing quality over quantity in economic growth.

Xi’s greater emphasis on science and technology complements an enhanced overall focus on achieving “high-quality development”—balancing growth with social and political aims—through a “dual circulation” strategy to build a stronger domestic market on which other countries are more dependent. Some sources of growth are now deemed more favorable than others, and this view is leading Xi to influence firms and investors more actively through industrial policy and political guidance. Xi wants to build a “modern industrial system” focused on advanced manufacturing, industrial innovation, and strategic technologies, while ensuring that this system promotes consumer rights, environmental protection, and social welfare. Technology should strengthen rather than replace the “real economy,” with the expansion of digital commerce and digital finance now decidedly secondary concerns. This context is essential to understand the “crackdown” or “rectification” against online platform firms that came to define technology policy during Xi’s second term and foreshadowed how it will evolve.

In October 2020, Jack Ma, the founder of e-commerce giant Alibaba and fintech unicorn Ant Group, gave a speech at the Bund Summit in Shanghai in which he lambasted China’s banking sector and financial authorities for not understanding technology and wanting to regulate fintech. A few days later, Beijing suspended Ant Group’s planned IPO, worth an estimated \$37 billion, kicking off a two-year regulatory campaign against large consumer-facing technology firms. This campaign included major fines and punishments against most platform firms; new regulatory enforcement practices; and dozens of new guidelines and regulations aimed at anti-monopoly, fair competition, consumer protection, labor rights, personal data protection, data localization, financial security, online games, and online content. Especially significant were SAMR’s publication of the Anti-Monopoly Guidelines for the Platform Economy in February 2021 and amendments to the Anti-Monopoly Law in June 2022. Markets were shocked by what many saw as a political effort by Xi to crush the power

of the private sector, which was implemented in a manner that was often haphazard, piecemeal, and unpredictable.

But much of the campaign can be explained by a decision to stop treating the consumer technology sector as a special new industry and instead to subject it to normal regulatory conditions (with notable exceptions, such as banning for-profit tutoring and enforcing “socialist values” in online content). The sector was rife with problematic practices such as over-leveraged expansion, excessive data collection, consumer price discrimination, restrictive merchant contracts, extreme interoperability limits, and bad labor conditions. Xi judged that the health of China’s economic and social development depended on preventing the “disorderly expansion of capital,” a phrase coined by the Politburo in December 2020 to describe the anti-competitive activities of big tech firms that operate in a regulatory vacuum. But authorities had been drawing up regulatory plans for the platform economy since early in Xi’s second term. Ma’s speech accelerated and toughened a normal regulatory agenda already in motion, which was narrowly focused on consumer technology and not primarily aimed at taking down tech titans.

Beijing ended the campaign against the platform economy in January 2023, when Guo Shuqing announced that it was “basically completed,” with “normalized regulation” to follow, enabling platform firms to help the government in “leading growth, creating jobs and competing globally,” a development foreshadowed at the Central Economic Work Conference in December 2022. However, as subsequent security-related regulations and investigations of prominent executives suggest, the end of this campaign does not represent a return to the past status quo. Rather, this is the beginning of a new regulatory normal. Despite reduced political uncertainty, firms are now clearly expected to prioritize party instructions and regulatory compliance, directing more of their capital to serve national strategic interests. At the Two Sessions in March 2023, Xi told a gathering of United Front business leaders that the party treats the private sector as “our people” but that “high-quality development brings higher demands for the private economy,” as they must “implement the new development concept” and “participate in the construction of major national projects and key industrial chain supply chain projects.” Xi is not anti-tech or anti-market or anti-business, he is pro-party: in his view, markets exist to support policies, not the other way round.

While Beijing is directing more resources to the high-tech sectors flagged in Xi’s Party Congress report, China’s growth rate is continuing to slow, and Xi is increasingly keen to avoid the wasteful investment that typically accompanies new central priorities, as waves of unqualified firms pour into the favored sector to cash in on government subsidies. Xi addressed this issue with emerging industries at the Two Sessions in March 2023, when he said, “What worries me is when there is a big clamor. First everyone rushes in headlong to get involved, but then everyone scatters in an uproar. To participate in international competition, we still need to do a good job of overall



planning.” What is less clear is whether more top-level design can overcome problems created by government intervention in the first place.

Personnel appointments at the start of Xi’s third term show that his focus on scientific and technological expertise as a critical input for China to innovate itself out of the middle-income trap and out of Western chokeholds on core technologies. Xinhua reported that one of the criteria that central inspection teams used to assess candidates from government agencies for the new Central Committee was their ability to respond to US-led sanctions and promote innovation to overcome technology chokepoints. That helps explain why all seven of the provincial leaders promoted to the Politburo are technocrats—officials with an educational and professional background in STEM—which almost doubled the number of technocrats on the body (from five to eight). Aside from helping to formulate innovation policy, Xi may also view technocrats as more capable administrators and more politically dependable subordinates.

Beijing’s technology push has mixed consequences for foreign firms. Downsides include state subsidies, procurement bias, and regulatory preferences to promote domestic technology industries, but an upside is that helping Chinese firms move up the value chain requires stronger quality assurances, regulatory enforcement, and protections for intellectual property rights for all market participants. The government is also likely to offer additional incentives to attract foreign high-tech firms to establish production facilities and make other investments in China, especially those involved in advanced manufacturing.