

Advanced Rail

Aviation Equipment

Agricultural Machinery

Electrical
Equipment

MADE IN

Medical
Devices

CHINA 2025:

**GLOBAL AMBITIONS BUILT
ON LOCAL PROTECTIONS**

Robotics

High-Tech Maritime
Vessel Manufacturing

Next-Generation IT

New Materials

New-Energy
Vehicles

High-End Numerical
Control Machinery

Biomedicine



U.S. CHAMBER OF COMMERCE



**Made in China 2025:
Global Ambitions Built on Local Protections**

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The U.S. Chamber of Commerce is the world's largest business federation representing the interests of more than 3 million businesses of all sizes, sectors, and regions, as well as state and local chambers and industry associations.

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Message from the U.S. Chamber of Commerce

The U.S. Chamber of Commerce is pleased to share this report that reflects on China's implementation of the Made in China 2025 (MIC 2025) plan nearly two years after its issuance.

The U.S. Chamber of Commerce has been at the forefront of tracking and analyzing China's state-led economic development policies for more than a decade. On the basis of informed research and an abiding commitment to market-based economic principles, the Chamber has educated and advocated constructively before U.S. and Chinese policy makers regarding the intended and unintended consequences of those policies, including through a series of reports:

[*China's Drive for 'Indigenous Innovation': A Web of Industrial Policies*](#) (2010) This seminal report highlighted China's efforts to use its powerful regulatory regime to decrease reliance on foreign technology and develop indigenous technologies.

[*No Ancient Wisdom, No Followers: The Challenges of Chinese Authoritarian Capitalism*](#) (2012) Financed by the Chamber, authored by Jim McGregor, this book looked at China's changing economic system in which state companies were taking control of the domestic economy.

[*China's Approval Process for Inbound Foreign Direct Investment: Impact on Market Access, National Treatment and Transparency*](#) (2012) This report detailed China's inbound investment approval process and identified challenges for potential foreign investors.

[*Competing Interests in China's Competition Law Enforcement: China's Anti-Monopoly Law Application and the Role of Industrial Policy*](#) (2014) This report examined China's use of the Anti-Monopoly Law to advance industrial policy and boost national champions.

[*Preventing Deglobalization: An Economic and Security Argument for Free Trade and Investment in ICT*](#) (2016) The report catalogued the efforts by many countries'—including China's—to favor “domestic” products and services over “foreign” ones. It included an economic case study on China's efforts to nativize its information and



communication technology sector, which would cost the country an estimated \$3 trillion annual reduction to its GDP by 2025.

As the Chinese economy matures, the Chamber acknowledges that it is natural for China to pursue a more innovative economy through significant investments in research and development as well as policies aimed at improving innovation capacity and economic efficiency. Its latest effort, MIC 2025, extends China's innovation focus to 10 strategic sectors of its economy.

Although MIC 2025 echoes important themes of the Third Plenum Decision that call for reforming state-owned enterprises, curbing overcapacity, strengthening intellectual property rights protection, and advancing the role of the market in allocating resources across the economy, the overall plan and its implementing policies signal an evolution and intensification of China's state-led approach in many areas. The legacies of China's command economy are continuing to imbue its economic policy and hamper its complete integration into the global economy.

The U.S. and China share a highly interdependent, yet complex relationship that is critically important to both nations and the world. Our economic and commercial ties have long been the ballast of our relations. The Chamber and our members remain firmly committed to mutually beneficial engagements that support the economies of both countries. Plans like MIC 2025 and their implementation are putting the two economies on a path of separation rather than integration in critical commercial areas. In other areas, MIC 2025 and related policies appear to embrace the global economy as a means to expand the market share of indigenous companies globally. At a time of uncertainty in bilateral relations, it is important for the United States and China to increase positive-sum economic integration, particularly amidst a slowdown in China's growth, as well as ongoing geoeconomic and geopolitical instabilities.

The Chamber hopes that this report helps to inform stakeholders on both sides about the mounting concerns of American business with plans like MIC 2025. We also hope that it will stimulate discussion regarding near-term solutions that can reduce frictions in economic and commercial relations, limit barriers to investment in a manner that contributes to the

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development of both countries, and promote market reforms in China and competitive markets globally.

The Chamber believes strongly in market-based approaches to economic development, including the benefits to the U.S. economy from high-standard trade agreements and strong inflows of foreign direct investment. However, there are growing voices in the United States calling for alternative policy approaches to respond to restrictions on American companies abroad and growing market distortions globally. The Chamber believes proactive, near-term steps by China to kick-start market reforms, liberalize its investment regime, and reduce subsidies and other distortions in the domestic economy would help to strengthen ties at an important moment in bilateral relations.



Executive Summary

MIC 2025 is a ten-year, comprehensive blueprint aimed at transforming China into an advanced manufacturing leader. In a broad sense, MIC 2025 targets ten strategic industries—including next generation information technology, aviation, rail, new energy vehicles, and agricultural machinery—critical to economic competitiveness and growth in the 21st century. These industries constitute nearly 40 percent of China’s entire industrial value-added manufacturing, according to Rhodium Group analysis.¹

Unlike other countries’ manufacturing plans, such as Germany Industry 4.0, MIC 2025 appears to provide preferential access to capital to domestic companies in order to promote their indigenous research and development capabilities, support their ability to acquire technology from abroad, and enhance their overall competitiveness. In concert with the 13th Five-Year Plan, Internet Plus Action Plan, and other state-led development plans, MIC 2025 constitutes a broader strategy to use state resources to alter and create comparative advantage in these sectors on a global scale.

While MIC 2025 echoes market-oriented principles and themes from China’s Third Plenum Decision document, it has yet to tangibly expand the market’s role in the economy. Instead, implementation of MIC 2025 is proceeding on a path that builds on the policy themes and goals of past industrial policies and plans.² In particular, the MIC 2025 implementation roadmap is notable for:

- (1) **Reinforcing government control of the commanding heights.** Contrary to key elements of the Third Plenum Decision, in which the Chinese leadership called for markets to play a decisive role in the allocation of resources across the economy,³ MIC 2025 instead appears to reaffirm the government’s central role in economic planning. It also establishes an inter-ministerial leading small group, headed by Vice Premier Ma Kai, to ensure coordination and implementation.

¹ Rosen, D. (February 24, 2017). Email.

² Notable plans include the Medium to Long Term Science and Technology Plan, Project 863, China Mega Projects, the National Informatization Development Strategy, and the Strategic and Emerging Industries Plan.

³ 关于全面深化改革若干重点问题的决定 [Decision on Comprehensively Deepening Reform on Several Major Problems] (CCP, November 15, 2013) <http://cpc.people.com.cn/n/2013/1115/c64094-23559163.html>

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- (2) **Intensifying preferential policies and financial support.** MIC 2025 illustrates the state's intent to leverage China's legal and regulatory systems to favor domestic Chinese companies over foreign ones in targeted sectors. Perhaps most significantly, MIC 2025 industries will likely receive hundreds of billions of RMB in government support over the coming years that could substantially distort domestic and global markets. Such support may be used not only to invest in local innovation, but also to fund foreign technology acquisitions. State-backed support for acquisition of specific technologies represents a new feature and natural extension of China's industrial policy.
- (3) **Setting global benchmarks.** MIC 2025 arguably represents the latest far-reaching industrial policy on a continuum of such policies to develop not only national champions but global champions. Policy documents associated with MIC 2025 set explicit global sales growth and market share targets that are to be filled by "domestic products."

MIC 2025 raises significant concerns not only for China's domestic economy but its economic partners. MIC 2025 aims to leverage the power of the state to alter competitive dynamics in global markets in industries core to economic competitiveness. By targeting and channeling capital to specific technologies and industries, MIC 2025 risks precipitating market inefficiencies and sparking overcapacity, globally. As a result monitoring and forecasting how these policies impact critical sectors of the global economy and distort certain markets will be critical to formulating appropriate policy responses.

Speaking on China's policies for semiconductors, a MIC 2025 sector, at the Center for Strategic and International Studies in September 2016, then U.S. Secretary of Commerce Penny Pritzker highlighted the challenge:

Let me state the obvious: this unprecedented state-driven interference would distort the market and undermine the innovation ecosystem. The world has seen the effects of this type of targeted, government-led interference before...The result has been overcapacity in



the global marketplace that has artificially reduced prices, cost jobs in both the U.S. and around the world, and caused significant damage to those industries globally.⁴

The approach of MIC 2025 and related policies appears inconsistent with China's Third Plenum goals. MIC 2025 also strikes a discordant note to President Xi Jinping's speech at Davos in February 2017, in which he signaled China's strong support for globalization and open trade and investment. China's industrial policies, Internet and data legal and regulatory frameworks, and inward foreign direct investment regime (the most restrictive among all G20 economies)⁵ regrettably suggest limited support for globalization and competitive markets.

Indeed, China's emerging legal and regulatory frameworks governing information technology pose serious challenges for global connectivity. Cloud computing and other digital technologies that require a seamless flow of data are already changing the nature of numerous industries, including manufacturing. Yet Chinese efforts to exert greater control over where commercial data is stored and how it is transferred are skewing the decision-making process for companies that must decide where products are made and innovation takes place.

This approach is contributing to frictions in China's relations with its commercial partners. Many of the challenges associated with China's industrial policies—for example, government procurement, subsidies, data, licensing, and national security—would unlikely be effectively addressed through an investment treaty or agreement given the architectural limitations of such agreements. To ensure the continued healthy development of trade and investment relations, MIC 2025 and related Chinese state-led economic development policies should be top of the agenda in future government-to-government economic and commercial discussions with China.

⁴ "U.S. Secretary of Commerce Penny Pritzker Delivers Major Policy Address on Semiconductors at Center for Strategic and International Studies" (CSIS, November 2, 2016) <https://www.commerce.gov/news/secretary-speeches/2016/11/us-secretary-commerce-penny-pritzker-delivers-major-policy-address>

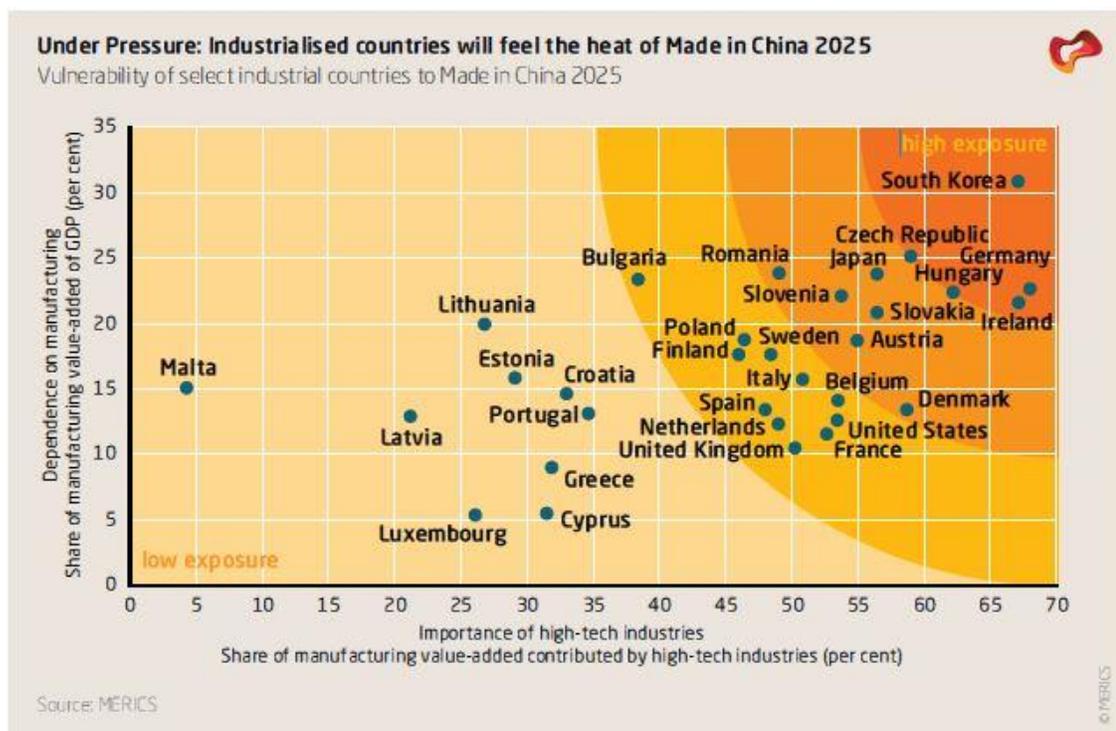
⁵ OECD FDI Regulatory Index, <http://www.oecd.org/investment/fdiindex.htm>

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I. Overview of Made in China 2025

The Made in China 2025 Plan (MIC 2025) is a high-level industrial policy aimed at transforming China into a global manufacturing leader. Promoting indigenous innovation, domestic brands, secure and controllable standards, and localization of production and data appear to be central components of the plan.

MIC 2025 and subsequent policy documents advance objectives that have the potential to significantly alter the domestic and global competitive landscape in targeted sectors. These objectives are creating frictions in China's relations with its commercial partners, particularly countries that depend on manufacturing and high-tech industries.



Source: Jost Wübbeke, Mirjam Meissner, Max J. Zenglein, Jaqueline Ives, and Björn Conrad, "Made in China 2025: The making of a high-tech superpower and consequences for industrial companies" (Mercator Institute for China Studies, December 2016) <https://www.merics.org/en/about-us/merics-analysis/papers-on-china/made-in-china-2025/>



A. Background

In 2013 the Chinese Academy of Engineering (CAE), a think tank with ministerial-level rank, and the Ministry of Industry and Information Technology (MIIT) launched research into China's Manufacturing Power Strategy. Zhou Qi, CAE president, and Zhu Gaofeng, a CAE scholar, lead a group of 50 scholars and over 100 experts in the research project. In January 2014, Vice Premier Ma Kai expressed his full support for the research project, and urged CAE and MIIT to quickly formulate MIC 2025.⁶

In May 2015 the State Council officially released MIC 2025, which identifies ten priority sectors:

- Next-generation information technology;
- High-end numerical control machinery and robotics;
- Aerospace and aviation equipment;
- Maritime engineering equipment and high-tech maritime vessel manufacturing;
- Advanced rail equipment;
- Energy-saving and new energy vehicles;
- Electrical equipment;
- New materials;
- Biomedicine and high-performance medical devices; and
- Agricultural machinery and equipment

These industries constitute nearly 40 percent of China's entire industrial value-added manufacturing, according to Rhodium Group analysis.⁷ MIC 2025 identifies several industries—including large aircraft, aircraft engines, new energy vehicles, smart grids, and high-end medical devices—as areas to improve indigenous research and development (R&D).⁸ It calls for doubling self-sufficiency rates for core infrastructure components and key

⁶ "Made in China 2025 a Series of Research Accomplishments Released," (Chinese Academy of Engineering, June 17, 2016) http://www.cae.cn/cae/html/main/col76/2016-06/17/20160617165537858319768_1.html

⁷ Rosen, D. (2017, February 24). Email.

⁸ 中国制造 2025 [Made in China 2025] (State Council, May 8, 2015) http://www.gov.cn/zhengce/content/2015-05/19/content_9784.htm

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infrastructure materials.⁹ Furthermore, it sets a goal to achieve significant growth in market share of indigenous intellectual property (IP) for high-value equipment.¹⁰

Several sections of the initial MIC 2025 plan echo principles and themes from China's Third Plenum Decision document. For example, MIC 2025 calls for “deepening comprehensive reform, fully exhibiting the decisive role of the market in the allocation of resources”, “perfecting a system in which the market mainly decides prices”, and “effectively resolving the contradictions in overcapacity.”¹¹ However, similar to the Third Plenum Decision, these aspirations have not been accompanied by forward movement on reforms. Indeed, in certain areas, market-oriented reforms have slowed or even reversed.¹²

Following MIC 2025's formal issuance, the National Advisory Committee on Building a Manufacturing Power Strategy,¹³ with input from 48 academics and over 400 specialists and high-ranking industry representatives, led work on an implementation plan that culminated in the “*Made in China 2025 Major Technical Roadmap*,” or Green Book (See Appendix 3 for Chamber analysis).¹⁴

The Green Book advances explicit industrial policy goals, setting growth and market share targets for strategic sectors and technologies that are to be filled by domestic production.

⁹ *Id.*

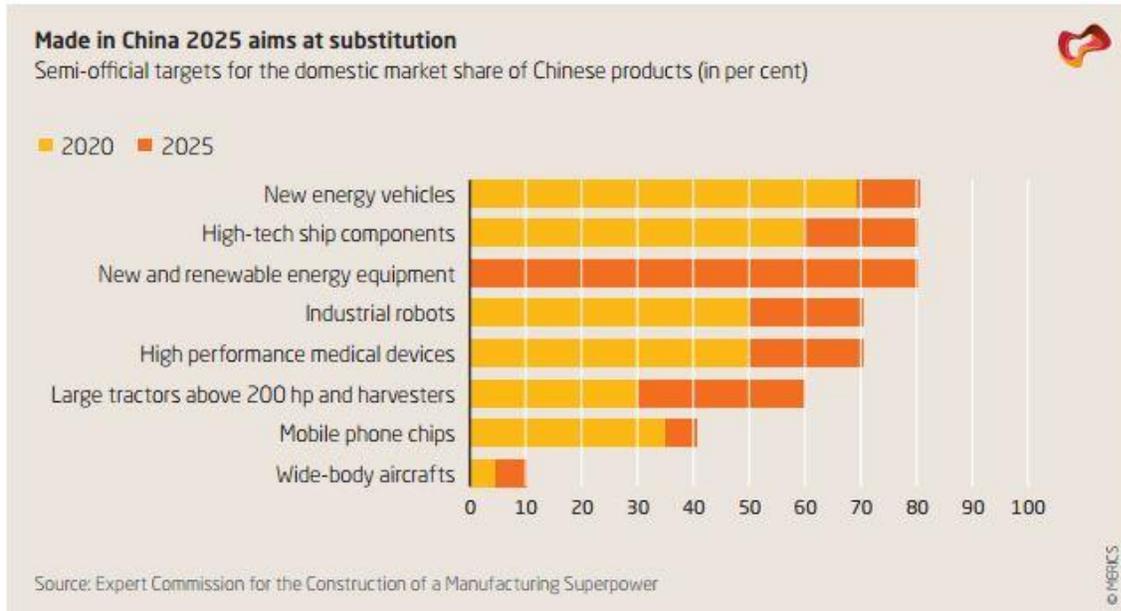
¹⁰ *Id.*

¹¹ *Id.*

¹² “Business Climate Survey,” (American Chamber of Commerce, January 2017) <http://www.amchamchina.org/policy-advocacy/business-climate-survey/>

¹³ The National Advisory Committee on Building a Manufacturing Power Strategy was created in August 2015. Vice Premier Ma Kai attended the opening ceremony and delivered a speech. The group was established to advance MIC 2025, participate in research for MIC 2025-related policies, and formulate the Green Book.

¹⁴ National Advisory Committee on Building a Manufacturing Power Strategy, “Made in China 2025 Major Technical Roadmap,” <http://www.cae.cn/cae/html/files/2015-10/29/20151029105822561730637.pdf>



Source: Jost Wübbeke, Mirjam Meissner, Max J. Zenglein, Jaqueline Ives, and Björn Conrad, “Made in China 2025: The making of a high-tech superpower and consequences for industrial companies” (Mercator Institute for China Studies, December 2016) <https://www.merics.org/en/about-us/merics-analysis/papers-on-china/made-in-china-2025/>

This suggests that Chinese companies will likely follow the visible hand of the Green Book, rather than operate according to the invisible hand of the market. The definition of domestic production is not made clear, though subsequent industry-specific policies suggest that it excludes foreign companies that manufacture entirely in China.

For each major industry area and subsector, the Green Book provides detailed information and guidance on a variety of issues, including:

- An overview of the current domestic and international market demand;
- Chinese development and localization targets for 2020 and 2025;
- Key products and critical technologies for development in that area;
- Application and demonstration projects; and
- Strategic support and guarantees

The Chinese government has stated that the Green Book—and its targets—are non-binding. Nevertheless, government officials, including Vice Premier Ma Kai, have publicly endorsed the

approaches and direction in the Green Book.¹⁵ Like other normative documents, the Green Book signals the central government's priorities and objectives.

B. Key Objectives

China's chief strategic objective, as espoused in MIC 2025 and related plans, is to become a global leader in manufacturing high-quality and high-technology products. A careful analysis of MIC 2025 and related policies suggests that China is attempting to employ a multi-step process to achieve its objectives:

Localize & Indigenize MIC 2025 aims to indigenize R&D and control segments of global supply chains.¹⁶ Indigenous innovation is a core theme coursing throughout MIC 2025 and subsequent implementing regulations. MIC 2025 strongly supports Chinese companies in their efforts to develop indigenous technology, IP, and brands.

Substitute Once dependence on foreign technology has been reduced, either by developing it indigenously or acquiring it overseas, MIC 2025 and related plans call for substitution as a strategic imperative. Indeed, President Xi has called for the advancement of domestic production and indigenous and controllable substitution plans.¹⁷

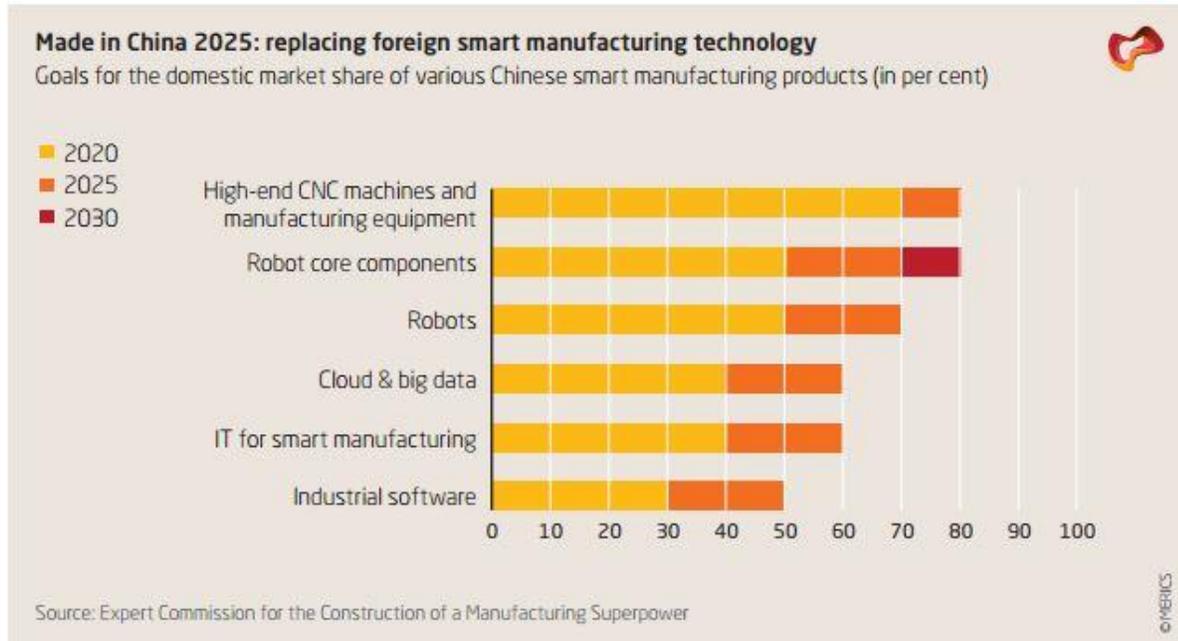
Capture Global Market Share After developing or acquiring its own technology and brands, China aims to capture domestic and international market share across MIC 2025 industries and technologies.¹⁸

¹⁵ Hao Yan, "New-energy vehicles to get renewed push," (China Daily, September 9, 2015), http://www.chinadaily.com.cn/business/motoring/2015-09/30/content_22017079.htm

¹⁶ Jost Wübbeke, Mirjam Meissner, Max J. Zenglein, Jaqueline Ives, and Björn Conrad, "Made in China 2025: The making of a high-tech superpower and consequences for industrial companies" (Mercator Institute for China Studies, December 2016) <https://www.merics.org/en/about-us/merics-analysis/papers-on-china/made-in-china-2025/>

¹⁷ 习近平在中共中央政治局第三十六次集体学习时强调加快推进网络信息技术自主创新朝着建设网络强国目标不懈努力 [Xi Jinping at the 36th Collective Study Session of the CCP Central Committee Politburo Stressed Speeding Up the Promotion of Indigenously Innovated Network Information Technologies toward Unrelenting Effort to Establish the Internet Power Goals] (October 9, 2016) http://news.xinhuanet.com/politics/2016-10/09/c_1119682204.htm

¹⁸ "Made in China 2025 Major Technical Roadmap," (National Advisory Committee on Building a Manufacturing Power Strategy, October 2015) <http://www.cae.cn/cae/html/files/2015-10/29/20151029105822561730637.pdf>



Source: Jost Wübbeke, Mirjam Meissner, Max J. Zenglein, Jaqueline Ives, and Björn Conrad, “Made in China 2025: The making of a high-tech superpower and consequences for industrial companies” (Mercator Institute for China Studies, December 2016) <https://www.merics.org/en/about-us/merics-analysis/papers-on-china/made-in-china-2025/>

Myriad policy explanations and statements from government meetings reveal aspects of these three objectives. A non-comprehensive, but illustrative set of examples includes:

Advanced Manufactured Consumer Goods and Inputs The *MIC 2025 Explanation: Strengthening Quality and Brand Construction* calls for indigenous brands to control over 80 percent of the domestic market for several consumer goods, including TVs, air conditioners, and refrigerators.¹⁹ Further, it calls for self-sufficiency rates to reach 80 percent for machinery and fine chemicals, 90 percent for ethylene, and 100 percent for most steel products.²⁰

Robotics The *Robotic Industry Development Plan (2016-2020)* sets an annual production target of 100,000 indigenously branded industrial robots by 2020.²¹ Furthermore, a

¹⁹ 《中国制造 2025》解读之：加强质量和品牌建设 [The MIC 2025 Explanation: Strengthening Quality and Brand Construction] (MIIT, June 29, 2015) <http://qys.miit.gov.cn/n11293472/n11293877/n16553775/n16553822/16680725.html>

²⁰ *Id.*

²¹ 机器人产业发展规划（2016-2020年）[Robotic Industry Development Plan (2016-2020)] (NDRC, April 27, 2016) http://www.ndrc.gov.cn/zcfb/zcfbghwb/201604/t20160427_799898.html

guiding ideology is to raise the core competitiveness of indigenous brands in the robotics industry.²²

Smart Manufacturing A priority task in the *Guangdong Province Plan for the Development of Smart Manufacturing (2015-2025)* is to establish a smart manufacturing indigenous innovation system.²³ It further calls for technologies, products, and services with indigenous IP to increase international market share, and for the creation of a batch of international Chinese companies to grasp core and critical technology.²⁴ In addition to Guangdong, other provincial and local governments, such as Changsha (see page 21), are issuing similar plans.

Medical Devices The Minister of MIIT, Miao Wei, and the Chair of the National Health and Family Planning Commission (NHFPC), Li Bin, signed a cooperative agreement for the two ministries to research and develop locally-produced medical devices and advance indigenous innovation capabilities.²⁵ Li Bin emphasized using policies and guiding funds for health institutions to participate in the research, innovation, and application of domestically produced medical devices.²⁶ Furthermore, an incentive mechanism will be established for medical and health organizations to use domestically produced medical devices.²⁷

C. Interface with 13th Five-Year Plan and Other Development Strategies

MIC 2025 and the Green Book appear to be part of an evolutionary effort in China to advance indigenous innovation and build global champions through linkages with other plans. The

²² *Id.*

²³ 广东省智能制造发展规划（2015-2025年）[Guangdong Province Plan for the Development of Smart Manufacturing (2015-2025)] (Guangdong Provincial Government, July 23, 2015) http://zwgk.gd.gov.cn/006939748/201507/t20150729_595930.html

²⁴ *Id.*

²⁵ 两部委联合召开推进国产医疗设备发展应用座谈会并签署合作协议 [Two Ministries Jointly Convene a Forum and Sign a Cooperation Agreement to Promote the Development and Application of Domestically Produced Medical Equipment] (September 1, 2015) <http://www.miit.gov.cn/n1146290/n1146402/n1146435/c3882165/content.html>

²⁶ *Id.*

²⁷ *Id.*



themes and objectives in China’s national and local plans and industry development outlines largely overlap with MIC 2025, serving to complement and support the overarching policy direction for China’s broader innovation and development strategy as articulated in MIC 2025.

National Plans

Concurrent to MIC 2025, China is implementing its 13th Five-Year Plan (FYP) and industry specific FYPs over the 2016-2020 period. These FYPs complement MIC 2025 in highlighting the critical importance to the government’s leadership in advancing indigenous innovation, achieving technological self-sufficiency, reaching a secure and controllable standard, and expanding the state’s role in the market. The FYPs also prioritize sectors and technologies that largely overlap with MIC 2025.²⁸ Indeed, several MIC 2025 industries—including next generation IT, aviation, and new materials—are included in the most recent Strategic and Emerging Industry Guiding Catalogue.²⁹

Moreover, MIC 2025 shares similar goals with the Internet Plus Action Plan, another high-level national industrial plan. Internet Plus aims to digitize China’s economy and society, and promote a number of technologies—including cloud computing, big data, e-commerce, and Internet of Things (IoT)—that will feature prominently in the future development of MIC 2025 industries.³⁰

Industry Outlines

China’s innovation and science and technology (S&T) policies, plans, and official speeches also promote similar themes and objectives to MIC 2025. The *National Innovation-Driven Development Strategy Outline* (the Strategy Outline), issued by the Central Committee of the Communist Party and the State Council on May 19, 2016, seemingly underscores China's state-led approach to leverage the power of the state to centralize resources and achieve technological

²⁸ Scott Kennedy and Christopher K. Johnson, “Perfecting China, Inc. The 13th Five-Year Plan,” (CSIS, May 2016) https://csis-prod.s3.amazonaws.com/s3fs-public/publication/160521_Kennedy_PerfectingChinaInc_Web.pdf

²⁹ 战略性新兴产业重点产品和服务指导目录 [Guiding Catalogue for Major Products and Services in Strategic and Emerging Industries] (NDRC, January 2017) http://www.sdpc.gov.cn/gzdt/201702/t20170204_837246.html

³⁰ 国务院关于积极推进“互联网+”行动的指导意见 [Guiding Opinions on the Internet Plus Action Plan] (State Council, July 4, 2015) http://www.gov.cn/zhengce/content/2015-07/04/content_10002.htm

breakthroughs.³¹ The Strategy Outline notes that China’s strategic goal of becoming an innovation power will be achieved by building an industry and technology system that is globally competitive, indigenous, and controllable.³²

As a guiding principle, the Strategy Outline calls for China to continue down its special indigenous innovation path.³³ Underlying China’s pursuit of indigenous innovation is a concern that China relies on other countries for critical technology even though some of these industries apparently lack a substantial nexus to national security as normally defined. President Xi Jinping has said the country faces a major S&T bottleneck and a wide innovation gap compared to advanced countries.³⁴ These gaps include:

- Lacking self-sufficiency in critical high-end materials;³⁵
- Relying mainly on imports for high-end medical devices; and
- Depending on foreign companies for the vast majority of patented pharmaceutical drugs

II. Achieving MIC 2025 Goals

To achieve MIC 2025 goals China is likely to use a variety of tools, including providing access to cheap capital and subsidies, employing a range of regulatory levers, and awarding preferential treatment to domestic Chinese companies.

A. Financial Policies, Funds, and Subsidies

Unlike other countries’ manufacturing plans, such as Germany Industry 4.0, MIC 2025 appears to provide preferential access to capital to domestic companies in order to promote their

³¹ 国家创新驱动发展战略纲要 [The National Innovation-Driven Development Strategy Outline] (China Communist Party Central Committee and State Council, May 19, 2016), (“the Strategy Outline”) http://www.gov.cn/zhengce/2016-05/19/content_5074812.htm

³² *Id.*

³³ *Id.*

³⁴ 为建设世界科技强国而奋斗——在全国科技创新大会、两院院士大会、中国科协第九次全国代表大会上的讲话 [Struggle to Build a Science and Technology Power—Speech at the National Science and Technology Innovation Conference, the Biennial Conference of the Country’s Two Top Think Thanks, the Chinese Academy of Sciences and Chinese Academy of Engineering, and the National Conference of the China Association for Science and Technology] (May 30, 2016) http://news.xinhuanet.com/politics/2016-05/31/c_1118965169.htm

³⁵ The State Council established a National New Materials Industry Development Leading Small Group on December 23, 2016. The group was formed to implement China’s Manufacturing Power Strategy. Vice Premier Ma Kai chairs the group, which is housed within MIIT. http://www.gov.cn/zhengce/content/2016-12/28/content_5153721.htm



indigenous R&D capabilities, enhance their competitiveness, and support their ability to acquire technology from abroad.

China is issuing financial policies to provide full-scale support to MIC 2025. For example, the *Several Opinions on Finance to Support Industry Stable Growth, Restructuring, and Improving Profit*, issued by seven ministries and the People's Bank of China on February 16, 2016, encourages banks to provide financial support to develop indigenous brands and increase export credit insurance for indigenous IP and strategic and emerging industries.³⁶

In addition, a number of large-scale state-directed or quasi-government funds are being established at the central and local level to support R&D into indigenous technology. According to Chinese media reports, nearly 800 state-guided funds with a total value of RMB 2.2 trillion have already been established to support various initiatives and industries, including a significant portion for industries tied to MIC 2025.³⁷ (A non-exhaustive list of larger funds to support MIC 2025 is included in Appendix 2.)

China's subsidy policies not only enhance the competitiveness of domestic companies at home, but also help to augment their competitiveness in global markets. As a non-signatory to the Organization for Economic Co-operation and Development (OECD), China is able to offer financing terms that are highly competitive compared with its OECD counterparts.³⁸

³⁶关于金融支持工业稳增长调结构增效益的若干意见 [The Several Opinions on Finance to Support Industry Stable Growth, Restructuring, and Improving Profit] (PBoC, NDRC, MIIT, MOF, MOFCOM, CBRC, CSRC, CIRC, February 16, 2016) http://www.gov.cn/xinwen/2016-02/16/content_5041671.htm

³⁷ “两万亿元引导基金蓄势待发” [Two Trillion Yuan Guiding Funds Ready to Go] (Xinhua News, April 7, 2016) http://bj.xinhuanet.com/hbpd/jrpd/jrpd/2016-04/07/c_1118555182.htm

³⁸ Handel Lee, Liu Zhigang, and Thomas Coles, “Out of China: The activities of China's export credit agencies and development banks in Africa,” (King & Wood Mallesons, July 23, 2014) <http://www.kwm.com/en/uk/knowledge/insights/out-of-china-the-activities-of-chinas-export-credit-agencies-and-development-banks-in-africa-20160101>

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Semiconductors, agricultural equipment, smart manufacturing, and electric batteries offer representative examples of how China is using such funds and subsidies to support specific industries:

Semiconductors: The Chinese government is marshaling public and private funds to develop its semiconductor industry.³⁹ In 2014 China’s State Council released the *Guidelines to Promote National Integrated Circuit Industry Development* (The IC Plan).⁴⁰ The IC Plan sets specific targets to develop the entire semiconductor industry ecosystem. In addition to promoting “secure and controllable” and other indigenization efforts, the IC plan sets up an Integrated Circuit Fund (IC Fund) and encourages the establishment of local funds to financially support IC industry development. According to the Green Book the IC Fund will be expanded to support domestic market share targets. The IC Fund is ostensibly privately controlled; however, its links to government agencies—including the fact that the IC Fund is led by the former head of the MIIT’s Bureau for information and communication technology (ICT) and is backed by China Tobacco, China Mobile, and other state-owned companies⁴¹—raises concerns about its independence.

The Chinese government plans to use these local and national funds to spend as much as \$161 billion over 10 years to develop chips through M&A and investment,⁴² of which nearly \$50 billion has already been raised.⁴³ Recently, a semiconductor fund set up in Beijing’s Zhongguancun district provided monetary support to Chinese smartphone

³⁹ “Preventing Deglobalization: An Economic and Security Argument for Free Trade and Investment in ICT,” (U.S. Chamber of Commerce, September 2016)

https://www.uschamber.com/sites/default/files/documents/files/preventing_deglocalization_1.pdf

⁴⁰ 国家集成电路产业发展推进纲要 [Guidelines to Promote National Integrated Circuit Industry Development] (State Council, June 26, 2014) http://www.gov.cn/xinwen/2014-06/24/content_2707360.htm

⁴¹ Li Dongmei, “China Integrated Circuit Industry Investment Fund Lends \$47 million Round in Centec Networks” (China Money Network, September 22, 2016) <https://www.chinamoneynetwork.com/2016/09/22/china-integrated-circuit-industry-investment-fund-leads-47m-round-in-centec-networks>

⁴² Ian King, “China Has Big Plans for Homegrown Chips,” (Bloomberg, June 25, 2015)

<https://www.bloomberg.com/news/articles/2015-06-25/china-has-big-plans-for-homegrown-chips>

⁴³ Jimmy Goodrich, “China’s 13th Five-Year Plan Opportunities & Challenges For the U.S. Semiconductor Industry,” (Written Testimony Prepared for the U.S.-China Economic & Security Review Commission April 27, 2016)

http://www.uscc.gov/sites/default/files/Jimmy%20Goodrich_Written%20Testimony%20042716.pdf



maker Xiaomi to develop the company’s first smartphone processor.⁴⁴ Xiaomi did not disclose how much financial support the government provided to develop the chip—which in total cost at least RMB 1 billion—but it underscored that the government’s “warmth,” in addition to money, was important.⁴⁵

Agricultural Equipment: MIIT planning documents related to MIC 2025 call for domestically-produced agricultural machinery components to reach 90 percent market share by 2025.⁴⁶ In the *Agricultural Machinery Development Action Plan (2016-2025)*, released by MIIT, the Ministry of Agriculture, and the National Development and Reform Commission (NDRC) in December 2016, China calls for the self-sufficiency rate for critical parts and components to reach 50 percent and 70 percent in 2020 and 2025 respectively.⁴⁷ The plan also aims to have 2-3 famous brands for critical parts and components, and 3-5 internationally competitive agricultural machinery companies.⁴⁸ Notably, the finalized plan removed discriminatory incentives for purchases of indigenous branded products, which appeared in earlier drafts. Previously, the Chinese government—at both the central and local level—has used subsidies and other forms of funding to support indigenous agricultural machinery manufacturers and procurers. For example, in some provinces customers who purchased indigenous brands equipped with certain technologies received subsidies from the government. Indigenous manufacturers also received significant funding—through government-backed, local industry funds—to improve their R&D and technological capabilities. It will be important to continue monitoring these issues to ensure local and provincial governments create a level playing field for all companies, regardless of nationality.

⁴⁴ Eva Dou, “Xiaomi Launches Its Own Chip, With an Assist From Beijing,” (Wall Street Journal, February 28, 2017) <https://www.wsj.com/articles/xiaomi-launches-its-own-chip-with-an-assist-from-beijing-1488281629>

⁴⁵ *Id.*

⁴⁶ 中国制造 2025 解毒之：农业机械装备领域 [Made in China 2025 explanation: Agricultural Machinery Area] (MIIT, May 22, 2015) <http://qys.miit.gov.cn/n11293472/n11293877/n16553775/n16553822/16633904.html>

⁴⁷ 农机装备发展行动方案（2016-2025） [Agricultural Machinery Development Action Plan (2016-2025)] (MIIT, Ministry of Agriculture, and NDRC, December 2016)

<http://www.miit.gov.cn/n1146295/n1652858/n1652930/n3757018/c5433686/content.html>

⁴⁸ *Id.*

Smart Manufacturing: Local governments are also directing subsidies toward smart manufacturing. Changsha, for example, has announced plans to provide financial support to companies that produce smart equipment incorporating their own indigenous IP.⁴⁹ Subsidies will be given to companies with either indigenous IP for critical components or that have a localization rate exceeding 60 percent.⁵⁰

Electric Batteries: China has used subsidies and restrictions on access to raw materials to help create inroads for Chinese companies in the electric battery market.⁵¹ China issued draft Guidelines in 2016 to provide subsidies for electric battery manufacturers with production capacity above 8 GWh—a target only Chinese domestic companies were able to meet.⁵² Subsidies, which can account for more than 50 percent of the cost of batteries, are often aimed at companies—instead of consumers—to help ensure the short-term feasibility of producing specific technologies.⁵³

To help channel investment into preferred MIC 2025 projects, the Chinese government is creating project libraries. In April 2016, MIIT released a *Notice on Launching Made in China 2025 Major Project Library Collection* to help implement MIC 2025 and promote investment into industry and information areas.⁵⁴ The libraries are divided into three types of investment projects: major construction and major technological remodeling projects; next generation information infrastructure projects; and industry and communication companies “going out” projects.⁵⁵ Projects that are included in the library will receive preferential—primarily financial—support.⁵⁶ Projects in the “going out” category will, in addition to financial support,

⁴⁹ 长沙智能制造三年（2015-2018年）行动计划 [Changsha Smart Manufacturing Three-Year (2015-2018) Action Plan] (Changsha People’s Government, July 29, 2015) <http://www.nxjx.gov.cn/index.php?m=Index&a=article&id=184>

⁵⁰ *Id.*

⁵¹ Henry Sanderson, Tom Hancock, and Leo Lewis, “Electric cars: China’s battle for the battery market,” (Financial Times, March 5, 2017) <https://www.ft.com/content/8c94a2f6-fdcd-11e6-8d8e-a5e3738f9ae4>

⁵² *Id.*

⁵³ Anjani Trivedi, “In Trump’s China, Industrial Subsidies Loom Large,” (Wall Street Journal, November 16, 2016) <https://www.wsj.com/articles/in-trumps-china-industrial-subsidies-loom-large-1479270824>

⁵⁴ 关于开展中国制造 2025 重点项目库征集工作的通知 [Notice on Launching Made in China 2025 Major Project Library Collection Work] (MIIT, April 1, 2016) Smart Manufacturing Comprehensive Standardization and a New Form of Using a Major Project Library] (MIIT, January 13, 2017)

<http://www.miit.gov.cn/n1146285/n1146352/n3054355/n3057267/n3057272/c4692134/content.html>

⁵⁵ *Id.*

⁵⁶ *Id.*



also receive diplomatic support.⁵⁷ Central-level MIIT is responsible for creating the project library, but local-level IIT bureaus and relevant SOEs are responsible for implementing the project libraries.⁵⁸ Assigning responsibilities to SOEs raises concerns about potential conflicts of interest, and highlights the multifaceted role the state will play in supporting MIC 2025 industries. The criteria to be included into the project library are also vague. *The Industry and Information Investment Project* form requires companies to disclose the source of their technology as indigenously developed technology, imported technology, industry/academic/research cooperation technology, or acquired foreign technology.⁵⁹ The Notice provides no details on why this information is required and how it will impact project selection.

1. *Overseas Investment*

In several MIC 2025 sectors, the technological gap between domestic and foreign competitors is significant, and closing that gap would require extended timelines and high levels of financial commitment that could stress budgets. To accelerate the learning process, the state appears to be supporting acquisition strategies of Chinese state-owned and state-supported companies tied to MIC 2025 priority sectors.

State-led or state-directed investment is most notable in the ICT industry. Before the IC Plan was announced in June 2014, China's outbound investment in the semiconductor industry never exceeded \$1 billion.⁶⁰ By 2015, Chinese companies announced takeover offers worth \$35 billion.⁶¹ The IC Plan illustrates how industrial policy can influence Chinese companies' investment decisions. Rhodium Group notes that the IC Plan is "the clearest example of the nexus between strategic high-tech policy and outbound investment in today's China."⁶²

⁵⁷ *Id.*

⁵⁸ *Id.*

⁵⁹ *Id.*

⁶⁰ Thilo Hanemann and Daniel H. Rosen, "Chinese Investment in the United States: Recent Trends and the Policy Agenda," (Rhodium Group, December 2016)

[http://origin.www.uscc.gov/sites/default/files/Research/Chinese Investment in the United States Rhodium.pdf](http://origin.www.uscc.gov/sites/default/files/Research/Chinese%20Investment%20in%20the%20United%20States%20Rhodium.pdf)

⁶¹ *Id.*

⁶² *Id.*

Apex Acquisition of Lexmark

Acquisition by the Apex Technology Co., a Chinese investment consortium, of Lexmark International, a U.S. computer-printer maker, demonstrates how the IC Fund is cooperating with Chinese companies to support overarching government policy goals. In December 2016, the IC Fund invested RMB 500 million (\$72 million) to buy a 4.29 percent stake in Apex, making it the third largest investor.⁶³ According to investor relations forms which are no longer publicly available, the IC Fund cooperated with Apex not only as a financial investor, but also in the hope that Apex would carry out China's national strategy. In April 2016, roughly four months after the IC Fund's investment, Apex acquired Lexmark International in an all-cash deal worth \$3.6 billion, representing a 17 percent premium on Lexmark's closing share price as of the day of the announcement.⁶⁴ Prior to the acquisition, Lexmark had sued Apex, alleging it infringed at least 15 patents.⁶⁵ Apex also had been sued by Canon Inc., Seiko Epson Corp., and Hewlett-Packard Co.⁶⁶

China is also injecting state funds into private equity to fund foreign acquisitions. For instance, following Canyon Bridge Capital Partners' \$1.3 billion bid for Lattice Semiconductor, Reuters reported that financial investment in Canyon Bridge originated from China's State Council.⁶⁷

Elements of China's outbound investment strategy that are tied to industrial policy are contributing to growing global concern about Chinese acquisitions of foreign technology.⁶⁸ In 2014, a McKinsey article highlighted the implications of China's IC Plan on semiconductor companies, stating that "we should expect China to continue to actively seek opportunities to acquire global intellectual property and expertise, usually with the intent of transferring them back home."⁶⁹ A Mercator Institute report on MIC 2025 notes that "large scale investments in

⁶³ <http://www.hupogu.com/S/SZ002180/info-shareholder>

⁶⁴ Brian Womack, "Lexmark to Be Bought by Apex, PAG Asia in \$3.6 Billion Deal," (Bloomberg, April 19, 2016) <https://www.bloomberg.com/news/articles/2016-04-19/lexmark-to-be-acquired-by-apex-pag-asia-in-3-6-billion-deal>

⁶⁵ Selina Wang, "Apex Changes From Foe to Suitor With \$3.6 billion Lexmark Deal," (Bloomberg, April 20, 2016) <https://www.bloomberg.com/news/articles/2016-04-20/apex-changes-from-foe-to-suitor-with-3-6-billion-lexmark-deal>

⁶⁶ *Id.*

⁶⁷ Liana B. Baker, Koh Gui Qing, and Julie Zhu, "Exclusive: Chinese government money backs buyout firm's deal for U.S. chipmaker," (Reuters, November 28, 2016) <http://www.reuters.com/article/us-lattice-m-a-canyonbridge-idUSKBN13N1D5>

⁶⁸ Guy Chazan, "EU Capitals seek stronger right of veto on Chinese takeovers," (Financial Times, February 14, 2017) <https://www.ft.com/content/8c4a2f70-f2d1-11e6-95ee-f14e55513608>, and

Rob Taylor, "Security Blanket: New Moves to Slow China's Wave of Acquisitions," (Wall Street Journal, January 23, 2017) <https://www.wsj.com/articles/australia-tightens-oversight-of-investment-from-abroad-1485166809>

⁶⁹ Gordon Orr and Christopher Thomas, "Semiconductors in China: Brave new world or same old story?" (McKinsey, August 2014) <http://www.mckinsey.com/industries/high-tech/our-insights/semiconductors-in-china-brave-new-world-or-same-old-story>



industries such as smart manufacturing equipment potentially open the door for systematic technology transfer.”⁷⁰ The Mercator report further cautions that “if Chinese enterprises prove capable of using this technology effectively, a hollowing out of the technology leadership of industrial countries in pillar industries is possible.”⁷¹

2. *SOE Consolidation*

Funds, incentives, and financial policy are also being used to advance SOE consolidation in several MIC 2025 industries. In July 2016 the State Council issued the *Guiding Opinions on Promoting SOE Restructuring and Reorganizing* to promote SOEs in building up global competence and dominance.⁷² The Guiding Opinions set targets for several industries that overlap with MIC 2025 sectors, including telecommunications, new energy, aviation, and smart manufacturing.⁷³ The Guiding Opinions encourage restructuring and M&A to attain critical technology, key resources, and well-known brands.⁷⁴

In numerous sectors tied to MIC 2025, China seems to be seeking to create fewer but larger state-owned companies in disregard of competition concerns. Consolidation of existing companies and the creation of new companies is underway. Shipping,⁷⁵ steel,⁷⁶ energy,⁷⁷ and rail⁷⁸ have all seen tie-ups in the past few years.

⁷⁰ Jost Wübbeke, Mirjam Meissner, Max J. Zenglein, Jaqueline Ives, and Björn Conrad, “Made in China 2025: The making of a high-tech superpower and consequences for industrial companies” (Mercator Institute for China Studies, December 2016) <https://www.merics.org/en/about-us/merics-analysis/papers-on-china/made-in-china-2025/>

⁷¹ *Id.*

⁷² 关于推动中央企业结构调整与重组的指导意见 [Guiding Opinion on Promoting SOE Restructuring and Reorganizing] (State Council, July 26, 2016) http://www.gov.cn/zhengce/content/2016-07/26/content_5095050.htm

⁷³ *Id.*

⁷⁴ *Id.*

⁷⁵ Brenda Goh, “China launches new shipping giant to battle downturn,” (Reuters, February 18, 2016) <http://www.reuters.com/article/us-china-shipping-cosco-idUSKCN0VR0AK>

⁷⁶ Josephine Mason, “China Baosteel’s takeover of Wuhan to create world’s No. 2 steelmaker,” (Reuters, September 20, 2016) <http://www.reuters.com/article/us-china-baosteel-mergers-idUSKCN11Q0U3>

⁷⁷ “Shenhua Said to Seek CGN Merger to Form \$204 Billion Power Giant,” (Bloomberg, July 2016)

<https://www.bloomberg.com/news/articles/2016-07-21/shenhua-said-to-seek-cgn-merger-to-form-204-billion-power-giant>

⁷⁸ “With a Rail Merger, China Is Forging an Industrial Giant Second Only to GE,” (Bloomberg, July 7, 2015)

<https://www.bloomberg.com/news/articles/2015-06-07/china-forges-industrial-giant-second-only-to-ge-with-rail-merger>

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Central state-owned enterprise mergers (2012-2016)		
Year	Central state-owned enterprise	Merged into/became
2012	China Printing Group Corporation	China Reform Holdings Corporation Limited
2013	Caihong Group Corporation	China Electronics Corporation
2013	China Grain & Logistics Corporation	China National Cereals, Oils and Foodstuffs Corporation (COFCO)
2014	China National Erzhong Group Corporation	China National Machinery Industry Corporation (Sinomach)
2014	China Huafu Trade & Development Corporation	China National Cereals, Oils and Foodstuffs Corporation (COFCO)
2015	CNR Corporation	China Railway Rolling Stock Corporation (CRRC)
	CSR Corporation	
2015	China Power Investment Corporation (CPI)	State Power Investment Corporation
	State Nuclear Power Technology Corporation (SNPTC)	
2015	China Ocean Shipping Group Corporation (COSCO)	China COSCO Shipping Corporation Limited
	China Shipping Group Company	
2015	China Metallurgical Group Corporation	China Minmetals Corporation
2015	Zhuhai Zhenrong Company	Nam Kwong (Group) Company Limited
2015	Sinotrans & CSC Holdings Company Limited	China Merchants Group Company Limited
2016	Chinatex Corporation	China National Cereals, Oils and Foodstuffs Corporation (COFCO)
2016	China International Travel Services Group	China National Travel Service (HK) Group
2016	Wuhan Iron and Steel Corporation	Shanghai Baosteel Group Corporation
2016	China National Building Materials Group Corporation (CNBM)	China Construction Materials Group
	China National Materials Group Corporation Limited (Sinoma)	
2016	China National Cotton Reserves Corporation	Sinograin

Source: Wendy Leutert and Francois Godement, “Big is beautiful? State-owned enterprises mergers under Xi Jinping,” (European Council on Foreign Relations, November 2016)

http://www.ecfr.eu/publications/summary/china_state_owned_enterprise_mergers_under_xi_jinping7196

In semiconductors, Tsinghua Unigroup, a state-owned enterprise, bought two of the top four Chinese fabless companies and aims to combine them into a single entity.⁷⁹ A new state-owned

⁷⁹ Gordon Orr and Christopher Thomas, “Semiconductors in China: Brave new world or same old story?” (McKinsey, August 2014) <http://www.mckinsey.com/industries/high-tech/our-insights/semiconductors-in-china-brave-new-world-or-same-old-story>



aircraft engine maker was set up in August 2016 to advance China’s plan to become a global leader in aviation equipment, including engines.⁸⁰

Official documents and speeches indicate the Party is strengthening its role in SOEs operations and decision making. At a national meeting in October 2016, President Xi Jinping said Party leadership is the “root and soul” for SOEs and will become an important force in implementing major strategies.⁸¹ As China implements a number of high-level plans like MIC 2025, state intervention to achieve strategic objectives appears to be superseding the role of market forces in the economy and in allocating resources. A greater role for the state in the economy runs counter to Third Plenum reform goals, and often reduces market competition and increases market inefficiencies.

B. Protecting MIC 2025 Sectors From Foreign Competition

1. Market Access

Pre-establishment restrictions are the first barrier to foreign investment in MIC 2025 industries or in the broader Chinese economy. According to the OECD, China maintains the most restrictive investment regime among G20 countries.⁸²

Current restrictions impact half of the priority industries in MIC 2025. Auto manufacturing, civil aviation, telecommunications, ship building, and railway equipment all have foreign equity restrictions or joint venture requirements.⁸³ These restrictions either block opportunities for foreign companies to operate in the market, or, in some cases, create a de facto technology transfer requirement to the Chinese partner as a pre-condition for market access.

⁸⁰ Chun Han Wong, “China Establishes New State-Owned Aircraft-Engine Maker,” (Wall Street Journal, August 28, 2016) <https://www.wsj.com/articles/china-establishes-new-state-owned-aircraft-engine-maker-1472397621>

⁸¹ Lan Hongguang, “Xi Stresses CPC Leadership of State-Owned Enterprises,” (Xinhua, October 11, 2016) http://news.xinhuanet.com/english/2016-10/11/c_135746608.htm

⁸² OECD FDI Regulatory Index, <http://www.oecd.org/investment/fdiindex.htm>

⁸³ 外商投资产业指导目录（2015年修订） [Guiding Catalogue on Foreign Investment in Industry] (NDRC, MOFCOM, March 2015) http://www.ndrc.gov.cn/zcfb/zcfbl/201503/t20150313_667332.html

New energy vehicles (NEV), a MIC 2025 priority industry, illustrates the Chinese government's use of joint venture and technology transfer requirements for foreign companies that wish to access the domestic Chinese NEV market. New regulations for NEVs appear to make these technology transfer requirements even more onerous. Previously, foreign companies were required to transfer only one of three core technologies to a joint venture. Now, new MIIT regulations require NEV manufactures (including joint ventures) to master the development and manufacturing technology for the complete NEV.⁸⁴ Consequently, foreign companies may be forced to disclose and transfer additional technology to their joint venture in China so that all IP is registered and belongs to the local entity.

Though China is encouraging foreign investment in some MIC 2025 industries, including robotics and smart manufacturing, long-term market access cannot be guaranteed. Once domestic firms achieve self-sufficiency and close the technology gap, China may erect additional barriers to foreign companies.⁸⁵

2. *Licensing*

Licensing can restrict market operation, even in ostensibly open industries. China's licensing process can be extensive, burdensome, and discriminatory. From IP disclosures, to inconsistent interpretation of regulations between central and local regulators, to lengthy and indeterminate approval timelines, to de facto licensing restrictions on the number of players in a particular industry, licensing requirements are a top and long-standing barrier to access and grow operations in key sectors of the economy.⁸⁶ As MIC 2025 includes many heavily regulated industries, licensing is likely to remain a barrier to entry and competition.

⁸⁴ 新能源汽车生产企业及产品准入管理规定[Management Regulations for Access to New-Energy Vehicle Manufacturing Companies and Products] (MIIT, January 16, 2017) <http://www.miit.gov.cn/newweb/n1146295/n1146557/n1146624/c5462995/content.html>

⁸⁵ Jost Wübbecke, Mirjam Meissner, Max J. Zenglein, Jaqueline Ives, and Björn Conrad, "Made in China 2025: The making of a high-tech superpower and consequences for industrial companies" (Mercator Institute for China Studies, December 2016) <https://www.merics.org/en/about-us/merics-analysis/papers-on-china/made-in-china-2025/>

⁸⁶ "Business Climate Survey," (American Chamber of Commerce, January 2017) <http://www.amchamchina.org/policy-advocacy/business-climate-survey/>



Licensing has been an issue in the telecommunications industry, where services are divided into two categories: basic and value-added. Companies operating in either category are required to obtain requisite licenses. Since China entered the WTO in 2001 it does not appear to have issued a stand-alone license to any domestic or foreign applicant for basic telecommunications services.⁸⁷ Since 2013, it has issued licenses for value-added services to 29,000 domestic suppliers, while issuing only 41 to foreign suppliers.⁸⁸

China's expansive view of value-added telecommunications services (VATs) continues to create obstacles for a number of internet-related industries and services.⁸⁹ For example in the latest revision to the *Catalogue of Telecommunications Services* (Telecom Catalogue), the scope of VATs was expanded to include a range of Internet-related services, including cloud computing, thereby subjecting them to the licensing requirements and foreign equity caps that apply to the telecommunications sector, even though these services are not generally regarded as telecommunications services.⁹⁰

In November 2016 MIIT issued its draft *Notice on Regulating Business Behavior in the Cloud Service Market* (draft Cloud Regulations) which provides that cloud computing would be governed by Internet Data Center (IDC) licenses under the Telecom Catalogue.⁹¹ Foreign companies, however, are not permitted to obtain an IDC license in China; rather, foreign companies must partner with a Chinese company holding an IDC license.⁹² According to the draft Cloud Regulations, companies that do not possess an IDC license—typically the foreign partner—would be barred from using their brand or trademark when selling or supplying services through their joint venture.

⁸⁷ "2016 Report to Congress on China's WTO Compliance," (USTR, January 2017) <https://ustr.gov/sites/default/files/2016-China-Report-to-Congress.pdf>

⁸⁸ *Id.*

⁸⁹ *Id.*

⁹⁰ *Id.*

⁹¹ 意见征集：关于规范云服务市场经营行为的通知 [Feedback Solicitation: Notice on Regulating Business Behavior in the Cloud Service Market] (MIIT, November 24, 2016)

<http://www.miit.gov.cn/n1146285/n1146352/n3054355/n3057709/n3057717/c5379305/content.html>

⁹² "2016 Report to Congress on China's WTO Compliance," (USTR, January 2017) <https://ustr.gov/sites/default/files/2016-China-Report-to-Congress.pdf>

Licensing procedures raise concerns about potential conflicts of interest. For example, MIIT is not only the licensing authority for the telecommunications industry; it is also tasked with implementing MIC 2025. This dual authority creates an opportunity for MIIT to use its regulatory authority to promote state champions at the expense of foreign companies. Despite China's WTO obligations to separate regulatory authority from commercial functions, the issue remains an obstacle.⁹³

As cloud computing applications proliferate across industries and throughout the manufacturing supply chain, the terms of foreign participation in the China market may further erode. Restrictions that require foreign companies to joint venture in advanced technology industries—whether in the product or service category—raise significant concerns regarding how much control foreign companies will have over their IP and proprietary data going forward.⁹⁴ As a result, not only foreign cloud service providers, but also companies that depend on the cloud for advanced manufacturing and provision of services may face untenable decisions about how to access and compete in the future.⁹⁵

3. Laws, Regulations, and Standards

China is issuing laws, regulations, and standards that have the potential to be used to disadvantage foreign companies in MIC 2025 sectors. Many of these measures involve “secure and controllable” and other similar technology requirements, which limit foreign companies’ access to China’s market on often questionable grounds related to national security. For example:

The National Security Law (NSL) codifies into law “realizing secure and controllable information systems and data for Internet and core information technology, critical

⁹³ “Report of the Working Party on the Accession of China,” (World Trade Organization, October 1, 2001)

⁹⁴ U.S. Department of Commerce ITA, “2016 Top Markets Report Cloud Computing Country Case Study,” http://trade.gov/topmarkets/pdf/Cloud_Computing_China.pdf

⁹⁵ According to the U.S. Department of Commerce ITA, “2016 Top Markets Report on Cloud Computing Country Case Study,” China’s cloud computing market is expected to reach \$20 billion by 2020. As foreign companies face restrictions in the China market, Chinese cloud service operators are investing in the United States and other major western markets with no, or at least very few, restrictions.



infrastructure, and major areas.”⁹⁶ The NSL does not define secure and controllable, but other regulations using the term—such as guidelines from the China Banking Regulatory Commission and TC 260 Standards (see sections below)—indicate that foreign companies would not be able to qualify for these standards unless they surrender key technologies to Chinese authorities, such as source code and encryption algorithms. Moreover, NSL does not provide definitions or clear guidance on the scope of “critical infrastructure” or “major areas,” resulting in a potentially expansive application.

The Cyber Security Law (CSL) provides for the “promotion of secure and trustworthy⁹⁷ Internet products and services.”⁹⁸ Furthermore, CSL provides for setting up and perfecting the cyber security standards system.⁹⁹ Going forward, each ministry will formulate and revise the national and industry standards for cyber security management as well as for cyber products, services, and operations.¹⁰⁰ These provisions provide the legal framework to issue Internet-related standards across industry sectors. As more industries implement Internet-enabled products and services, standards have the potential to create trade barriers in industries nominally open to foreign investment.

The National Cyber Security Strategy is a high-level strategic framework for China’s cyber security initiatives and goals. The strategy promotes expanding the use of secure and controllable products.¹⁰¹ Released by the Cyberspace Administration of China (CAC) and approved by the Leading Small Group on Cyber Security and Informatization, the strategy likely reflects the top leadership’s motivations and goals to push forward internet sovereignty and security reviews. Moreover, the Cyber Security Strategy takes a broader

⁹⁶ 国家安全法 [National Security Law] (National People’s Congress, July 1, 2015)

<http://law.npc.gov.cn/FLFG/flfgByID.action?flfgID=34964916&zlsxid=01>

⁹⁷ China currently uses several terms—including “secure and controllable,” “secure and reliable,” “indigenous and controllable,” and “secure and trustworthy”—that all indicate an effort to use security as a means to potentially require localization/indigenization or promote domestic Chinese companies.

⁹⁸ 网络安全法 [Cyber Security Law] (National People’s Congress, November 7, 2016)

<http://law.npc.gov.cn/FLFG/flfgByID.action?flfgID=36094348&zlsxid=01>

⁹⁹ *Id.*

¹⁰⁰ *Id.*

¹⁰¹ 国家网络空间安全战略 [National Cyber Security Strategy] (Cyber Space Administration of China, December 27, 2016)

http://www.cac.gov.cn/2016-12/27/c_1120195926.htm

perspective on critical information infrastructure to include industrial manufacturing, medical treatment, and major Internet applications—suggesting an expansive scope of application, as confirmed by the industry-specific measures discussed below.

The Secure and Controllable standard has been included in a growing number of measures spanning many MIC 2025 industries that would require meeting vague but potentially restrictive conditions. Examples in the financial sector are instructive:

Banking: The China Banking and Regulatory Commission Guiding Opinions on Secure and Controllable set fixed targets for achieving a “secure and controllable” information technology environment for the banking industry.¹⁰² A subsequent set of Banking Guidelines (never made available to the general public) set criteria—including disclosing source code and requiring the use of domestic IP and domestic encryption—to be considered “secure and controllable.”

Insurance: The China Insurance Regulatory Commission issued draft *Insurance System Informatization Regulatory Requirements* in April 2016 that included a provision to provide preferential procurement to “secure and controllable products.”¹⁰³ The draft policy provides no explanation for how to meet the secure and controllable standard. The draft policy has not been finalized, and implementation remains unclear.

In addition to the “secure and controllable” measures in the financial service sector listed above, China has more than 30 such measures in various industries,¹⁰⁴ including in

¹⁰² 关于应用安全可控信息技术加强银行业网络安全和信息化建设的指导意见 [Guiding Opinions on the Application of Secure and Controllable Information Technology for Strengthening the Banking Industries Cyber Security and Establishing Informatization] (CBRC, NDRC, MOST, MIIT, September 3, 2014)

http://www.cbrc.gov.cn/govView_EE29BABB27EB4E51A4343517691438F9.html

¹⁰³ 保险机构信息化监管规定（征求意见稿） [Insurance System Informatization Regulatory Requirements (draft for comment)] (CIRC, October 2015) <http://www.circ.gov.cn/web/site0/tab5174/info3975814.htm>

¹⁰⁴ “2016 Report to Congress on China’s WTO Compliance,” (USTR, January 2017) <https://ustr.gov/sites/default/files/2016-China-Report-to-Congress.pdf>



telecommunication pilot programs,¹⁰⁵ medical device regulations,¹⁰⁶ aviation,¹⁰⁷ and big data application in healthcare.¹⁰⁸ These measures and derivative standards could curtail access by foreign producers to the Chinese market. Although the Banking Guidelines were nominally suspended in April 2015, companies continue to report its implementation.

Technical Committee (TC) 260 Standards for CPUs, operating systems, and office suites create potential trade barriers and significantly burden the ICT industry without achieving any legitimate objective. In addition to burdening companies unnecessarily, these standards require extensive IP disclosures that would undermine innovation and may violate provisions of the WTO agreements on Technical Barriers to Trade and Trade-related Aspects of Intellectual Property Rights.¹⁰⁹

“Secure and controllable” is not the only standard that may serve as a trade barrier. Equally unclear and potentially troublesome are standards or requirements for “indigenous and controllable,” “secure and trustworthy,” and “secure and reliable” (see footnote 97 for more on these terms) that are all referenced within various MIC 2025 related policies, in particular smart manufacturing.

¹⁰⁵ 关于开展电信行业网络安全试点示范工作的通知 [Notice on Launching Telecommunications Industry Cyber Security Pilot Demonstration Work] (MIIT, August 2015)

<http://www.miit.gov.cn/n1146295/n1652858/n1652930/n3757020/c3764879/content.html>

¹⁰⁶ 关于改革药品医疗器械审评审批制度的意见 [Opinions on Reforming the Pharmaceutical and Medical Equipment Review and Approval System] (State Council, August 2015) http://www.gov.cn/zhengce/content/2015-08/18/content_10101.htm

¹⁰⁷ 民航网络信息安全管理规定（暂行）征求意见稿 [Regulations on the Management of Civil Aviation Information Security] (Ministry of Transportation, February 20, 2017)

<http://www.chinalaw.gov.cn/article/cazjgg/201702/20170200482722.shtml>

¹⁰⁸ 关于促进和规范健康医疗大数据应用发展的指导意见 [Guiding Opinions on Promoting and Standardizing the Application and Development of Healthcare Big Data] (State Council, June 2016)

http://www.gov.cn/zhengce/content/2016-06/24/content_5085091.htm

¹⁰⁹ WTO Agreement on Technical Barriers to Trade https://www.wto.org/english/docs_e/legal_e/17-tbt_e.htm

Chinese policies indicate an approach that will require smart manufacturing products and services to meet vague and undefined standards, for example:

Pilot Demonstrations In 2015¹¹⁰ and 2016,¹¹¹ MIIT issued separate notices for Smart Manufacturing Pilot Demonstrations that call for indigenous and secure and controllable equipment and software. The Chinese government often uses pilot demonstrations to test policy initiatives before implementing them nationwide.

Smart Hardware In 2016, MIIT and NDRC issued a three-year plan on the smart hardware industry that calls for establishing a secure and reliable development framework and platform from cloud to end user.¹¹²

Industrial Infrastructure The *Informatization and Industrialization Development Plan (2016-2020)* also calls for secure and controllable industrial infrastructure hardware and software, high-end industry application software, embedded systems, new industrial application platforms, and industrial internet network equipment.¹¹³ The Plan also recommends establishing testing services to verify a product's compliance with standards and security and reliability.¹¹⁴

As with “secure and controllable,” these standards raise concerns about trade-inhibiting requirements that may constitute technical barriers to trade and put proprietary information at risk. Overall, these policies align with a general trend toward using standards to reduce China's reliance on foreign technology.

¹¹⁰ 关于开展智能制造试点示范项目推荐的通知 [Notice on Launching Recommendations for Smart Manufacturing Pilot Demonstrations] (MIIT, April 3, 2015)

<http://www.miit.gov.cn/n1146295/n1652858/n1652930/n3757016/c3764217/content.html>

¹¹¹ 关于开展智能制造试点示范 2016 专项行动的通知 [Notice on the 2016 Action Plan for Launching Smart Manufacturing Pilot Demonstrations] (MIIT, April 11, 2016)

<http://www.miit.gov.cn/n1146295/n1652858/n1652930/n3757018/c5360117/content.html>

¹¹² 智能硬件产业创新发展专项行动（2016-2018）[Special Action on the Innovative Development of Smart Manufacturing Software Industry] (MIIT, September 21, 2016)

<http://www.miit.gov.cn/n1146295/n1652858/n1652930/n3757016/c5259332/content.html>

¹¹³ 关于印发信息化和工业化融合发展规划（2016-2020）的通知 [Notice on the Release of Notice on the Development Plan for Integrating Informatization and Industrialization] (MIIT, October 12, 2016)

<http://www.miit.gov.cn/n1146295/n1652858/n1652930/n3757016/c5338237/content.html>

¹¹⁴ *Id.*



China's plans also suggest that standards may be used to promote indigenous Chinese technology and IP. Both high-level development plans and industry specific measures highlight this goal. The *Development Strategy for Establishing National Standardization (2016-2020)* (the Development Strategy) lists possessing indigenous IPR for critical technology in enterprise and social standards among its important tasks.¹¹⁵ Furthermore, the Development Strategy lists increasing the international influence and contribution of the “Chinese standard” as one of its development goals.¹¹⁶

Strengthening the formation of standards with indigenous IP is also a general principle for standardization efforts in specific industries. For example, within IoT, China aims to create sensing and perception class standards with indigenous IP.¹¹⁷ For autonomous driving technology, the *Notice on the Implementing Plan for Advancing “Internet Plus” Convenient Transportation and Promoting the Development of Smart Transportation*, issued by the NDRC and Ministry of Transportation, calls for indigenous IP in LTE.¹¹⁸

China is also pursuing unique standards that diverge from existing international ones. For China's Internet-related services—including cloud computing, industrial software, and big data—and smart manufacturing standards, there is already low harmonization with international standards.¹¹⁹ As China plans to set or revise over 500 standards in smart manufacturing the use of standards to promote indigenous IP may become a more contentious issue particularly where competing standards already exist.¹²⁰

¹¹⁵ 关于印发国家标准化体系建设发展规划（2016-2020）的通知 [Notice on the Release of the Development Strategy for Establishing National Standardization] (State Council, December 17, 2015) http://www.gov.cn/zhengce/content/2015-12/30/content_10523.htm

¹¹⁶ *Id.*

¹¹⁷ 物联网标准化白皮书 [Internet of Things Standardization White Paper] (China Electronics Standardization Institute, January 18, 2016) <http://www.cesi.cn/cesi/guanwanglanmu/biaozhunhuayanjiu/2016/0119/12330.html>

¹¹⁸ 推进“互联网+”便捷交通促进智能交通发展的实施方案 [Notice on the Implementing for Advancing “Internet Plus” Convenient Transportation and Promoting the Development of Smart Transportation] (NDRC and MOT, July 30, 2016) http://www.sdpc.gov.cn/zcfb/zcfbtz/201608/t20160805_814065.html

¹¹⁹ Jost Wübbeke, Mirjam Meissner, Max J. Zenglein, Jaqueline Ives, and Björn Conrad, “Made in China 2025: The making of a high-tech superpower and consequences for industrial companies” (Mercator Institute for China Studies, December 2016) <https://www.merics.org/en/about-us/merics-analysis/papers-on-china/made-in-china-2025/>

¹²⁰ 国家智能制造标准体系建设指南 [Guideline for Establishing National Smart Manufacturing Standardization] (MIIT and SAC, December 30, 2015) <http://www.miit.gov.cn/n1146290/n4388791/c4570716/content.html>

Furthermore, Chinese policies indicate an aim to promote Chinese standards as international standards. As part of the *Plan to Enhance Standardization and Quality of Equipment Manufacturing*, which is closely tied to MIC 2025, China aims to spread Chinese standards abroad, particularly in countries linked to One-Belt One-Road—a Chinese initiative to connect Eurasian economies through infrastructure, trade, and investment.¹²¹ High-end computer numerical control (CNC) machine tools, robotics, aviation, and high-end medical devices, are all identified as sectors in which China should promote indigenous standards as international standards.¹²²

4. *National and Cyber Security Reviews*

Review processes—including for national and cyber security—have the potential to be used to impede market access, extract concessions, and advance industrial policy.

National Security Review for Investment The NSL establishes an expansive national security concept that may impact foreign companies' access to and operations in the China market. Broad and non-specific, China's definition of national security includes non-traditional areas such as economic and societal security. The NSL establishes a national security review and monitoring system to conduct inspections on projects that may impact national security. Read together with other draft¹²³ and existing regulations¹²⁴ related to the screening of inbound investment, this definition could result in an expansive approach to national security reviews that would potentially limit foreign investment.¹²⁵

¹²¹ 装备制造业标准化和质量提升规划 [Plan to Enhance Standardization and Quality of Equipment Manufacturing] (AQSIQ, SAC, MIIT, August 1, 2016) http://www.aqsiq.gov.cn/xxgk_13386/ywxx/cpzl/201608/t20160805_471898.htm

¹²² *Id.*

¹²³ 中华人民共和国外国投资法(草案征求意见稿) [The Foreign Investment Law of the People's Republic of China (Draft for Consultation)] (MOFCOM, January 19, 2015) <http://tfs.mofcom.gov.cn/article/as/201501/20150100871010.shtml>

¹²⁴ 国务院办公厅关于印发自由贸易试验区外商投资国家安全审查试行办法的通知 [Notice of the General Office of the State Council on Distributing Pilot Rules for National Security Review of Foreign Investment in Free Trade Zones], Art.2 (General Office of the State Council, effective May 8, 2015) http://www.gov.cn/zhengce/content/2015-04/20/content_9629.htm

¹²⁵ "Preventing Deglobalization: An Economic and Security Argument for Free Trade and Investment in ICT," (U.S. Chamber of Commerce, September 2016) https://www.uschamber.com/sites/default/files/documents/files/preventing_deglocalization_1.pdf



Cyber Security Review for Products and Services The CSL sets forth cyber security reviews for a broad but unclear scope of industries. Security reviews are required for any internet (network) product or service procured by a critical information infrastructure (CII) operator that might influence national security. CII is broadly defined to include:

“telecommunications and information services, energy, transportation, finance, public services, e-government, and other major industries and areas, as well as other areas that once damaged, lose function, or leak data, may seriously endanger national security, the national economy, and the people’s livelihood or public interests.”¹²⁶

As described above, China’s National Security Strategy sets a more expansive view of CII, including manufacturing, healthcare, and important internet application systems. Ultimately, the State Council will issue implementing regulations defining the scope of CII.

Security Review Measures: In an effort to implement security reviews within the CSL, the CAC issued the draft *Measures on the Security Review of Online Products and Services* (draft Measures) on February 4, 2017. The draft Measures set forth an unclear review scope—“important network products and services”—and criteria that focus on issues generally considered unrelated to national security, including notions of abuse of dominant market position and prejudicial behavior.¹²⁷ Although in draft form, the CAC draft Measures reflect positions China is advancing in other planning documents. For instance, the Cyber Security Strategy—issued before the CAC draft Measures—calls for security evaluations to increase “the security and controllability” of products and services and to prevent product and service providers from using information technology superiority to carry out “unfair competition” or “harm users’ interest.”¹²⁸

¹²⁶网络安全法 [Cyber Security Law] (National People’s Congress, November 7, 2016)

<http://law.npc.gov.cn/FLFG/flfgByID.action?flfgID=36094348&zlsxid=01>

¹²⁷ 网络产品和服务安全审查办法（征求意见稿） [Measures on the Security Review of Online Products and Services (draft for comment)] (CAC, February 4, 2017) http://www.cac.gov.cn/2017-02/04/c_1120407082.htm

¹²⁸ *Id.*

Although specific details about national and cyber security reviews have yet to be formalized, it is likely to provide Chinese authorities with a multifaceted toolkit to regulate companies into compliance with state policy objectives.¹²⁹ A legal and regulatory framework that sets forth security-related requirements to support the development of indigenous technologies and exclude foreign technologies poses an obstacle for foreign companies operating in these industries, which are part of MIC 2025.

5. Procurement and Bidding

China's state-directed economy impacts procurement opportunities for foreign companies. Not being party to the WTO Agreement on Government Procurement results in Chinese public procurement being largely closed to foreign suppliers. Even if no express legal requirement to purchase goods produced by domestic companies exists for public procurement, including by SOEs, in many cases, it may be implicitly or explicitly encouraged.¹³⁰ Indeed, in its annual report to Congress on China's WTO compliance, the Office of the United States Trade Representative has stated that China is "maintaining and adopting government procurement measures that give domestic preferences."¹³¹

The state is already heavily involved directly and through state-owned companies in several MIC 2025 priority areas, including IT, aviation, and rail. As China develops these industries domestically, it is likely to use procurement to favor domestic suppliers in MIC 2025 sectors.

Electric batteries provide an example of how lists or catalogues are used to potentially limit market access for foreign companies. Forecasting China's strong demand for NEVs, a number of foreign companies opened battery factories in China in 2015.¹³² One year later, Beijing

¹²⁹ "Preventing Deglobalization: An Economic and Security Argument for Free Trade and Investment in ICT," (U.S. Chamber of Commerce, September 2016)

https://www.uschamber.com/sites/default/files/documents/files/preventing_deglocalization_1.pdf

¹³⁰ Michael O. McCarthy, "Background Material For U.S.-China Economic and Security Review Commission," (June 6, 2012) <http://www.uscc.gov/sites/default/files/6.14.12McCarthy.pdf>

¹³¹ "2016 Report to Congress on China's WTO Compliance," (USTR, January 2017) <https://ustr.gov/sites/default/files/2016-China-Report-to-Congress.pdf>

¹³² Henry Sanderson, Tom Hancock, and Leo Lewis, "Electric Cars: China's battle for the battery market," (Financial Times, March 5, 2017) <https://www.ft.com/content/8c94a2f6-fdcd-11e6-8d8e-a5e3738f9ae4>



issued a list of companies allowed to supply the domestic market; no foreign company was included on the list.¹³³

Medical devices also offer relevant examples of procurement policies at the State Council, ministerial, and provincial levels that might disadvantage foreign companies:

State Council

- In May 2015, the State Council issued the *Notice on Deepening Healthcare Reform 2014 Work Summary and 2015 Key Work Priorities*. It states that “publicly-owned hospitals will preferentially equip and utilize domestic medical equipment and apparatus.”¹³⁴ By directing public hospitals to preferentially equip and utilize domestic medical equipment and apparatus, the NHFPC is adding extraneous considerations to a decision that should be based on open market competition.
- In March 2016 the State Council issued the *Guiding Opinions on Promoting the Healthy Development of the Medical and Pharmaceutical Industry*. It reinforces that “where domestically produced pharmaceuticals and medical devices can meet the required need, government procurement projects...should procure domestically produced products.”¹³⁵

Both State Council documents send a clear signal to local and provincial governments to procure locally (i.e., Chinese) produced goods, despite reports of persistent preference for imported or foreign-invested products among hospitals and physicians.

¹³³ *Id.*

¹³⁴ 关于印发深化医药卫生改革 2014 年工作总结和 2015 年重点工作任务的通知 [The Notice on Deepening Healthcare Reform 2014 Work Summary and 2015 Key Work Priorities] (State Council, April 26, 2015)

http://www.gov.cn/zhengce/content/2015-05/09/content_9716.htm

¹³⁵ 关于促进医药产业健康发展的指导意见 [Guiding Opinions on Promoting the Healthy Development of the Medical and Pharmaceutical Industry] (State Council, March 4, 2016) http://www.gov.cn/zhengce/content/2016-03/11/content_5052267.htm

Ministerial

Ministerial catalogues provide examples how these preferences create practical constraints for foreign companies:

- In May 2015, NHFPC issued the first batch of the “*Outstanding Domestic Equipment Catalogue*.” The catalogue covers digital X-ray, color ultrasound, and fully automatic biochemical analyzer machines. Of the 218 products submitted for consideration by 57 companies, 95 products from 27 companies were selected. Despite many applications for products made in China by the local factories of multinational companies, all of the products selected were from Chinese-owned brands.
- In February 2016, NHFPC issued the second batch of product selection for MRI, CT, automatic blood cell analyzer, respirators, anesthesia machines, blood dialysis machines, and automatic medicine dispensing machines. Of the 209 applications submitted, 153 products were approved, again with no domestically-produced equipment made by a foreign-invested enterprise approved.

In both cases, NHFPC policies violate the principle of equal treatment for all companies registered in China regardless of ownership. More broadly, defining “domestic equipment” based on the perceived home country ownership of the brand, whether explicitly or in practice, creates a deeply concerning precedent regarding how China’s government will determine what constitutes a domestic product. While these catalogues may not have an explicit link to procurement, NHFPC is still directly making recommendations of “outstanding products” (i.e., preferred but not mandated products) that will impact the purchasing behavior of hospitals and local governments.

Provincial

Companies also face obstacles at the provincial level. Anhui,¹³⁶ Shanghai,¹³⁷ Fujian, and Sichuan have all issued catalogues that provide preferential treatment to domestic brands. Sichuan sets

¹³⁶ 关于申报配置国产医学影像检查设备的通知 [Notice on Reporting the Allocation of Domestically Produced Image Inspection Equipment] (Anhui Health and Family Planning Commission, April 2, 2014) <http://www.ahwjw.gov.cn/ghxxc/tzgg/201504/7de4ab97666c45e0a602b2bdd0849e6a.html>



quota requirements for domestically-produced CT and MRI equipment; hospitals are also required to allocate a certain percentage (up to 65 percent) of their budget to procuring domestic equipment. When matched with the quotas proposed in the Green Book, this provides a clear pathway for favoring Chinese-owned manufacturers.

III. Conclusions

MIC 2025 is a ten-year, comprehensive plan to transform China into an advanced manufacturing leader. Representing just under 40 percent of China’s entire industrial value added manufacturing, MIC 2025’s 10 strategic industries—including next generation information technology, aviation, rail, new energy vehicles, and agricultural machinery—cover areas that will be critical to economic competitiveness and growth in the 21st century.

As China’s economy grows and matures, it is understood that China will focus on enhancing innovation and ascending the value chain. China faces a number of domestic pressures, including slowing economic growth, increasing levels of environmental pollution, and a declining working age population, that make upgrading the economy a top priority.

The U.S. Chamber of Commerce therefore welcomed the release of China’s Third Plenum Decision in 2013 as a blueprint for realizing China’s economic development and innovation goals. MIC 2025 appropriately reiterates core elements of Third Plenum Decision, including calls for “deepening comprehensive reform, fully exhibiting the decisive role of the market in the allocation of resources,” “perfecting a system in which the market mainly decides prices,” and “effectively resolving the contradictions in overcapacity.”

However, these aspirations have not yet been accompanied by tangible, forward movement on market-oriented reforms. Instead, new policies are being issued and implemented that raise the likelihood of growing inefficiencies and overcapacity in China as well as spillover distortions on a global scale. Ultimately state-led economic development policies that emphasize state control,

¹³⁷ 关于进一步加强本市乙类大型医用设备配置管理的通知 [Notice on Further Strengthening Management of the Allocation of Medical Equipment in the Local City’s Second Category Large-Scale Hospitals] (Shanghai Municipal Commission of Health and Family Planning, June 18, 2014) <http://www.wsjw.gov.cn/wsj/n429/n432/n1487/n1504/u1ai134123.html>

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restrict competition, and target specific industries and technologies risk doing more harm than good—for China and the world.

The U.S. Chamber of Commerce is concerned about the growing risk that policies such as MIC 2025 pose for China's relationships with its key economic and commercial partners, including the United States. We therefore urge that MIC 2025 and related policies be at the top of the economic agenda in future bilateral discussions with China.

American and other foreign companies are well-positioned to help contribute to China's achieving its economic development and innovation goals. Ultimately, the U.S. Chamber of Commerce believes that more competitive markets in China that allow all companies, regardless of national origin, to compete fully and deepen the role of the market in allocating resources across the economy, are the optimal pathway for China to realize its goals and avoid the middle income trap.

IV. Appendix 1: MIC 2025-related Policies (non-exhaustive list)

A. General MIC 2025 Policies

Title of Policy	Releasing Agency	Date	Notes
Notice of the State Council on Issuing Made in China 2025 国务院关于印发《中国制造2025》的通知	State Council	March 8, 2015	Sets clear timelines and benchmarks for a variety of sectors and projects, ranging from indigenous intellectual property to indigenous self-sufficiency.
Guiding Opinions of the State Council on Promoting the Internet Plus 国务院关于积极推进“互联网+”行动的指导意见	State Council	July 1, 2015	Aims to integrate mobile internet, cloud computing, big data, and the IoT with modern manufacturing.
Made in China 2025: Major Area Technical Roadmap 中国制造2025重点领域技术路线图	National Manufacturing Power Strategic Advisory Committee	September 2015	Sets specific sales growth and market share targets for a variety of industries to be filled by domestic production.
Several Opinions on Finance to Support Industry Stable Growth, Restructuring, and Improving Profit	PBOC, NDRC, MIIT, MOF, MOFCOM, CBRC, CIRC, CRSC	February 16, 2016	Calls for providing full-scale support to the Made in China 2025 Plan by introducing financial

Title of Policy	Releasing Agency	Date	Notes
关于金融支持工业稳增长调结构增效益的若干意见			<p>regulations to build China as a manufacturing powerhouse. Section 1.3 encourages banks to develop indigenous brands and support creating indigenous consumer product brands. Section 5.13 calls to increase export credit insurance to indigenous brands, indigenous IP, and strategic and emerging industries.</p>

B. New Generation Information Technology¹³⁸

Title of Policy	Releasing Agency	Date	Notes
<p>Opinion on the Use of Big Data Technology to Improve the Government's Supervisory Capabilities and Services for Market Entities</p> <p>国务院办公厅关于运用大数据加强对市场主体服务和监管的若干意见</p>	State Council	June 24, 2015	Encourages big data companies with indigenous IP to get stronger and larger. Calls for implementing a national information security multi-level protection system.
<p>Guiding Opinions on Smart Grids</p> <p>关于促进智能电网发展的指导意见</p>	NDRC and NEA	July 6, 2015	Calls for gradually construct a secure and reliable smart grid system by 2020.
<p>Internet of Things Standardization White Paper</p> <p>物联网标准化白皮书</p>	CESI	January 18, 2016	Calls for forming a standardization system with indigenous intellectual property rights. States that by using standards with indigenous intellectual property rights, [China] can

¹³⁸ For more Chinese ICT laws, administrative regulations, departmental rules, and policies, please see the Chamber's report "Preventing Deglobalization: An Economic and Security Argument for Free Trade and Investment in ICT," https://www.uschamber.com/sites/default/files/documents/files/preventing_degloabalization_1.pdf

Title of Policy	Releasing Agency	Date	Notes
			avoid being controlled by others in the standards process.
Guiding Opinion on Development of Manufacturing and Internet Integration 国务院关于深化制造业与互联网融合发展的指导意见	State Council	May 13, 2016	Helps to integrate MIC 2025 and Internet Plus; calls for expanding the application of industrial cloud computing.
Implementing Plan for Promoting “Internet +” Convenient Transportation to Promote the development of Intelligent Transportation (NDRC, MOT, July 30, 2016) 《推进“互联网+”便捷交通 促进智能交通发展的实施方案》	NDRC	July 30, 2016	Section 6.18: Calls for the research and application of indigenous IPR in LTE and for the launch of smart vehicle demonstration applications. Calls for launching indigenous research for core component technology for autonomous vehicles.
National Critical Information Infrastructure Audit 网络与信息系统	CAC	September 2016	Requests information on the adoption of domestic versus foreign technology

Title of Policy	Releasing Agency	Date	Notes
普查表			for a number of key IT hardware and software products.
“Internet Plus” Bidding and Purchasing Action Plan (2017-2019) “互联网+”招标采购行动方案（2017-2019年）	NDRC	October 21, 2016	Calls for testing and certification bodies to ensure that trading platforms that receive certification are “secure and reliable.” Requires all servers to be located in China.

C. Automated Machine Tools and Robotics

Title of Policy	Releasing Agency	Date	Notes
<p>Notice Regarding Recommendations for 2015 Smart Pilot Demonstration Projects 关于开展 2015 年智能制造试点示范项目推荐的通知</p>	MIIT	April 1, 2015	Sets forth a basic requirement for being recommended is using equipment and software that is indigenous and secure and controllable.
<p>Notice on Launching Smart Manufacturing Pilot Demonstration 2015 Special Action 关于公布 2015 年智能制造试点示范项目名单的通告</p>	MIIT	July 2, 2015	Calls for increasing the indigenous capabilities of equipment and systems.
<p>Opinion of MIIT on Promoting the Development of Industry Clusters 工业和信息化部关于进一步促进产业集群发展的指导意见</p>	MIIT	July 10, 2015	Underscores the importance of “regional brands” and “backbone companies” to lead industry clusters, indicating a preference for domestic companies and state-owned enterprises.

Title of Policy	Releasing Agency	Date	Notes
<p>Guangdong Province Plan for the Development of Smart Manufacturing (2015-2025) 《广东省智能制造发展规划（2015-2025年）》</p>	<p>Guangdong Provincial Government</p>	<p>July 23, 2015</p>	<p>As a basic principle, Strives to raise indigenous innovation capabilities. States that indigenous brands will be used to transform and upgrade traditional industries. Calls for improving the ability to provide auxiliary items for secure and controllable smart technology products.</p>
<p>Changsha Smart Manufacturing Three Year (2015-2018) Action Plan 长沙智能制造三年（2015—2018年）行动计划</p>	<p>Changsha Municipal Government</p>	<p>July 29, 2015</p>	<p>Calls for helping small and medium sized companies with indigenous IP gain funding support. Describes subsidies for critical components with indigenous IP or a localization rate exceeding 60%. Calls for smart equipment and product pilot demonstrations to achieve the goals of innovative</p>

Title of Policy	Releasing Agency	Date	Notes
			application and secure and controllable products.
Guideline for Establishing the National Smart Manufacturing Standards System (2015 edition) 《国家智能制造标准体系建设指南》	MIIT and SAC	December 30, 2015	As a general principle, the Guideline calls for strengthening the formation and industrialization of standards with indigenous IP, and elevating indigenous IP standards into international standards.
Notice on Launching Smart Manufacturing Pilot Demonstration 2016 Special Action 关于开展智能制造试点示范 2016 专项行动的通知	MIIT	April 11, 2016	Calls for increasing the indigenous capabilities of critical smart parts, equipment, and systems.
Plan to Enhance Standardization and Quality of Equipment Manufacturing 装备制造业标准化和质量提升规划	AQSIQ, SAC, and MIIT	August 1, 2016	Calls for building a secure and controllable industrial internet test bed and using indigenously innovated technology in international standards.

Title of Policy	Releasing Agency	Date	Notes
Standard Conditions for Robots Industry (Open for Comment) 《工业机器人行业规范条件（征求意见稿）》	MIIT	September 12, 2016	Encourages promoting Chinese branded industrial robotics and support the use of local/national governments to provide preferential policies for companies that meet the Standard Conditions.
Notice on 2016-2018 Special Action Smart Hardware Industry Innovative Development 智能硬件产业创新发展专项行动（2016-2018年）	MIIT and NDRC	September 19, 2016	Section 4.2.6: Calls to establish “secure and reliable” development framework and platform for end cloud integrated hardware services.
Made in China 2025 - Energy Equipment Implementation Plan 中国制造 2025—能源装备实施方案	NDRC, MIIT, NEA	June 12, 2016	Uses indigenous innovation—referred to as a major requirement for implementing MIC 2025—at least 80 times throughout the plan. Promotes the application of indigenous innovation in each major project. Calls for the release and

Title of Policy	Releasing Agency	Date	Notes
			<p>promotion of indigenous innovation promotion catalogues for energy equipment. Includes an annex for “indigenously innovated energy equipment guiding catalogue.”</p>

D. Pharmaceutical and Medical Devices

Title of Policy	Releasing Agency	Date	Notes
<p>Notice on Further Strengthening the Management of Class Two Large-Scale Medical Equipment Configuration</p> <p>关于进一步加强乙类大型医用设备配置管理通知</p>	<p>Shanghai Municipal Health and Family Planning Commission</p>	<p>June 10, 2014</p>	<p>Section 3: “On the basis of generally meeting the requirements of clinical needs, district-level medical institutions deploying their second piece of equipment and city-level medical institutions deploying their third piece of equipment should choose domestically produced large-scale medical equipment.”</p>
<p>Notice on Deepening Healthcare Reform 2014 Work Summary and 2015 Key Work Priorities</p> <p>国务院办公厅关于印发深化医药卫生体制改革2014年工作总结和2015年重点工作任务的通知</p>	<p>State Council</p>	<p>April 26, 2015</p>	<p>Section 2.1.5: “publicly-owned hospitals will preferentially equip and utilize domestic medical equipment and apparatus.”</p>

Title of Policy	Releasing Agency	Date	Notes
<p>Notice on Declaring the Use of Domestic Medical Imaging Inspection Equipment 关于申报配置国产医学影像检查设备的通知</p>	<p>Anhui Provincial Government</p>	<p>April 2015</p>	<p>States that the application cost for applying for domestically produced equipment is covered by the province and the remaining portion by the local MOF.</p>
<p>Guiding Opinions on Promoting the Healthy Development of the Pharmaceutical Industry 国务院办公厅关于促进医药产业健康发展的指导意见</p>	<p>State Council</p>	<p>March 4, 2016</p>	<p>Section 3.12: Research and formulate product catalogues for innovative and superior pharmaceutical products and medical devices. Enlarge/strengthen the endorsement for innovative products, and increase the tolerance/recognition of clinicians and the public toward pharmaceutical products with indigenous intellectual property rights</p> <p>Section 3.13: Strictly carry out regulations</p>

Title of Policy	Releasing Agency	Date	Notes
			<p>in the Government Procurement Law, for localized pharmaceutical products and medical devices that are able to meet certain requirements, in principle government procurement projects must procure these localized products, and gradually increase the usage level of localized products in public health organizations.</p>
<p>Hainan Government Implementing Opinions on Promoting Pharmaceutical Industry Healthy Development 海南省人民政府办公厅印发海南省关于促进医药产业健康发展实施意见的通知</p>	<p>Hainan Provincial Government</p>	<p>September 18, 2016</p>	<p>Section 12: "...increase the tolerance/recognition of clinicians and the public toward pharmaceutical products with indigenous intellectual property rights."</p>

Title of Policy	Releasing Agency	Date	Notes
Notice Regarding Strengthening Related Management Work on Medical Equipment Deployment 四川省卫生计生委关于进一步加强医疗设备配置管理相关工作的通知	Sichuan Provincial Health and Family Planning Commission	November 29, 2016	Sets specific quota requirements (percentages) for types of domestic equipment and percentage of a hospital's overall procurement budget allocated to domestically produced equipment.

E. New Energy Vehicles

Title of Policy	Releasing Agency	Date	Notes
Made in China 2025 Interpretation: Promoting the Development of Clean and New Energy Vehicles 《中国制造2025》解读之：推动节能与新能源汽车发展	MIIT	May 12, 2016	Calls for indigenous electronic vehicles and plug-in hybrid vehicles to have more than 70 percent domestic market share by 2020, and new energy vehicles to enjoy more than 80 percent domestic market share by 2025.
Regulations Managing Access for New Energy Vehicle Production Companies and Parts 新能源汽车生产企业及产品准入管理规定	MIIT	January 6, 2017	Requires NEV manufacturers to master the development and manufacturing technology for the complete NEV, not just one of three core technologies.

F. Overlapping Plans

Title of Policy	Releasing Agency	Date	Notes
<p>Medium- and Long-Term Science and Technology Plan (2016-2020) 国家中长期科学和技术发展规划纲要 (2006-2020)</p>	State Council	February 7, 2006	States that a key tool for China to create its own IP and proprietary product lines will be through tweaking foreign technologies. Calls for China's reliance on foreign technology to decline to 30 percent, from around 50 percent.
<p>Notice on Informatization and Industrialization Deepening Integration Special Action Plan (2013-2018) 信息化和工业化深度融合专项行动计划 (2013-2018年)</p>	MIIT	August 23, 2013	States as an overall requirement and general principle to strengthen the ability to supply secure and controllable IP products and services. Calls for auxiliary parts in critical areas to reach full indigenization, while strengthening secure and controllable capabilities. Sets as an action goal to achieve breakthroughs on core and critical technology, and to form a secure and controllable modern

Title of Policy	Releasing Agency	Date	Notes
			IT industry system. Calls for launching a domestically produced CPU and operating system. Encourages IT and industrial companies to cooperate in order to support the adoption of secure and controllable information technology and products.
The 13th Five-Year Plan (FYP) 中华人民共和国国民经济和社会发展第十三个五年规划纲要	State Council	March 17, 2016	Emphasizes indigenous innovation, signaling the importance of achieving technology self-sufficiency. Reflects the enduring role of the state in the market.
Robotic Industry Development Plan (2016-2020) 机器人产业发展规划（2016-2020年）	NDRC	April 27, 2016	Calls for raising the competitiveness of indigenous brands. Calls for annual production of indigenous brands to reach 100,000 by 2020. Calls for China to create an authentication system for robotics; states

Title of Policy	Releasing Agency	Date	Notes
			that national funds will be used to procure authenticated robots.
13th FYP on Science and Technology Innovation Plan “十三五”科技创新规划	MOST	August 2016	Underscores indigenous innovation, indigenous IP, and localization throughout the S&T Plan. Calls for localization of critical technology and equipment of clean coal clean gas to exceed 90 percent.
Informatization and Industrialization Development Plan (2016-2020) 工业和信息化部关于印发信息化和工业化融合发展规划（2016—2020年）的通知	MIIT	October 12, 2016	Calls for increasing indigenous innovation, formulating internet security protection standards for the internet, creating critical information security standards; uses terms such as “secure and reliable.”
Industrial Technology Innovation Capabilities Development Plan (2016-2020) 产业技术创新能力发展规划（2016-2020）	MIIT	October 21, 2016	States that the major development direction for electronic communication manufacturing should include the use of domestically produced secure and controllable CPUs in a range of products,

Title of Policy	Releasing Agency	Date	Notes
			including computers, servers, industrial control computers and equipment, cars, and electronic products for medical and financial industries.
13th FYP on Strategic and Emerging Industries “十三五”国家战略性新兴产业发展规划	State Council	November 29, 2016	Calls for indigenous IP, indigenous innovation, localization, and secure and controllable. Calls for indigenous IP in robotic automation production lines and digital workshops; secure and controllable next generation information technology industrial system; and local production of mainline aircraft.
Smart Manufacturing Development Plan (2016-2020) 智能制造发展规划（2016-2020）	MIIT, MOF	December 8, 2016	Sets as a guiding thought raising the secure and controllable level of critical technology equipment.

Title of Policy	Releasing Agency	Date	Notes
<p data-bbox="261 205 509 499"> 13th FYP on National Informatization Plan “十三五”国家信息化规划 </p>	<p data-bbox="570 205 760 237">State Council</p>	<p data-bbox="850 205 1052 289">December 27, 2016</p>	<p data-bbox="1138 205 1453 1934"> Calls for achieving systematic breakthroughs in indigenously innovated core technology by 2020. Calls for raising the indigenous innovation capability for cloud computing. States that a prominent shortcoming for China’s informatization is weak indigenous innovation capabilities and the largest weak spot and hidden danger is core technology being controlled by others. Aims to fundamentally establish a secure and controllable information industry ecosystem by 2020. Uses secure and reliable throughout the plan, including in reference to cloud computing and broadband internet infrastructure. </p>

Title of Policy	Releasing Agency	Date	Notes
Information Communication Network and Information Security Plan (2016-2020) 信息通信网络与信息安全规划（2016-2020）	MITT	January 20, 2017	Sets work goals for establishing a secure and controllable information communication network and information security system. Calls for raising the secure and controllable level of internet infrastructure.
13th FYP Development Plan on a Modern Integrated Transportation System 十三五现代综合交通运输体系发展规划	State Council	February 28, 2017	Calls for constructing a trusted system for [transportation] industry security network, and basically realizing secure and controllable for major information systems and critical infrastructure. Promotes pushing forward exports of all types of domestically produced aviation equipment and helping indigenously branded cars go international.

V. Appendix 2: China MIC 2025-related Funds¹³⁹

A. Funds Targeting MIC 2025 Industries

Name	Estimated Value	Purpose
Industrial Transformation and Upgrading Fund		Sets to increase industrial products quality and strengthen indigenous innovation, and indigenous brands. Focuses on industrial area indigenous innovation, including software, integrated circuits, computers, communications, networks, etc.
Advanced Manufacturing Industry Investment Fund	\$3 billion (RMB 20 billion)	Covers all industries in MIC 2025.
National Emerging Industries Investment Guiding Fund	\$6 billion (RMB 40 Billion)	Aims to support strategic and emerging industries and high-technology industries.
Major Technology Equipment Insurance Compensation System		Supports the use and promotion of robotics on the “Major Technology Equipment Promotion and Usage Guiding Catalogue.”
IC Investment Fund	\$150 billion	Uses funds to finance investment M&A for companies and technologies in the semiconductor industry

¹³⁹ These charts are a non-exhaustive list of MIC-2025 related funds

Name	Estimated Value	Purpose
Made in China 2025 Strategic Cooperation Agreement (between China Development Bank and MIIT)	\$44.8 billion (RMB 300 billion)	Provides financial support to implementing the MIC 2025 plan.
The Special Constructive Funds	\$270 billion (RMB 1.8 trillion)	Provides financial support to a number of policy initiatives, including MIC 2025 and Internet Plus.
Shaanxi MIC 2025 Fund	\$117 billion (RMB 804 billion)	Provides financial support around 100 projects in 14 areas.
Gansu MIC 2025 Fund	\$37 billion (RMB 260 billion)	Provides financial support to over 600 major projects.
Anhui Manufacturing Development Fund	\$4.36 (RMB 30 billion)	Promotes Anhui's transformation from a big manufacturer to a strong one.
Sichuan MIC 2025 and Innovation-Driven Project Guiding Fund		Supports ten development areas in the Sichuan MIC 2025 Action Plan.

VI. Appendix 3: Chamber Analysis of China's MIC 2025 Technical Area Road Map

1) Next Generation Information Technology

a) Integrated circuits and specialized equipment

- i) **Goal for 2020:** By 2020 gradually narrow the gap between the IC industry and advanced international levels, and for the whole industry to average yearly sales growth exceeding 20 percent. Mobile intelligent terminals, network communications, cloud computing, networking, data and other large IC design technology to reach advanced international levels, and for the initial formation of the industry ecosystem. 16/14nm manufacturing to achieve scale production, packaging and testing technology to reach the advanced international level, key equipment and materials to enter into the international procurement system, and to basically complete an IC industry system with advanced technology and is safe and reliable.
- ii) **Goal for 2030:** The main segments of the IC industry chain to reach advanced international levels, and a batch of companies to enter the international first-tier.
- iii) **Support Strategy & Protection:** Gradually expand the scale of the National IC Industry Investment Fund, or establish a second or third fund. Strengthen policy and resource coordination; for instance the IC Research and Development (R&D) Projects, the National Science and Technology Major Projects in supporting common technical R&D, and the National IC Industry Investment Fund in supporting industry development. To provide support, set policies to introduce, understand, and absorb technology.

b) Information and telecommunication equipment

- i) **Goals for 2020:** Have the information and telecommunication equipment industry technology and industry capability enter the ranks of powerful countries, and form a relatively complete industry system and innovation system.

- (1) Wireless Mobile Communication: Become one of the leaders in 5G international standards, technology, and industry. Domestic production (not including Taiwanese companies) of mobile telecommunication system equipment, mobile terminals, mobile terminal chips to reach 75%, 75%, and 35%, respectively, of the domestic market, international market share is expected to be 35%, 25%, and 15% respectively.
- (2) Next Generation Internet: Domestic production of optical communication equipment to maintain number one spot internationally, expect to reach 50% market share internationally; domestic production of routers and switches is expected to reach 20% international market share.
- (3) High Performance Computers and Servers: It is expected that international market share for domestically produced high-performance computers and servers will reach 30%, and the domestic market share will reach 60%; reach wide-spread usage of domestic high-end service products with comparable overall performance to advanced international products in financial services, telecommunications, smart cities and other critical areas; use of domestically made branded servers for CPU to achieve industrial application.

ii) **Goals for 2025**: Have a more complete information and telecommunication equipment industry, in which the strength of the whole industry is ranked in the forefront of world powers.

- (1) Wireless Mobile Communication: Domestic production of mobile telecommunication system equipment, mobile terminals, mobile terminal chips to reach 80%, 80%, and 40%, respectively, of the domestic market, international market share is expected to be 40%, 45%, and 20% respectively.
- (2) Next Generation Internet: Domestic production of optical communication equipment expected to reach 60% market share

internationally; domestic production of routers and switches is expected to reach 25% international market share.

(3) High Performance Computers and Servers: It is expected that international market share for domestically produced high-performance computers and servers will reach 40%, and the domestic market share will reach 80%. It is expected that domestically made high-end servers will exceed 50% of the domestic market; use of domestically produced branded servers for CPUs reach above 30% of the domestic market.

iii) **Coordinated and innovative construction of secure and reliable national production of hardware and software**: Propose constructing next generation high-performance computer servers, basic software, and application test boards for domestically produced CPUs with indigenous IP, use next generation high-performance computers, high-end servers, and storage equipment, as well as basic software with indigenous IP (operating systems, databases, and middleware), support use and application demonstrations of high-end servers and storage equipment technology. Propose promoting a plan for complete domestic production of software and hardware for at least the critical application areas of financial services, telecommunications, and smart cities. By 2020, achieve domestically produced servers for financial services and telecommunications industries to reach 75% market share, domestically produced basic software to reach 50% market share; by 2020, achieve domestically produced servers for financial services and telecommunications industries to reach 90% market share, domestically produced basic software to reach 75% market share.

c) Operating systems and industrial software

i) **Goals for 2020**: Achieve breakthroughs in certain core technologies, basically form Chinese industry software technology standards and ecosystem, and have low-end account for over 30% of the market. Focus on raising production efficiency and service-oriented manufacturing, and have autonomous “cloud” plus “terminal” industrial big data platforms in major industries exceed 40% of application rate.

- ii) Goals for 2025: Make breakthroughs on a vast number of core technologies, form an autonomous control operating system and industrial software standards, and have autonomous industrial software exceed 50% market share. Have “Internet Plus” smart industrial cloud have usage rates exceeding 60% market share in major industries.
 - iii) **Strategic support and guarantees:** Encourage strong companies to lead setting international standards. Establish national testing and a standards certification system for operating systems and industrial software.
- d) Core information equipment for smart manufacturing
- i) **Goals for 2020:** Basically complete the standards and system for core information equipment for smart manufacturing, make breakthroughs in core and critical technologies for a batch of core information equipment for smart manufacturing, so that Chinese made basic information equipment for smart manufacturing, industrial control equipment, industrial sensors, smart instrumentation and testing equipment, Internet of Things (IOT) manufacturing equipment, and industrial information security equipment products reach wide-spread use in the domestic market, and for the domestic market share to reach above 40%, supporting at least 5 companies with yearly revenue exceeding RMB 10 billion.
 - ii) **Goals for 2025:** Build a an autonomous control, secure and reliable, and core information equipment for advanced smart manufacturing industry ecosystem and technical innovation system, have domestically made core information equipment for advanced smart manufacturing have a leading position in the domestic market with domestic market share reaching 60%, and the overall technical level reaching internationally advanced levels.
 - iii) **Strategic support and guarantees:** Establish a national laboratory for core informational equipment for smart manufacturing.

2) High-end Numerical Control Machinery and Robotics

a) High-end computerized numerical control (CNC) machine tools

- i) **Goals for 2020:** High-end CNC machine tools and basic manufacturing equipment to exceed 70% of the domestic market, CNC system standard and intelligence to reach 60% and 10% of the domestic market share, respectively, spindles, screws, rails, and other medium- to high-grade component capability to reach 50% domestic market share.
- ii) **Goals for 2025:** High-end CNC machine tools and basic manufacturing equipment to exceed 80% of the domestic market, among these CNC machine tools for automobile industry mean time between failures (MTBF) to reach 2,000 hours, maintaining accuracy for 5 years; CNC system standard and intelligence to reach 80% and 30% of the domestic market share, respectively, spindles, screws, rails, and other medium- to high-grade component capability to reach 80% domestic market share.
- iii) **Strategic support and guarantees:** Create national innovation centers for advanced industrial design and CNC machine tools.

b) Robotics

- i) **Goals for 2020:** Indigenous brands of industrial robots to reach 50% market share for the domestic market, domestically produced critical components to reach 50% of the domestic market, product MTBF to reach 80,000 hours; achieve a small batch of production and usage for service robots for elderly care, rehabilitation, social services, and disaster relief and rescue; achieve breakthroughs in next generation core technology; develop 2-3 companies with yearly production above 10,000 units, output value exceeding RMB 10 billion, and are internationally competitive leading companies; create 5-8 robotics industry clusters.
- ii) **Goals for 2025:** Form a complete robotic industrial system, and strive to reach internationally advanced levels in robotic R&D, manufacturing, and system integration. Indigenous industrial robotic brands to reach over 70% market share domestically, domestically produced core components to

reach 70% market share domestically, main technical indicators for products to reach foreign levels, and MTBF to reach internationally advanced levels; service robots to achieve high-level production, and for service robots to start having widespread use in peoples' lives, social services, and national defense, with a certain amount of products for export; successful development of a next generation robotic prototype, and achieve a certain scale demonstration usage; have 1-2 companies enter the top 5 companies.

- iii) **Strategic support and guarantees:** Prepare a plan for robotics that supports and promotes the indigenous innovation capabilities of robotics and establishes indigenous brands. Companies that help lead, contribute breakthroughs, or reach targets will be rewarded. Innovation and testing centers will also be created to promote certification of robots and are reliable and safe.

3) Aerospace and aviation equipment

a) Aircrafts

- i) **Goals for 2020:** Operating revenues for the civil aircraft industry will exceed RMB 100 billion; complete development, production, and delivery of 150-seat single-aisle main-line aircraft; main-line aircraft delivery should be above 5% of the total domestic market, turboprop branch-line airplane delivery should be 5-10% of the total international market, and general airplane and helicopter delivery to reach 20% and 10% of the international market.
- ii) **Goals for 2025:** Operating revenues for the civil aircraft industry will exceed RMB 200 billion; complete development, production, and delivery of 280-seat double-aisle main-line aircraft; main-line aircraft delivery should be above 10% of the total domestic market, turboprop branch-line airplane delivery should be 10-20% of the total international market, and general airplane and helicopter delivery to reach 40% and 15% of the international market.

- iii) **Strategic support and guarantees:** Formulate an airplane development plan and accompanying policies to increase the promotion of domestic production of the airplane industry. Carry out special supportive policies for domestic production of special equipment R&D.
- b) Aviation engines
- i) **Goals for 2020:** Complete a CJ-1000A model; complete a 1,000kgf level turbofan and a 1,000kW level turbofan demonstration and development model; achieve industrialization for aviation piston engines; some products will start to seize the domestic aircraft market, and start to open-up the after sales market, to further expand China's airline engine industry.
 - ii) **Goals for 2025:** Commercial service of the CJ-1000A; complete airworthiness certification for the 1,000kgf level turbofan, the 1,000kW level turbofan, and other major products; complete model development of the 5,000kW level turboprop. Achieve the first indigenously developed advanced large-scale civil turbofan for domestic commercial service, moving China's aviation engine industry into the top echelon internationally.
 - iii) **Strategic support and guarantees:** Promote the development of indigenously innovated aviation engines.
- c) Aviation airborne equipment and systems
- i) **Goals for 2020:** Initial development of the "system, equipment, and component" three levels of aviation equipment and systems supporting systems; establish a long-term, stable, high-quality, and trustworthy aviation material and component supporting system and complete industrial chain.
 - ii) **Goals for 2025:** Achieve 30% market share domestically for regional aircraft airborne products; general aircraft airborne products to have 50% market share; develop several system-level suppliers for critical aircraft airborne equipment and system areas; realize self-sufficiency of aircraft material and components.

iii) **Strategic support and guarantees:** Establish a national laboratory for airborne equipment and systems.

d) Aerospace equipment

i) **Goals for 2020:** Form next generation launch vehicles, basically complete the main functionality of the national civil aerospace basic infrastructure, satisfying the needs of China's main business areas, complete manned space flight and lunar exploration project three-step mission, reach a self-sufficient rate of over 60% for special information applications, and form a more perfected satellite application industry chain.

ii) **Goals for 2025:** Build an efficient, secure, and adaptable space transportation system with a rational layout, global coverage, and efficient operation of national civil space infrastructure, forming a long-term, stable, and efficient space application service system, possessing interplanetary probe capability, and reaching a self-sufficiency rate above 80%, and industrialization development reaching advanced international levels.

4) Maritime engineering equipment and high-tech maritime vessel manufacturing

a) Marine engineering equipment

i) **Goals for 2020:** Indigenous design and construction of maritime construction equipment and high-tech ships to reach 35% and 40% of the international market, respectively; marine construction equipment and high-tech ship critical system and equipment to reach 40% and 60%, respectively, self-supporting rate; form the R&D base for domestic offshore oil exploration equipment technology; basically achieve self-supporting ability for core equipment for marine engineering below-water equipment as well as for 500 meter below-water production systems and specialized system production and testing capability; launch research on extraction equipment for marine mineral resources and national gas hydrate, wave/tidal energy and other marine renewable resource development equipment, and desalination, seeking breakthroughs in some critical and core technology.

- ii) **Goals for 2025:** Have more than 5 internally recognized manufacturing companies, and some areas be international leaders in design and manufacturing; indigenous research, design, and construction of main marine construction equipment and high-tech ships to reach 40% and 50% domestic market share, respectively; self-supporting rate for core systems and equipment to reach 50% and 80%, respectively; realize complete self-supporting ability for core equipment for marine engineering above water equipment as well as for 1,500 meter below-water production systems and specialized system production and testing capability, and achieve breakthroughs on the design, manufacture, testing, and installation of 3,000 meter below-water production systems and other critical technology; have production capability for extraction equipment for marine mineral resources and national gas hydrate, wave/tidal energy and other marine renewable resource development equipment, and desalination, and launch some pilot applications; create complete digitization, networked, smart, and green design and manufacturing system.

- iii) **Strategic support and guarantees:** Speed up the construction of indigenous innovation capabilities for deep ocean construction equipment.

5) Advanced rail equipment

a) Advanced rail transportation equipment

- i) **Goal 2020:** Research capabilities for rail transportation equipment and leading products to reach internally advanced levels, and industry sales to exceed RMB 650 billion, and for overseas business to account for over 30% of total sales, and the service industry to account for over 15%, and for major products to enter the EU, U.S., and other developed markets.

- ii) **Goal 2025:** China is to form a complete rail transportation equipment manufacturing industry, possessing an innovation system that has continuous innovation, in main areas promotes smart manufacturing, main products reaching internationally advanced levels, overseas business to account for 40% and the service industry to account for over 20%, leading

revisions to international standards, construct an internationally leading modern rail transport equipment industry system, and accounting for the high-end global industry chain.

6) Energy-efficient and new-energy vehicles (NEV)

a) Energy-efficient vehicles

- i) **Goal for 2020:** By 2020, form market-driven, enterprise-focused and research-based energy-efficient vehicle manufacturing system. Indigenous products should reach 40% of the market; fuel consumption standards for new commercial-use vehicles should be close to advanced international standards, domestically produced key parts should surpass 70% of the market; average fuel consumption of passenger-use vehicles should be better than 5L/100km, domestically produced key parts should surpass 50% of the market; have popular car types and popular car companies, 5 enterprises with sales of energy-efficient vehicles in the top 10. Indigenous products pp100 quality standard is equal to that of joint venture (JV) branded products.
- ii) **Goals for 2025:** By 2025, form new a complete independent and controllable energy-efficient vehicle industrial chain, indigenous products to reach 50% of the market; fuel consumption standards for commercial-use vehicles to reach advanced international standards, domestically produced key parts should surpass 80% of the market; average fuel consumption of passenger-use vehicles should be better than 4L/100km, domestically produced key parts should surpass 60% of the market; 3 enterprises with sales of energy-efficient vehicles in the top 5, the reputation of indigenous products to surpass that of JV brands, indigenous key products to reach 60% or the market, have energy-efficient commercial vehicles that have internationally advanced levels.

b) NEV

- i) **Goals for 2020:** By 2020, form market-driven, enterprise-focused and research-based energy-efficient vehicle manufacturing system. Indigenous NEV annual production should exceed 1 million units, have more than 70%

of the market; produce popular car types that enter into the top 10 of global sales, NEV passenger vehicles exports should achieve economies of scale, MTBF vehicle mileage to reach 20,000 km; power battery, motor, and other critical system should be at advanced international levels, and should have 80% of the Chinese market.

- ii) **Goals for 2025:** By 2025, form new a complete independent and controllable industrial chain, 3 million annual production of NEVs on par with advanced international standards, indigenous NEVs to reach over 80% of the market; product technology standards should be on par with global standards, have 2 NEV enterprises that are in top 10 of global sales of first-class car companies, foreign sales should be 10% of total sales; hydrogen, hydrogenation, and other supporting infrastructure to be basically completed, fuel cell vehicles to achieve small-scale regional operation.
- iii) **Support Strategy and guarantees:** Increase support for research of critical core technologies, support creation of NEV technology innovation alliance, set up a common technology platform for industry. Increase infrastructure for battery charging stations, hydrogen refueling stations. Create cooperative development mechanism for NEV and smart car, smart grid, smart cities infrastructure, as well as coordinated development mechanism for critical parts and materials.

c) Smart cars

- i) **Goals for 2020:** By 2020, initial creation of indigenous smart car innovation system that is enterprise focused, market guided, closely integrated with government-industry research, and is developed through cross-industry cooperation. 50% of automotive informatization products to be indigenous, over 40% of DA, PA cars to be indigenous, grasp critical technology for sensors and controls, supply capability should meet independent-scale demand, product quality should meet advanced international standards. Start construction of smart transportation cities, indigenous facilities with over an 80% rate.

- ii) **Goals for 2025:** By 2025, form basic foundation of indigenous smart car industrial chain and smart transportation system. 60% of automotive informatization products to be indigenous, over 40% of DA, PA cars to be indigenous; sensors and controls should meet international advanced standards, grasp key actuator technology, have 1 enterprise with supply scale in the top 10 of supplier companies in the world; indigenous smart trucks to begin large-scale export; achieve digitized, networked, smart automotive for entire life cycle, complete initial transition and upgrade of the auto industry.

- iii) **Support Strategy & Protection:** Establishment of a national smart car common technology research institute and innovation center to support development of key parts companies. Perfect the legal and regulatory system related to smart cars, establish new smart car shared industrialized operating model and perfected supporting management system.

7) Electrical equipment

a) Electricity generation equipment

- i) **Goals for 2020:** Advanced power equipment industry scale to reach 100 million kW annually, to meet changes in China's energy structure and demand for major infrastructure construction, overall technical levels to reach internationally advanced levels, enter into ranks of global leaders. Domestically produced power equipment to reach 90% of the domestic market, and the proportion of exports to reach 30% of annual production.

- ii) **Goals for 2025:** Create 3 global enterprises with capital, scale, technology, quality, brand advantages, and core competitiveness. Possessing continuous innovation capability, completely equipped large scale-thermal power, hydropower, and nuclear power facilities to reach international advanced and leading levels, have indigenous IP for new energy and renewable energy equipment and energy storage devices to have over 80% of the market.

b) Electricity transmission equipment

- i) **Goals for 2020:** Power transmission output value reach RMB 2.2 billion; domestically produced key parts reaches 80% or more of the domestic market; power transmission complete equipment export proportion over 20%; ultra-high voltage power transmission technology is a global leader, enter into ranks of global powerhouses.
- ii) **Goals for 2025:** Power transmission output value reach RMB 3 billion; create a China-led international standard system for ultra-high voltage power transmission complete equipment; domestic production of key parts reaches 90% or more of the domestic market; power transmission complete equipment export proportion over 25%; product reliability and technological specifications to reach international advanced levels.

8) Agricultural machinery and equipment

a) Agricultural equipment

- i) **Goals for 2020:** Create an open and coordinated support capacity for core features and machine test and detection. Agricultural machinery industry total output value to reach RMB 600 billion, domestic production of agricultural machinery products to reach over 90% of the market, large-scale tractors with over 200 horsepower, cotton picker machines, and other high-end products are about 30% of market. Industrialize variable application technology, effective use of fertilizer and pesticide reaches 40%. Control core parts manufacturing and reliable key technologies, MTBF for tractors and combine harvesters increased to 250 hours and 60 hours respectively.
- ii) **Goals for 2025:** A full range of agricultural equipment for the production of bulk grain and strategic economic crops, a clear increase in agricultural equipment information collection, intelligent decision-making, and precision work, and create a plan for the informatization of agricultural production. Agricultural machinery industry total output value reaches RMB 800 billion, domestic production of agricultural machinery products to reach over 95% of the market, large-scale tractors with over 200

horsepower, cotton picker machines, and other high-end products are about 60% of market. Smart seeding and fertilizing, plant protection, harvesting machinery, effective use of fertilizer and pesticide reaches more 50%. Comprehensively grasp core equipment manufacturing and machine reliability of key technologies, MTBF for tractors and combine harvesters increased to 350 hours and 100 hours respectively.

9) New materials

a) Advanced basic materials

- i) **Goals for 2020:** Reach effective control over the entire scale of the basic material industry, see initial results from adjustment to the industry structure, achieve self-sufficiency of advanced basic materials, form some export capability.
- ii) **Goals for 2025:** Industry structure is noticeably adjusted, adjustment to basic material products achieves upgrades and replacements, have over 90% of the domestic market.

b) Critical strategic materials

- i) **Goals for 2020:** Achieve industrialization and application demonstration for over 30 kinds of critical strategic materials. Effectively resolve urgent needs in the development need of next generation information technology, high-end equipment manufacturing, and other strategic emerging industries, critical strategic materials exceed 70% of domestic market; begin to create joint upstream and downstream innovation of strategic new materials, an application demonstration system, and public service science and technology platform.
- ii) **Goals for 2025:** By 2025, basically solve the problem of restrictions on strategic materials for important areas of high-end manufacturing, critical strategic materials have over 85% of domestic market. Some products enter into global supply system, key varieties fill the domestic void, achieve an indigenous IP system.

c) Cutting edge materials

- i) **Goals for 2020:** Accumulate a number of cutting edge core technology patents, some products achieve scale production, achieve application demonstration in key areas.
- ii) **Goals for 2020:** achieve effective layout of cutting edge materials technology, standards and patents; cutting edge materials achieves important breakthrough and achieves applications of scale, some areas achieve global leading standards.

10) Biomedicine and high-performance medical devices

a) Biomedicine

- i) **Goals for 2020:** Promote a large number of enterprises to achieve drug quality standards and systems that are in line with international standards, among which at least 100 pharmaceutical enterprises obtain U.S., EU, Japanese, World Health Organization authentication and achieve product export; according to international drug standards, develop and promote 10-20 chemical drugs and high-end drugs, 3-5 new traditional Chinese medicines, 3-5 new biotech drugs complete drug registration in Europe, U.S. and other developed nations, speed up the development of internationalization of domestically produced drugs. Before 2020 when international patents for blockbuster drugs expire, achieve over 90% generic production. Achieve breakthroughs for 10-15 important core and critical technologies; begin to establish national drug innovation system and innovation team.
- ii) **Goals for 2025:** By 2025, basically achieve drug quality standards and systems that are in line with international standards; develop chemical drugs, traditional Chinese medicine, biotech drugs focused on 10 major diseases, achieve industrialization of 20-30 innovative new drugs; 5-10 drugs with indigenous property rights receive U.S. Food and Drug Administration or EU authentication, and enter the international market;

construct, improve, and support the national drug innovation system for external services, form of high-level innovation team with an international perspective, promote China's drug internationalization development strategy.

b) High-performance medical devices

i) **Goals for 2020:**

- (1) Annual manufacturing scale reaches 600 billion;
- (2) County-level hospitals domestically produced mid and high level medical equipment reach a 50% rate;
- (3) Domestic production of core parts reach 60% of the domestic market;
- (4) Build 5 or more platforms and joint innovation centers for construction of scientific and technological achievements;
- (5) Form 20 demonstration and application bases;
- (6) Form 3 or more internationally recognized brands.

ii) **Goals for 2025:**

- (1) Annual manufacturing scale reaches 1.2 trillion;
- (2) County-level hospitals domestically produced mid and high level medical equipment reach a 70% rate;
- (3) Domestic production of core parts reach 80% of the domestic market;
- (4) Build 10 or more platforms and joint innovation centers for construction of scientific and technological achievements;
- (5) Form 6 province-level industrial clusters with output value of RMB hundreds of billions;
- (6) Form 30 demonstration and application bases;
- (7) In all major product areas form 5 or more internationally recognized brands.



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