

Made in China 2025 and Advancements in Artificial Intelligence: An Evaluation of China's Economic Strategy Development

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Abstract

China has long been recognized as the world's manufacturing hub. The “Made in China 2025” initiative, coupled with advancements in artificial intelligence, positions the country to enhance its industrial capabilities and global competitiveness. This paper aims to provide a snapshot of the results from the “Made in China 2025” (MIC 2025) initiative and examines how this strategic plan has propelled China’s development in Artificial Intelligence (AI), which currently gives the country a global leadership edge in this transformative technology.

Keywords

Made in China 2025, artificial intelligence, economic development, technology

I. WHAT IS MADE IN CHINA 2025 ?

“Made in China 2025” is a strategic industrial policy launched by the Chinese government in 2015. It aims to transform China from a low-cost manufacturing hub into a high-tech powerhouse, upgrade its manufacturing sector, and reduce its dependency on foreign technology.

To achieve the goals of MIC 2025, the Chinese government developed and deployed five strategic initiatives spanning 10 priority sectors identified as crucial for economic advancement.

A. The Five Strategic Initiatives:

1. Establishment of Research and Development Centers across China — target to build 40 such centers by 2025.
2. Development of High-end Industrial Projects across all the key industries — to enhance China’s market share and intellectual property in high-value sectors.
3. Promotion of Green Manufacturing and Sustainable Production — develop and implement worldwide-leading green manufacturing practices.
4. Advancement of Smart Manufacturing — including robotics and digitalization, to reduce production costs and time.
5. Enhancement of New Materials Production — to increase self-sufficiency in core materials and components.

B. The 10 Priority Sectors of Key Industries:

1. Next-generation information technology
2. Numerical control tools and robotics
3. Aerospace and aviation equipment
4. Maritime engineering equipment and high-tech shipping
5. Advanced rail equipment
6. Energy-saving and new energy vehicles

7. Electrical equipment
8. Agricultural machinery and equipment
9. New materials
10. Biopharma and high-end medical devices

II. “MADE IN CHINA 2025” SCORECARD

Since the launch of MIC 2025, the 10 key industries targeted by the initiative have experienced varying degrees of success in advancing toward the program's goals. Some sectors have achieved significant progress, while others have faced setbacks.

In May 2025, the U.S. Chamber of Commerce presented an independent report prepared by the Rhodium Group, titled “Was ‘Made in China 2025’ Successful?” The research measured the outcomes of MIC 2025 across four main categories: China’s import dependency, dependency on foreign companies, global competitiveness, and technological leadership. The report provided some insights [1]:

“Overall, China’s economic growth is currently slowing, and significant imbalances and inefficiencies are hindering its progress. However, China’s economy has also benefitted from a remarkable surge in industrial and technological capabilities and performance tied directly to MIC25. That surge, in turn, is driving China’s competitiveness and innovation in MIC25 sectors on a global scale.”

Center on China’s Economy and Institutions, Stanford University, updated its All SCCEI China Briefs on May 15, 2025. It cited an analysis of financial and patent data of roughly 1,700 manufacturing firms listed in China, revealing that participation in the MIC 2025 program had a limited impact on firm productivity and innovation measures [2]:

“These MIC 2025 firms outperformed control firms in subsidy receipt and productivity before the policy, suggesting pre-existing advantages. They showed an increase in R&D intensity but no clear gains in innovation and productivity outcomes, such as patent counts or total factor productivity gains.”

A. Current Evaluation:

	Key Industry	Progress	Challenges
1	Next-Generation Information Technology	<ul style="list-style-type: none"> ■ Rapid growth in AI, 5G, big data, and cloud computing. Companies like Huawei, Alibaba, and Tencent have become global players ■ China has made advances in quantum computing and digital payments infrastructure 	<ul style="list-style-type: none"> ■ Semiconductors remain a major weakness. China still depends heavily on foreign technology for high-end chips despite massive investments ■ U.S. export restrictions have slowed

			access to cutting-edge chipmaking tools
2	High-End Numerical Control (CNC) Machinery and Robotics	<ul style="list-style-type: none"> China is now the largest market for industrial robots and has boosted local production significantly Companies like Siasun Robotics and Estun Automation are becoming more competitive 	<ul style="list-style-type: none"> Still behind Japan, Germany, and South Korea in core technologies and high-precision CNC systems High reliance on imported control systems and sensors
3	Aerospace and Aviation Equipment	<ul style="list-style-type: none"> Development of the COMAC C919, China's first large passenger jet, marked a milestone in aviation Aerospace manufacturing capabilities have expanded, especially in military aviation 	<ul style="list-style-type: none"> The C919 still depends on foreign engines and avionics systems, although there is a push for domestic alternatives Civil aircraft certification and international trust remain barriers
4	Maritime Engineering and High-Tech Shipping	<ul style="list-style-type: none"> China is a global leader in shipbuilding, especially in commercial vessels Increasing production of LNG carriers and other high-tech ships 	<ul style="list-style-type: none"> Needs to improve in marine equipment R&D, such as advanced propulsion systems and automation
5	Advanced Rail Equipment	<ul style="list-style-type: none"> Major success story: China Railway Rolling Stock Corporation (CRRC) is a global leader China has built the world's largest high-speed rail network and exports rail tech globally 	<ul style="list-style-type: none"> International expansion has been limited by political and economic barriers in some countries Some quality and interoperability concerns remain abroad
6	Energy-Saving and New Energy Vehicles (NEVs)	<ul style="list-style-type: none"> China is the world's largest EV market and home to top EV makers like BYD and NIO Strong government support and infrastructure (e.g., charging stations) have fueled growth 	<ul style="list-style-type: none"> Concerns over battery technology dependence and raw material supply chains (e.g., lithium, cobalt) Increasing international scrutiny over subsidies and market access
7	Power Equipment	<ul style="list-style-type: none"> Advances in smart grids, renewable integration, and ultra-high-voltage (UHV) transmission systems Companies like State Grid Corporation of China have deployed tech domestically and abroad 	<ul style="list-style-type: none"> Lagging in certain core components and smart control software Environmental and cost concerns with older coal-heavy infrastructure
8	Agricultural Equipment	<ul style="list-style-type: none"> Growing domestic production of tractors, drones, and harvesters AI and IoT integration into smart farming technologies is increasing 	<ul style="list-style-type: none"> Still behind in precision agriculture tech, especially compared to the U.S. and EU Fragmented rural markets led to slow adoption of advanced systems

9	New Materials	<ul style="list-style-type: none"> Advances in graphene, rare earths, advanced ceramics, and composites Strong state support for innovation and domestic use 	<ul style="list-style-type: none"> Commercial scalability and quality consistency issues Many advanced materials are still not globally competitive
10	Biopharmaceuticals and High-End Medical Equipment	<ul style="list-style-type: none"> COVID-19 accelerated growth in vaccine R&D and domestic medical equipment production Companies like Sinovac Biotech and Mindray Medical have expanded internationally 	<ul style="list-style-type: none"> Dependence on foreign innovation for high-end drugs and imaging equipment Quality control, global regulatory approvals, and IP remain major hurdles

B. Successes and Setbacks:

	Sector	Overall Progress	Remaining Issues
1	Information Technology	Moderate	Chips, IP restrictions
2	CNC/Robotics	Moderate	Precision tech, core parts
3	Aerospace	Limited	Foreign dependency
4	Maritime	Strong	Advanced systems
5	Rail Equipment	Strong	Global expansion barriers
6	NEVs	Strong	Battery supply, global competition
7	Power Equipment	Moderate	Green transition challenges
8	Agricultural Equipment	Limited	Precision farming
9	New Materials	Moderate	Quality/scaling issues
10	Biopharma & Medical	Moderate	Innovation, IP issues

III. ARTIFICIAL INTELLIGENCE AND “MADE IN CHINA 2025”

“In recent years, China has emerged as a formidable force in the realm of artificial intelligence, driven by a strategic vision that aims to position the country as the global leader in AI innovation by the year 2030. This ambition is outlined in key policy frameworks such as the Next-Generation AI Development Plan (2017) and the Made in China 2025 initiative.” [3]

A. The “New Generation Artificial Intelligence Development Plan”:

On July 20, 2017, China's State Council issued the “New Generation Artificial Intelligence Development Plan” (AIDP). The plan outlined a strategic roadmap for the nation's AI development; it laid out three key milestones:

- 2020: Achieve global competitiveness in AI
- 2025: Achieve world-leading AI breakthroughs
- 2030: Become the global AI innovation leader

The strategy emphasizes innovation and aims to enhance domestic capabilities across various sectors, including manufacturing, healthcare, and transportation. As China persists in making substantial investments in AI research and development, the emphasis is transitioning towards the incorporation of AI into daily applications and enhancing efficiency.

B. Artificial Intelligence is Critical in Achieving MIC 2025 Goals:

Artificial intelligence is a key focus in China’s development plan. The country is expanding AI R&D funding via AIDP, supporting AI chip startups, integrating AI into state-owned enterprises and manufacturing clusters, and promoting AI education and talent pipelines, among other AI-related schemes.

Artificial intelligence is not only a key sector in MIC 2025; it is a catalyst that enables the digital transformation of all 10 strategic industries. It helps China leapfrog traditional bottlenecks, improve efficiency, reduce foreign dependency, and move toward technological self-reliance.

For example, the domestically developed DeepSeek platform is experiencing tremendous success in China after launching its chatbot model DeepSeek-V2 in May 2024. It continued to draw worldwide attention in 2025 and prompted the market to reexamine its existing AI investment amid the rise of more cost-efficient AI agents. Aside from market reaction, DeepSeek brought about different impacts, including increased competition in open-source AI, prompted industry response and innovation, and heightened community engagement and research.

1) AI in core MIC 2025 industries

	MIC 2025 Sector	AI Applications
1	Information Technology	Natural language processing, smart chips, AI cloud platforms
2	Robotics & CNC	Adaptive robot learning, human-robot collaboration, intelligent sensors
3	Aerospace	Flight path optimization, autonomous drones, AI-driven design
4	Maritime	Autonomous ships, smart logistics, AI for naval defense
5	Rail Transport	Predictive analytics for maintenance, intelligent traffic scheduling
6	New Energy Vehicles	Self-driving systems, energy optimization, battery health prediction
7	Power Equipment	Smart grids, energy consumption prediction, load balancing
8	Agricultural Equipment	Precision farming, yield prediction, pest detection via computer vision
9	New Materials	AI-assisted material discovery, simulations for molecular behavior
10	Biopharma & Medical	AI drug discovery, medical imaging diagnostics, health data analysis

2) AI as an enabler of smart manufacturing

- Predictive maintenance — Using machine learning to anticipate equipment failures and reduce downtime.
- Intelligent automation — AI-powered robots can adapt to different tasks and environments in CNC machinery, electronics assembly, and more.
- Digital twins — Simulating production lines and processes to optimize efficiency.
- Quality control — Computer vision systems identify defects in real-time with higher accuracy than human inspectors.

3) AI for policy and industrial planning

- Big data analytics help policymakers monitor industrial upgrades and allocate subsidies more efficiently.
- AI-enhanced R&D platforms accelerate innovation across industries.
- Talent optimization — Matching skilled workers and training programs to industrial needs using AI-driven workforce planning tools.

4) Geopolitical strategy

- Developing home-grown AI capabilities reduces reliance on foreign tech.
- AI sovereignty becomes a pillar of broader technological self-sufficiency, particularly in:
 - Semiconductor design — AI chip design
 - Algorithmic leadership, such as Baidu, Alibaba, Tencent, and Huawei AI Labs
 - National security — military AI, surveillance, cyber defense

IV. ARTIFICIAL INTELLIGENCE’S IMPLICATIONS FOR CHINA

Artificial intelligence has broad and profound implications for China, spanning economic transformation, geopolitical strategy, social governance, and ethical challenges. With a strategic, centralized, and ambitious approach, China aims not just to adopt AI but to establish itself as a global AI superpower by the 2030s.

A. Economic Implications:

1) Industrial transformation

- AI is driving China’s shift from labor-intensive to innovation-driven manufacturing, such as intelligent supply chains and smart factories.
- Key sectors include finance, logistics, healthcare, transportation, retail, and agriculture.

2) Productivity and GDP growth

- McKinsey estimates AI could contribute US\$600 billion+ annually to China’s GDP by 2030 [4].
- AI automates routine work, enhances decision-making, and creates new services such as AI customer support, and autonomous delivery.

3) Startups and ecosystem growth

- China is home to some of the world’s most valuable AI startups such as SenseTime, Megvii, and iFlytek.
- Cities like Beijing, Shenzhen, and Hangzhou have become AI innovation hubs with strong state backing.

B. Geopolitical Implications:

1) Strategic competition with the U.S.

- AI is central to China-U.S. tech rivalry, especially in:
 - Semiconductors
 - Autonomous weapons
 - AI chips and supercomputing
- AI is seen as a “winner-take-all” technology, impacting national security, economic dominance, and soft power.

2) *Cyber sovereignty*

- China promotes its vision of digital governance and AI ethics, emphasizing state control over data and platforms.
- It exports AI-powered surveillance systems to other governments as part of the “Digital Silk Road” Initiative.

C. *Social and Political Implications:*

1) *Surveillance and social control*

- China is a global leader in AI surveillance — Facial recognition, gait analysis, crowd monitoring, and predictive policing.
- AI is integrated into the country’s “social credit” systems, urban safety monitoring, and public sentiment analysis.

2) *Public services and smart governance*

- AI improves healthcare access via diagnostics (e.g., lung CT scan AI), triage systems, and health monitoring in rural areas.
- AI is used in pandemic response, traffic optimization, and urban planning, such as in smart cities.

3) *Ethics and civil liberties*

- China is being criticized for a lack of transparency and accountability in AI deployments.
- Few legal protections against algorithmic bias, misuse of biometric data, or AI censorship.

D. *Data and Infrastructure Power:*

- 1) *Data advantage* — Large population + weak privacy protections = enormous training datasets.
- 2) *AI infrastructure* — National investments in supercomputers, AI cloud platforms, and AI parks.
- 3) *Development of homegrown large language models (LLMs)* — Baidu’s ERNIE and Tsinghua/THUNLP’s GLM to compete with OpenAI and Google.

E. *Challenges and Risks:*

Although AI holds the promise to revolutionize Chinese manufacturing under MIC 2025, it is crucial to address the associated risks for long-term, sustainable success. China will need to strike a balance between pursuing aggressive technological innovation and implementing relevant governance frameworks, fostering international collaboration, and considering the social implications of these advancements.

	Potential Issues	Challenge	Risk
1	Data Quality and Access	High-quality, labeled, and domain-specific data is critical for effective AI systems. Industrial data can be noisy, incomplete, or proprietary	Poor data can lead to inaccurate models, making AI systems unreliable in critical manufacturing processes
2	Technological Dependence and Bottlenecks	China still relies on foreign technologies for high-end AI chips, sensors, and certain algorithms	Export restrictions (e.g., from the U.S.) could limit access to key hardware and software, slowing progress or creating dependencies
3	Cybersecurity Vulnerabilities	Smart factories and AI systems are deeply interconnected and data-driven	Increases the attack surface for cyber threats, including IP theft, industrial espionage, and sabotage
4	Talent Shortage	There is a global shortage of highly skilled AI and robotics professionals	Insufficient expertise may lead to underperforming systems or failed implementation across industries
5	Ethical and Social Implications	Widespread AI adoption in manufacturing can lead to job displacement and changes in labor dynamics	Social unrest and inequality could increase if workforce upskilling doesn't keep pace
6	Interoperability and Standardization	Diverse industrial sectors use different protocols and systems	Lack of standardization can hinder AI integration, especially in small and medium-sized enterprises
7	Geopolitical Risks	MIC 2025 has drawn scrutiny from countries concerned about China's industrial policy and competitive edge	Trade tensions, sanctions, and tech decoupling (especially from the U.S. and EU) could affect AI development and deployment
8	Over-Reliance on Government Planning	Heavy state intervention may lead to misallocation of resources and stifle innovation	Projects might be driven by political goals rather than market demand or technical viability
9	IP Concerns	Ensuring proper IP protection in an AI-driven environment is complex	Weak IP enforcement may discourage international collaboration and trust