

NOVEMBER 2025

# Embodied AI: China's Big Bet on Smart Robots

Pavlo Zvenyhorodskyi and Scott Singer



---

# **Embodied AI: China's Big Bet on Smart Robots**

Pavlo Zvenyhorodskyi and Scott Singer

© 2025 Carnegie Endowment for International Peace. All rights reserved.

Carnegie does not take institutional positions on public policy issues; the views represented herein are those of the author(s) and do not necessarily reflect the views of Carnegie, its staff, or its trustees.

No part of this publication may be reproduced or transmitted in any form or by any means without permission in writing from the Carnegie Endowment for International Peace. Please direct inquiries to:

Carnegie Endowment for International Peace  
Publications Department  
1779 Massachusetts Avenue NW  
Washington, DC 20036  
P: + 1 202 483 7600  
F: + 1 202 483 1840  
[CarnegieEndowment.org](https://CarnegieEndowment.org)

This publication can be downloaded at no cost at [CarnegieEndowment.org](https://CarnegieEndowment.org).

## Contents

|                                                                  |    |
|------------------------------------------------------------------|----|
| Introduction                                                     | 1  |
| What Is Embodied AI?                                             | 2  |
| Embodied AI: A Physical World Extension<br>into the Real Economy | 4  |
| What Beijing Hopes to Achieve with Embodied AI                   | 5  |
| What the Chinese Government is Doing to Make It Happen           | 8  |
| Where The Industry Stands and Where It Is Headed                 | 10 |
| Conclusion                                                       | 11 |
| About the Authors                                                | 13 |
| Notes                                                            | 15 |
| Carnegie Endowment for International Peace                       | 19 |



## Introduction

On what at first glance appeared to be an ordinary workday in March this year at the factory of China's leading EV manufacturer, Zeekr, a small team of workers went about their usual tasks: lifting boxes, assembling car parts, and performing quality checks. But unlike any typical shift, none of them paused to rest or even stopped for a drink of water. The reason—they were not human. These UBTech robots, powered by a multimodal reasoning model based on DeepSeek R1, were the first publicly known group of humanoid robots deployed as a coordinated team to carry out a wide range of tasks in a complex, real-world industrial setting.<sup>1</sup> Just a few months later, UBTech unveiled the Walker S2, the world's first humanoid robot capable of autonomously changing its own batteries—potentially enabling uninterrupted, twenty-four-hour operation on the factory floor without any human assistance.<sup>2</sup>

These demonstrations offer a glimpse into leading Chinese companies' ability to translate frontier AI capabilities into useful real-world industrial applications. More significantly, these private sector achievements have become central to Beijing's evolving national AI strategy, which seeks to leverage China's combined strengths in AI software and robotics hardware to achieve a distinctive form of technological leadership. While Washington and most of Silicon Valley focus primarily on scaling large language models (LLMs) like ChatGPT and digital AI applications, Beijing has placed a fundamentally different bet. It believes that true AI dominance will come from systems capable of autonomous operation in the physical world—AI-powered robotics, commonly known as embodied AI.

To achieve its ambitions in embodied AI, the Chinese government is rolling out a familiar technological development playbook: encouraging local governments to experiment with different approaches to develop and scale the technology. In response to Beijing's call,

provinces are channeling investment into local companies working on AI systems that can learn from human workers on factory floors, navigate complex physical environments, and bridge the gap between digital reasoning and real-world action.

If China can achieve its vision, embodied AI could potentially solve some of China's most pressing domestic challenges, including turbocharging its sluggish economy and addressing social challenges like its aging population. It could also yield a broad-based set of strategic advantages. Building a mature embodied AI ecosystem and securing durable global leadership in this area could, in theory, form a key pillar of China's future economic and military power, and place it ahead in the global race toward artificial general intelligence (AGI). But how does China plan to do this, and what obstacles stand in the way?

This paper addresses that question by examining how the Chinese government conceives of embodied AI, the steps it is taking to advance it, and the ecosystem's strengths and weaknesses. The paper also sheds light on how progress in embodied AI could reshape China's economy, strengthen its national competitiveness, and impact the world.

## What Is Embodied AI?

In both the West and China, embodied AI is generally understood as AI-powered hardware systems that can perceive and interpret multimodal inputs from the physical environment, including by sight, sound, and touch. They make autonomous decisions, carry out physical actions in the real world, and learn from those interactions.<sup>3</sup>

Importantly, while embodied AI is often associated with humanoid robots, which mimic the appearance and functions of humans, the two are not synonymous. Humanoids are machines defined by their human-like physical appearance, but their functional capabilities

**Embodied AI is generally understood as AI-powered hardware systems that can perceive and interpret multimodal inputs from the physical environment, including by sight, sound, and touch.**

vary greatly depending on their software, sensing, and control systems. In practice, many humanoid robots remain limited-purpose systems, only capable of performing narrowly defined tasks, such as sitting at a reception desk and waving at visitors. The defining feature of embodied AI systems, on the other hand, does not lie in their physical form (see figure 1). These systems can take multiple physical forms, with humanoid robots being only one example; others include quadrupeds, drones, autonomous vehicles, industrial manipulators, and microbots. Industrial robots, for example, have long automated repetitive work on assembly lines even without generative AI.

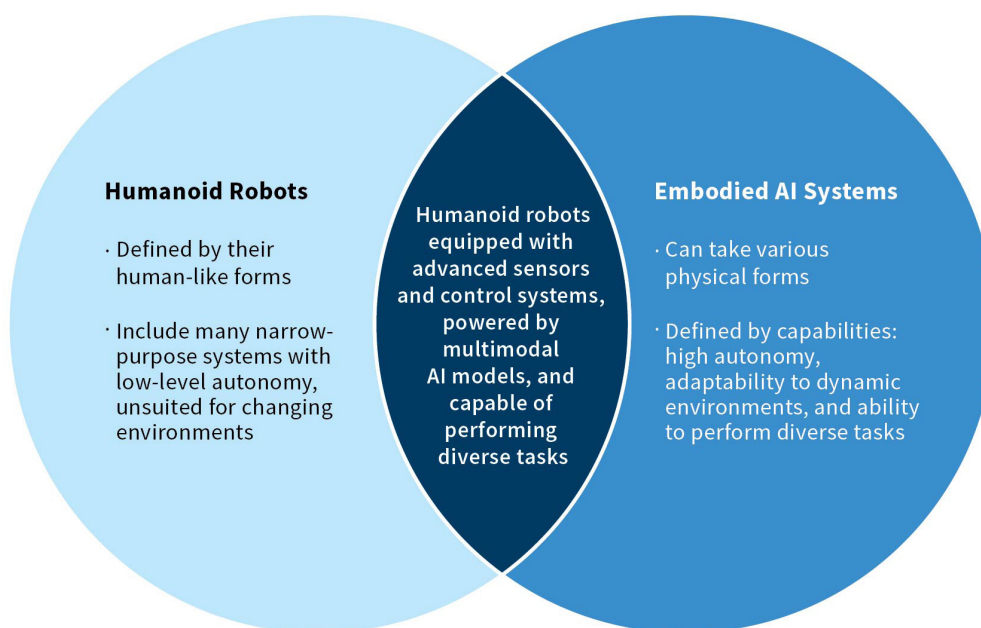


What defines embodied AI systems instead are their capabilities. They integrate advanced software, sophisticated sensors, and intricate control systems that enable a high degree of autonomous decisionmaking, adaptability to dynamic environments, and the ability to perform diverse tasks—for instance, completing all stages of a car production line traditionally handled by human workers.

Embodied AI systems are typically equipped with a rich set of sensors and are powered by multimodal AI models that support perception, reasoning, and action. These models typically draw on the capabilities of large language models (LLMs), using them as the linguistic and reasoning backbone to which vision- and action-modules are added. Embodied AI systems stand apart for their ability not only to interpret data but also to interact with and adapt to diverse physical environments. This sets them apart from conventional applications, in which AI enhances mostly single-purpose tools and services, such as CT diagnostic assistants or weather prediction models. It also distinguishes them from software-based “agents,” which act purely in digital environments.<sup>4</sup>

In practice, embodied AI has fuzzy boundaries and is more of a spectrum than a singular, easily recognized threshold. The lower end of this spectrum, comprising systems capable of performing a limited range of real-world tasks, such as UBTech’s Walker S2, has already been developed. However, neither China nor the West have achieved the fully autonomous systems grounded in continuously updated world models that some imagine as the foundation for embodied AGI.

**Figure 1. Relationship Between Humanoid Robots and Embodied AI Systems**



Western and Chinese research communities differ in the amount of attention and resources they are allocating to studying embodied AI. In the United States, most interest in embodied AI appears to be confined to the private sector. Big tech players such as Tesla, with its autonomous vehicles and smart robot Optimus, are making substantial investments in embodied AI.<sup>5</sup> Meanwhile, emerging companies such as Figure AI, which produces general-purpose humanoid robots, are also gaining traction, securing substantial external funding.<sup>6</sup>

By contrast, in China, enthusiasm for embodied AI extends well beyond the private sector. Since the beginning of this year, the country's expert community has witnessed a rapid surge of interest in embodied AI, with the topic rapidly gaining prominence in both policy and academic discussions.<sup>7</sup>

## Embodied AI: A Physical World Extension into the Real Economy

The rise of embodied AI in Chinese policy discourse has not emerged in a vacuum. China's embodied AI push reflects a deliberate effort by the government to translate advances in generative AI from the purely digital realm into what Beijing frequently refers to as the real economy: sectors encompassing the production of tangible goods and essential services that underpin economic activity in the physical world. In so doing, China hopes to revitalize its economy amid recent slow economic growth.<sup>8</sup>

The idea that the real economy constitutes the foundation of China's economic strength and must therefore be the primary focus of domestic AI adoption is deeply rooted in President Xi Jinping's economic thought. Xi's views on the economy were shaped in part by lessons from the 2008 global financial crisis. According to an analysis by the Chinese Communist Party's Institute of Party History and Literature, the crisis exposed the risks of excessive reliance on the virtual economy—nonphysical forms of economic activity such

as financial services and digital platforms.<sup>9</sup> Since becoming party general secretary in 2012, Xi has repeatedly called for the deep integration (深度融合) of the digital economy with the real economy,<sup>10</sup> which he regards as the key to China's long-term growth.<sup>11</sup>

**China's embodied AI push reflects a deliberate effort by the government to translate advances in generative AI from the purely digital realm into what Beijing frequently refers to as the real economy.**

Therefore, when the release of DeepSeek's R1 model in January 2025 made it clear that China's capabilities in AI were becoming increasingly mature,<sup>12</sup> the party likely concluded that the time had come to transition AI into the real economy. This conclusion was likely reinforced by the pressing need to revive economic growth amid China's property-market crisis, sluggish domestic

consumption, and the beginnings of population decline.<sup>13</sup> Building on China's earlier advances in hardware systems such as robotics, autonomous vehicles, and drones, Beijing sought to leverage embodied AI as one of the key tools to facilitate this transition.

The party's emerging focus on embodied AI has crystallized across several important reports and speeches after the DeepSeek moment. The March 2025 annual Government Work Report identified embodied AI alongside biomanufacturing, quantum technologies, and 6G as core tools for building the industries of the future.<sup>14</sup> While embodied AI has emerged as a new focus, the party has made clear that LLMs remain an important, complementary element of Beijing's AI agenda. For example, Premier Li Qiang's July 2025 keynote speech at the World AI Conference highlighted embodied AI alongside LLMs as areas of AI currently experiencing major breakthroughs.<sup>15</sup> Most recently, the CCP Central Committee recommended incorporating embodied AI as one of the new drivers of economic growth in China's forthcoming 15th Five-Year Plan for Economic and Social Development.<sup>16</sup> The Central Committee's decision offers the clearest indication to date that the CCP leadership intends to place a long-term strategic bet on embodied AI, expecting it to play a defining role in shaping China's future.

## What Beijing Hopes to Achieve with Embodied AI

Embodied AI could help Chinese leadership achieve five concrete goals across three key dimensions: domestic, strategic, and comprehensive (see figure 2). Domestically, embodied AI could help address structural economic and demographic challenges. Strategically, it could strengthen China's position amid global technological and geopolitical competition. Its third objective is crosscutting: achieving AGI in its truest form by creating general AI fully capable of autonomously interacting in the physical world.

### Goal 1: Catalyze Economic Growth

Domestically, Beijing seeks to use the development and deployment of embodied AI to significantly boost productivity in key industries, such as manufacturing and logistics, that are critical to revitalizing China's slowing economic growth. This goal is articulated in the 2024 "Report on the Development of Embodied AI" co-authored by the China Academy of Information and Communications Technology (CAICT),<sup>17</sup> a research body under the Ministry of Industry and Information Technology. The report's authors note that embodied AI could be leveraged to revolutionize human-machine collaboration, enabling autonomous

**Figure 2. Unpacking China's Embodied AI Ambitions**

DOMESTIC



**Goal 1: Catalyze Economic Growth**



**Goal 2: Address Aging Population**

STRATEGIC



**Goal 3: Strengthen the Military**



**Goal 4: Gain Geoeconomic Advantage**

COMPREHENSIVE



**Goal 5: Achieve AGI**

hardware systems to learn from human coworkers through natural language interfacing, gestures, and motion. CAICT imagines potentially transformative economic impact and claims that over time these systems could replace humans as the most flexible units on industrial production lines, significantly boosting productivity.

## Goal 2: Address Aging Population

Additionally, the CAICT report identifies embodied AI as a means of addressing China's rapidly aging population that is expected to pose a serious challenge to the country's economic growth. Embodied AI systems could substitute for human labor in roles typically affected by worker shortages due to the undesirable or hazardous nature of the tasks, such as those that might expose people to extreme temperatures. They could also provide eldercare services, thereby easing the burden on working-age individuals who, according to Chinese cultural norms, would otherwise be responsible for caring for aging family members.

### **Goal 3: Strengthen the Military**

In addition to its role in advancing the AI frontier, Beijing also regards embodied AI as a technology capable of significantly enhancing the country's military capabilities. The official news outlet of China's People's Liberation Army, PLA Daily, assesses that embodied AI could help China overcome human physiological limitations, redefine the boundaries of unmanned warfare, and give rise to a more agile and efficient combat system.<sup>18</sup> It envisions embodied AI systems that integrate multimodal sensors—such as vision, sound, touch, and even smell—with large multimodal models to autonomously observe their environment, make decisions, and act on the battlefield. Unlike current unmanned systems, which generally still require varying levels of human involvement, these embodied AI systems would offer a much higher degree of real-time tactical autonomy, making them significantly more resilient to electronic warfare interference. They would no longer be mere order executors, but commander-fighters capable of making adjustments in response to changing battlefield conditions.

### **Goal 4: Gain Geoeconomic Advantage**

In addition to addressing economic and societal challenges, embodied AI could provide the Chinese government with substantial geoeconomic advantages. If Beijing effectively leverages its vast manufacturing capacity, it could emerge as the world's leading supplier of embodied AI systems—creating a level of dependence on Chinese technology that might surpass earlier global reliance on emerging technologies such as 5G networks or solar panels. Unlike those technologies, embodied AI has the potential to become a foundational tool for automating a wide spectrum of physical tasks across the global economy, meaning that access to such systems could ultimately determine a country's future economic competitiveness.

Recognizing these stakes, Beijing has already begun laying the institutional groundwork for the global diffusion of embodied AI. Through its recent Global AI Governance Action Plan and AI+ International Cooperation Initiative,<sup>19</sup> China has sought to position itself as the partner best equipped to deliver practical AI applications tailored to the development needs of other countries. It has also announced the creation of a new platform for sharing these applications, the World AI Cooperation Organization (WAICO).<sup>20</sup> While China is currently concentrating on exporting more general AI applications, once embodied AI matures, it could use these established diffusion channels to spread the technology globally—even if it faces real economic constraints.

### **Goal 5: Achieve AGI**

In addition to addressing domestic challenges, some key Chinese thought leaders see embodied AI as a means of accelerating the country's frontier AI capabilities. For example, the CAICT report argues that embodied AI could help advance the ambition of achieving

AGI. The view that embodied AI offers the most promising path toward AGI is echoed by influential Chinese scholars such as Zhang Bo, a member of the Chinese Academy of Sciences and professor at Tsinghua University.<sup>21</sup> Zhang argues that while LLMs have laid a crucial foundation for AGI by enabling machines to understand and generate human language, it is embodied AI that will ultimately allow AI to replicate the full spectrum of human capabilities. He attributes this to embodied AI's ability to interact with and learn from the physical world, which he sees as essential for achieving true general intelligence.<sup>22</sup>

## What the Chinese Government is Doing to Make It Happen

By listing embodied AI among its key priorities in this year's Government Work Report, the Chinese leadership has indicated that it is determined to accelerate its development. The government hopes to encourage academia and local authorities to explore and pilot potential development strategies that could later be scaled up nationally. This "pilot first, scale later" approach is not new—it has long been an important tool in Beijing's innovation policy implementation. It was first employed in the 1980s by Deng Xiaoping during the Reform and Opening Up period, when he established special economic zones in cities like Shenzhen, allowing local governments to experiment with market-oriented reforms before scaling the most successful policies nationwide.<sup>23</sup> More recently, the People's Bank of China adopted this approach for digital currency deployment, launching pilot programs in cities such as Hangzhou and Shenzhen to test the use of the digital renminbi (RMB) with a view toward a nationwide rollout in the future.<sup>24</sup>

Following the government's encouragement, embodied AI has become the subject of an increasing number of scholarly discussions, exhibitions, and conferences across China.

One notable example is the annual China Embodied AI Conference, co-organized

**Various Chinese provincial and municipal governments have sought to position themselves as pioneers for future nationwide policy.**

by the Chinese Association for Artificial Intelligence and major Chinese universities active in AI and robotics research and talent development, such as Tsinghua and Tongji.<sup>25</sup> Its second annual meeting, held in 2025, culminated in the publication "15 Key Research Directions in Embodied Intelligence," which highlighted priorities such as multimodal embodied perception, embodied world model construction, and embodied AI safety.<sup>26</sup> This document, reportedly the first systematic roadmap for embodied AI development in China, is poised to provide the government with a clearer sense of priorities in future funding allocation.

At the same time, various Chinese provincial and municipal governments have sought to position themselves as pioneers for future nationwide policy. Many have launched their own initiatives, but a few stand out due to the scale, ambition, and visibility of their efforts. In particular, the authorities of Beijing, Shanghai, Guangdong, Zhejiang, and Hubei—who are traditionally among the wealthiest in China and have a strong track record of spearheading development of emerging industries through ambitious policy initiatives—have so far taken the lead.<sup>27</sup> These regions have adopted diverse approaches to shaping the development of embodied AI, varying both in their emphasis on different segments of the production chain and in the strategies used to incentivize and support local industry. They have also sought to allocate resources more strategically, focusing on areas of embodied AI development where local companies already hold a relative advantage.

For example, Beijing, home to one of China's leading AI chip developers, Cambricon,<sup>28</sup> has prioritized elements such as high-performance chips tailored for embodied AI applications.<sup>29</sup> Shanghai—headquarters of Hesai Technology,<sup>30</sup> a national leader in sensor technologies for autonomous vehicles—has concentrated on core hardware components.<sup>31</sup> At the same time, governments in Guangdong and Zhejiang have focused on complete embodied AI platforms, specifically multipurpose humanoid robotics. These regions already hold a competitive edge with companies such as Shenzhen-based UBTech Robotics and Hangzhou-based Unitree Robotics leading private sector developments in the embodied AI field. Meanwhile, the Hubei provincial government has focused its efforts on another niche of embodied AI platforms: smart vehicles. It has leveraged the resources of local Dongfeng Motor—one of China's largest car manufacturers—and established the Laboratory for Embodied Intelligence Technology in Automobiles.<sup>32</sup> To support these efforts, the provincial governments have pledged varying levels of funding. For instance, Beijing has launched a 100 billion RMB (approximately \$14.3 billion) investment fund with a fifteen-year lifespan to support AI and robotics.<sup>33</sup> Meanwhile, Shanghai has established an embodied AI fund, with an initial closing of 560 million RMB (approximately \$77 million).<sup>34</sup>

However, this largely devolved, local government-driven strategy is not without downsides. While provinces appear to be attempting to specialize in different segments of embodied AI, the lack of detailed guidance from Beijing risks leading to duplication of efforts and misallocation of resources. A parallel can be drawn with the electric vehicle sector. Fierce inter-provincial competition and overinvestment in local manufacturers produced staggering levels of economic waste and industrial overcapacity.<sup>35</sup> Yet the evolution of China's world-leading EV industry also demonstrates that this seemingly wasteful competition can, over time, generate genuine technological breakthroughs. As with EVs, local government efforts in embodied AI could foster the rise of national champions and provide Beijing with clearer models of how to scale emerging technologies that can later be replicated at the national level.

Ultimately, whether the approach of devolving the initial development of embodied AI to local governments succeeds will depend on several factors. First, national success likely hinges on local governments effectively dividing responsibility across different segments of the embodied AI supply chain and avoiding excessive duplication. Second, success will



also depend on whether sufficient and sustainable financing will be available to support the long-term growth of local embodied AI companies. The latter may prove difficult given the substantial debt many local governments have accumulated over the past decade. This debt was driven by provincial governments responding to Beijing's national growth targets, which encouraged heavy borrowing for investment in infrastructure and manufacturing such as electric vehicles, regardless of returns.<sup>36</sup> Third, technological advances could plateau, and fundamental breakthroughs could be limited. Whether embodied AI systems will ultimately match the dexterity, adaptability, and efficiency of human workers remains uncertain and could take far longer than many current industrial plans assume.<sup>37</sup>

## Where The Industry Stands and Where It Is Headed

While the role of academia and local governments is crucial, Beijing's bet on embodied AI ultimately hinges on the industry's ability to deliver breakthroughs that will make the technology cost-effective and scalable. That effort is already well underway.

National champions are already emerging across key sectors in China's embodied AI industry: Unitree and UBTech in humanoid robotics,<sup>38</sup> DJI in drones,<sup>39</sup> and Baidu Apollo and XPeng in autonomous vehicles.<sup>40</sup> In each of these cases, industry-driven capabilities in robotics, manufacturing, and EVs formed the foundation for integrating AI into existing company infrastructures.

Compared to the rest of the world, China's advantage in embodied AI lies in its robust hardware manufacturing base and supply chain, which could position it to rapidly scale production once the technology matures.<sup>41</sup> This includes cost-effective manufacturing of embodied AI hardware platforms such as robots and drones, as well as some key components of embodied AI systems, such as LiDAR, the sensor technology essential for 3D mapping and environmental navigation.<sup>42</sup> As the world's largest manufacturer, China also holds a

**China's advantage in embodied AI lies in its robust hardware manufacturing base and supply chain, which could position it to rapidly scale production once the technology matures.**

competitive edge in the diversity and abundance of real-world application scenarios, which generate rich datasets critical for training embodied AI systems—many of which are intended for use in production lines.<sup>43</sup> However, Chinese developers often struggle to access this data, prompting some industry leaders to call on the government to grant companies access to datasets held by government agencies and state-owned enterprises.<sup>44</sup>

Much like the rest of the world, China's embodied AI technology remains at a relatively early stage, with the industry still lacking a complete commercial cycle. It largely remains confined to R&D,



small-batch production, and pilot applications in specific scenarios, with key components such as balance and motion control software still under development.<sup>45</sup> However, major industry players are increasingly pushing to accelerate large-scale production and deployment. UBTech, for instance, recently secured a 250 million RMB (approximately \$35 million) order for its Walker S2 industrial humanoid robots from an undisclosed domestic company.<sup>46</sup>

China's comparative weaknesses, on the other hand, include limited access to advanced AI chips and compute for both training and inference of models used in embodied AI systems. It still trails the West, though it is making steady progress.<sup>47</sup> Another key limitation lies in multidimensional sensors, such as torque sensors and six-axis force sensors for high-precision force measurement and perception in embodied AI systems, where China still relies heavily on Western imports.<sup>48</sup>

Despite these limitations, most Chinese experts and industry leaders believe that the country's existing advantages, combined with steady progress in lagging areas and sustained government support, could enable steady technological progress in embodied AI within the next five to ten years.<sup>49</sup> This progress would culminate in the development and deployment of AI systems capable of performing physical work in real-economy settings, advancing Xi Jinping's conceptual objective for the use of AI in the real economy.<sup>50</sup> Meanwhile, some Chinese experts, such as Huang Tiejun, Director of the Beijing Academy of Artificial Intelligence—one of China's leading AI labs working on embodied AI—have made longer-term predictions. Huang has suggested that embodied AI could fully surpass human capabilities by 2045.<sup>51</sup>

## Conclusion

Beijing is making a long-term strategic bet on embodied AI, viewing it as a potential solution to many of China's economic, social, and geopolitical challenges. Yet, whether this gambit succeeds, and in what ways, remains uncertain. Technological breakthroughs may prove elusive, and high levels of local debt could constrain sustained investment. Nevertheless, Chinese leadership appears determined to push forward, committing substantial political will and financial resources to make embodied AI a viable and scalable technology.

Should Beijing develop fully commercially applicable embodied AI systems ahead of other countries, it would likely leverage its comparative advantages—a robust manufacturing base, comprehensive supply chains, and hundreds of thousands of factories where robots are likely to be deployed in the future—to rapidly scale up production and position itself as a dominant player in the global embodied AI systems market. In such a scenario, the world could depend on Chinese embodied AI technologies across critical economic sectors, including manufacturing, logistics, healthcare, and service industries. It would also greatly strengthen China's capabilities in autonomous warfare, potentially influencing the balance

of power in the Indo-Pacific and beyond—especially if China chooses to export military applications of embodied AI to countries such as Russia. And if embodied AI ultimately holds the key to unlocking true AGI, Beijing could hold a decisive edge in its frontier AI rivalry with Washington. How the United States responds to this challenge will not just determine the trajectory of AI development but also shape the balance of economic and military power in the decades ahead.

## About the Authors

**Pavlo Zvenyhorodskyi** is a research analyst in the Technology and International Affairs Program at the Carnegie Endowment for International Peace, where he focuses on China's AI policy and U.S.–China competition in AI.

**Scott Singer** is a fellow in the Technology and International Affairs Program at the Carnegie Endowment for International Peace, where he works on global AI development and governance with a focus on China.

## Acknowledgments

The authors thank Jon Bateman, Matt Sheehan, Irene Solaiman, Noah Tan, Teddy Tawil, and Sam Winter-Levy for their helpful feedback on previous drafts. The writers acknowledge the use of LLM tools for preliminary desk research and clarificatory editing.



## Notes

- 1 Coco Feng, “Future of Made-in-China: UBTech Robotics deploys first humanoid ‘team’ in car factory,” *South China Morning Post*, March 3, 2025, <https://www.scmp.com/tech/tech-trends/article/3300872/future-made-china-ubtech-robotics-deploys-first-humanoid-team-car-factory>.
- 2 He Huifeng, “China unveils world’s first humanoid robot that changes its own batteries,” *South China Morning Post*, July 18, 2025, <https://www.scmp.com/economy/china-economy/article/3318756/china-unveils-worlds-first-humanoid-robot-changes-its-own-batteries>.
- 3 “Embodied AI,” NVIDIA Glossary, NVIDIA, accessed July 2, 2025, <https://www.nvidia.com/en-us/glossary/embodied-ai/>. “具身智能即将为通用机器人补全最后一块拼图” [Embodied AI Is About to Complete the Final Piece of the Puzzle for General-Purpose Robots], Agibot, accessed September 18, 2025, <https://www.agibot.com/article/188/detail/7.html>.
- 4 George Lawton, “What is embodied AI? How it powers autonomous systems,” TechTarget, September 25, 2024, <https://www.techtarget.com/searchenterpriseai/definition/embodied-AI>. 电子信息产业网, “具身智能、智能机器人与人形机器人还傻傻分不清? 这篇文章都讲明白了” [Still Confused About the Differences Between Embodied AI, Intelligent Robots, and Humanoid Robots? This Article Explains It All], reposted by 中华网, April 14, 2025, <https://www.gkong.com/news/121095.html>.
- 5 Pratyush Thakur, “Tesla’s role in the increasingly embodied AI world,” Investing.com, January 18, 2025, <https://www.investing.com/news/stock-market-news/teslas-role-in-the-increasingly-embodied-ai-world-3819502>.
- 6 “Figure Exceeds \$1B in Series C Funding at \$39B Post-Money Valuation,” Figure AI, September 16, 2025, <https://www.figure.ai/news/series-c>.
- 7 *People’s Daily*, “三问具身智能” [Three Questions on Embodied AI], reposted by Xinhua, March 24, 2025, <http://www.news.cn/tech/20250324/304fce2317bf4683bf68156c5a3980c2/c.html>.
- 8 Scott Singer, “China Wants to Integrate AI Into 90 Percent of Its Economy by 2030. It Won’t Work,” Carnegie Endowment for International Peace, September 2, 2025, <https://carnegieendowment.org/emissary/2025/09/ai-china-90-percent-economy-why-wont-work?lang=en>.
- 9 Xu Xianchun, “习近平关于发展我国数字经济的战略思考” [Xi Jinping’s Strategic Thinking on Developing China’s Digital Economy], The Institute of Party History and Literature of the Central Committee of the Chinese Communist Party, August 2, 2022, <https://www.dswxyjy.org.cn/n1/2022/0802/c427152-32491961.html>.

- 10 网络传播杂志,“习近平总书记论加快发展数字经济” [General Secretary Xi Jinping on Accelerating the Development of the Digital Economy], reposted by the Cyberspace Administration of China, January 19, 2020, [https://www.cac.gov.cn/2020-01/19/c\\_1580982285394823.htm](https://www.cac.gov.cn/2020-01/19/c_1580982285394823.htm).
- 11 *People's Daily overseas edition*, “习近平：实体经济是我国经济发展的根基” [Xi Jinping: The Real Economy Is the Foundation of China's Economic Development], reposted by 人民论坛网, March 8, 2017, <https://www.rmlt.com.cn/2017/0308/463234.shtml>.
- 12 IT之家,“DeepSeek-R1 模型发布, 性能对标 OpenAI o1 正式版” [DeepSeek-R1 Model Released, Its Performance Benchmarking Against OpenAI's o1 Official Version], posted on Baidu.com, January 20, 2025, <https://baijiahao.baidu.com/s?id=1821775242356587266&wfr=spider&for=pc>.
- 13 Alicia García-Herrero, “Ten challenges facing China's economy,” Bruegel, June 12, 2025, <https://www.bruegel.org/analysis/ten-challenges-facing-chinas-economy>.
- 14 Xinhua, “The Government Work Report,” reposted by the State Council of China, March 12, 2025, [https://www.gov.cn/yaowen/liebiao/202503/content\\_7013163.htm](https://www.gov.cn/yaowen/liebiao/202503/content_7013163.htm).
- 15 Li Qiang, “李强出席2025世界人工智能大会暨人工智能全球治理高级别会议开幕式并致辞” [Li Qiang Attends and Delivers a Speech at the Opening Ceremony of the 2025 World Artificial Intelligence Conference and the High-Level Meeting on Global AI Governance], Ministry of Foreign Affairs of the People's Republic of China, July 26, 2025, [https://www.mfa.gov.cn/wjdt\\_674879/gjldrhd\\_674881/202507/t20250726\\_11677829.shtml](https://www.mfa.gov.cn/wjdt_674879/gjldrhd_674881/202507/t20250726_11677829.shtml).
- 16 “授权发布: 中共中央关于制定国民经济和社会发展第十五个五年规划的建议” [Authorized Release: Proposals of the CPC Central Committee on Formulating the 15th Five-Year Plan for National Economic and Social Development], Xinhua, October 28, 2025, <http://www.news.cn/20251028/337438370029449296539148a206bdd1/c.html>.
- 17 “具身智能发展报告 (2024年)” [Embodied AI Development Report (2024)], China Academy of Information and Communications Technology, Beijing Humanoid Robotics Innovation Center Co., Ltd., August 2024, <https://www.caict.ac.cn/kxyj/qwfb/bps/202408/P020240830312499650772.pdf>.
- 18 Dong Shengli, Zhang Haiyong, and Zhao Hu, “具身智能推动智能化作战新发展” [Embodied Intelligence Drives New Advances in Intelligent Warfare], *PLA Daily*, April 5, 2025, <https://rmt-static-publish.81.cn/file/20250405/aa9899302136bd20710fcaa85b5ab08a.pdf>.
- 19 “Global AI Governance Action Plan,” Ministry of Foreign Affairs of the People's Republic of China, July 26, 2025, [https://www.fmprc.gov.cn/eng/xw/zyxw/202507/t20250729\\_11679232.html](https://www.fmprc.gov.cn/eng/xw/zyxw/202507/t20250729_11679232.html). “AI+ International Cooperation Initiative,” Ministry of Foreign Affairs of the People's Republic of China, September 24, 2025, [https://www.fmprc.gov.cn/eng/xw/zyjh/202509/t20250924\\_11715960.html](https://www.fmprc.gov.cn/eng/xw/zyjh/202509/t20250924_11715960.html).
- 20 “Chinese government proposes creation of global AI cooperation organization,” Xinhua, July 26, 2025, <https://english.news.cn/20250726/0eccf4a342374c269dce1f7806ee3766/c.html>.
- 21 Zhang Bo, “具身智能推动实现通用人工智能 (科技名家笔谈)” [Embodied AI Promotes the Realization of Artificial General Intelligence (Essays by Leading Science and Technology Experts)], *People's Daily overseas edition*, reposted on People's Daily Online, June 9, 2025, [https://paper.people.com.cn/rmrhwbw/pc/content/202506/09/content\\_30077910.html](https://paper.people.com.cn/rmrhwbw/pc/content/202506/09/content_30077910.html).
- 22 Ibid.
- 23 Sebastian Heilmann, “From Local Experiments to National Policy: The Origins of China's Distinctive Policy Process,” *China Journal* 59 (2008), [https://www.researchgate.net/publication/228369078\\_From\\_Local\\_Experiments\\_to\\_National\\_Policy\\_The\\_Origins\\_of\\_China's\\_Distinctive\\_Policy\\_Process](https://www.researchgate.net/publication/228369078_From_Local_Experiments_to_National_Policy_The_Origins_of_China's_Distinctive_Policy_Process).
- 24 Winni Zhou and Ryan Woo; editing by Mike Harrison, “China central bank expands digital yuan pilot scheme to more cities,” Reuters, April 2, 2022, <https://www.reuters.com/world/china/china-central-bank-expands-digital-yuan-pilot-scheme-more-cities-2022-04-02/>.
- 25 “The 2nd China Embodied AI Conference (CEAI 2025),” Chinese Association for Artificial Intelligence, accessed July 9, 2025, <https://ceai.caai.cn/#about>.

- 26 Ye Hongmei, “具身智能十五大重点方向发布, 包括具身自主学习、具身大模型等” [Fifteen Key Directions for Embodied AI Released, Including Embodied Autonomous Learning and Embodied Foundation Models], 新京报, March 20, 2025, <https://www.bjnews.com.cn/detail/1743333279129207.html>.
- 27 Hua Xia, “Chinese provinces plan to support emerging, future industries in 2024,” Xinhua, February 8, 2024, <https://english.news.cn/20240208/ce4dd217a00b42a38c895e271f69cad/c.html>; “3Q 2025 Gross Regional Product, Accumulated (100 million yuan),” National Bureau of Statistics of China, accessed November 13, 2025, <https://data.stats.gov.cn/english/easyquery.htm?cn=E0102>.
- 28 Hugh Chen, “Cambricon to raise \$700 million in race to build a Chinese AI chip leader,” Bamboo Works, June 10, 2025, <https://thebambooworks.com/cambricon-to-raise-700-million-in-race-to-build-a-chinese-ai-chip-leader/>.
- 29 “北京市科学技术委员会、中关村科技园区管理委员会等部门关于印发‘北京具身智能科技创新与产业培育行动计划(2025-2027年)’的通知” [Notice by the Beijing Municipal Science and Technology Commission, the Zhongguancun Science Park Administrative Committee, and Other Departments on Issuing the “Beijing Action Plan for Technological Innovation and Industrial Development in Embodied Intelligence (2025–2027)”], Beijing Municipal People’s Government, February 28, 2025, [https://www.beijing.gov.cn/zhengce/zhengcefagui/202503/t20250304\\_4024579.html](https://www.beijing.gov.cn/zhengce/zhengcefagui/202503/t20250304_4024579.html).
- 30 Pei Li and Yiqin Shen, “Hesai Raises \$190 Million in Biggest Chinese US IPO Since Didi,” *Bloomberg*, February 9, 2023, <https://www.bloomberg.com/news/articles/2023-02-09/hesai-raises-190-million-in-biggest-chinese-us-ipo-since-didi>.
- 31 海市国有资产监督管理委员会, “上海具身智能基金亮相 上海国投公司加速布局下一代人工智能战略高地” [Shanghai Embodied Intelligence Fund Unveiled: Shanghai State-owned Capital Investment Company Accelerates Efforts to Build a Strategic Hub for Next-Generation Artificial Intelligence], Shanghai Municipal People’s Government, April 25, 2025, <https://www.shanghai.gov.cn/nw31406/20250427/d3073f0c18e34863af4fc4fa01f86fc9.html>.
- 32 “汽车具身智能技术湖北省重点实验室设立” [Establishment of the Hubei Provincial Key Laboratory for Automotive Embodied Intelligence Technology], Hubei Provincial Department of Science and Technology, July 3, 2025, [https://kj.hubei.gov.cn/kjdt/sxkj/wh/202507/t20250703\\_5712396.shtml](https://kj.hubei.gov.cn/kjdt/sxkj/wh/202507/t20250703_5712396.shtml).
- 33 *Beijing Daily*, “本市培育千亿级产业集群具身智能发展三年‘施工图’绘就” [Beijing Unveils a Three-Year ‘Blueprint’ for Developing Embodied AI and Cultivating an Industrial Cluster Worth Hundreds of Billions], reposted by Beijing Municipal People’s Government, March 1, 2025, [https://www.beijing.gov.cn/ywdt/gzdt/202503/t20250301\\_4022474.html](https://www.beijing.gov.cn/ywdt/gzdt/202503/t20250301_4022474.html).
- 34 Shanghai State-owned Assets Supervision and Administration Commission, “上海具身智能基金亮相 上海国投公司加速布局下一代人工智能战略高地” [Shanghai Embodied AI Fund Unveiled: Shanghai State-owned Capital Investment Company Accelerates Efforts to Build a Strategic Hub for Next-Generation Artificial Intelligence], reposted by Shanghai Municipal People’s Government, April 25, 2025, <https://www.shanghai.gov.cn/nw31406/20250427/d3073f0c18e34863af4fc4fa01f86fc9.html>.
- 35 Zhuoran Li, “China’s EV Overcapacity Is Inevitable,” *The Diplomat*, August 06, 2024, <https://thediplomat.com/2024/08/chinas-ev-overcapacity-is-inevitable/>.
- 36 Michael Pettis, “Using China’s Central Government Balance Sheet to ‘Clean up’ Local Government Debt Is a Bad Idea,” Carnegie Endowment for International Peace, August 6, 2025, <https://carnegieendowment.org/posts/2025/08/using-chinas-central-government-balance-sheet-to-clean-up-local-government-debt-is-a-bad-idea?lang=en>.
- 37 Rodney Brooks, “Why Today’s Humanoids Won’t Learn Dexterity,” *Rodney Brooks* (blog), September 26, 2025, <https://rodneybrooks.com/why-todays-humanoids-wont-learn-dexterity/>.
- 38 Ann Cao, “China’s industrial robot output soars, as start-ups Unitree and UBTECH take lead,” *South China Morning Post*, May 19, 2025, <https://www.scmp.com/tech/tech-trends/article/3310908/chinas-industrial-robot-output-soars-start-ups-unitree-and-ubtech-take-lead>.
- 39 Zeyi Yang, “Why China’s dominance in commercial drones has become a global security matter,” *MIT Technology Review*, June 26, 2024, <https://www.technologyreview.com/2024/06/26/1094249/china-commercial-drone-dji-security/>.

- 40 “China, the Global Leader in Autonomous Vehicles – how did that happen?,” Intertraffic, April 9, 2025, <https://www.intertraffic.com/news/autonomous-driving/china-the-global-leader-in-autonomous-vehicles>.  
Edwin Foster, “XPeng’s AI-Driven Surge: A Rare EV Gem in a Crowded Field,” AInvest, July 7, 2025, <https://www.ainvest.com/news/xpeng-ai-driven-surge-rare-ev-gem-crowded-field-2507/>.
- 41 Song Yajuan, Xiao Chunfang, and Cai Lin, “专家：我国在具身智能研发上有三大优势” [Experts: China Has Three Major Advantages in Embodied AI Research and Development], 光明网, May 11, 2024, [https://kepu.gmw.cn/2024-05/11/content\\_37318005.htm](https://kepu.gmw.cn/2024-05/11/content_37318005.htm).
- 42 Mark Montgomery, “Lidar: Another emerging technology brought to you by China,” DefenseNews, April 25, 2024, <https://www.defensenews.com/opinion/2024/04/25/lidar-another-emerging-technology-brought-to-you-by-china/>.
- 43 “具身智能, 中国 ‘弯道超车’ 的关键在这” [Embodied AI: The Key to China’s Strategy for Overtaking Competitors], SenseTime News Center, April 25, 2025, <https://www.sensetime.com/cn/news-detail/51169503?categoryId=72>.
- 44 Guo Fangda, “具身智能由‘虚’向‘实’的突破与挑战” [Embodied AI: Breakthroughs and Challenges in Moving from the Virtual to the Physical], Economic Information Daily, April 24, 2025, [http://dz.jjckb.cn/www/pages/webpage2009/html/2025-04/24/node\\_5.htm](http://dz.jjckb.cn/www/pages/webpage2009/html/2025-04/24/node_5.htm).
- 45 Wang Peng, “具身智能的当下挑战与未来展望” [Embodied AI: Current Challenges and Future Prospects], 大众新闻, May 22, 2025, <https://m.dzplus.dzng.com/share/general/0/NEWS2413081BWPkGMNXXKMRAV>.
- 46 Chen Hong, “UBTech secures large humanoid robots order,” *China Daily*, September 9, 2025, <https://www.chinadaily.com.cn/a/202509/09/WS68bf7e39a3108622abc9f971.html>.
- 47 “具身智能, 中国 ‘弯道超车’ 的关键在这” [Embodied AI: The Key to China’s Strategy for Overtaking Competitors], SenseTime News Center, April 25, 2025, <https://www.sensetime.com/cn/news-detail/51169503?categoryId=72>.
- 48 Sunny Cheung, “The PRC’s Robotics Industry—Sunny Cheung’s Testimony Before the U.S.-China Economic and Security Review Commission,” The Jamestown Foundation, March 19, 2025, <https://jamestown.org/program/testimony-before-the-u-s-china-economic-and-security-review-commissions-hearing-made-in-china-2025-who-is-winning/>.
- 49 Lu Jian and Ning Di, “具身智能叩响家门还要多久” [How Long Until Embodied AI Knocks on Our Door?], *China Youth Daily*, April 15, 2025, [https://zqb.cyol.com/pc/content/202504/15/content\\_409793.html](https://zqb.cyol.com/pc/content/202504/15/content_409793.html).
- 50 “机器人崛起：具身智能的技术、商业与社会落地路线图” [The Rise of Robots: A Roadmap for the Technological, Commercial, and Societal Implementation of Embodied AI], Tencent Research Institute, July 24, 2024, <https://www.tisi.org/28277/?utm>.
- 51 “黄铁军：构建物理智能体，具身智能目标是星辰大海” [Huang Tiejun: Building Physical Agents—Embodied AI’s Goal Is the Universe], Beijing Academy of Artificial Intelligence, June 8, 2025, <https://hub.baai.ac.cn/view/46319>.



## Carnegie Endowment for International Peace

In a complex, changing, and increasingly contested world, the Carnegie Endowment generates strategic ideas, supports diplomacy, and trains the next generation of international scholar-practitioners to help countries and institutions take on the most difficult global problems and advance peace. With a global network of more than 170 scholars across twenty countries, Carnegie is renowned for its independent analysis of major global problems and understanding of regional contexts.

### Technology and International Affairs Program

The Technology and International Affairs Program develops insights to address the governance challenges and large-scale risks of new technologies. Our experts identify actionable best practices and incentives for industry and government leaders on artificial intelligence, cyber threats, cloud security, countering influence operations, reducing the risk of biotechnologies, and ensuring global digital inclusion.



[CarnegieEndowment.org](https://CarnegieEndowment.org)