Morgan Stanley
INVESTMENT MANAGEMENT

From Electric Vehicles to Humanoids: China's Next Manufacturing Leap

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Three backflips in three seconds, filmed in a lab and viewed millions of times on TikTok, made China's G1 humanoid robot an overnight internet star. That was where the robotics industry stood a year ago. Today, China's humanoid robots are beginning to move out of televised spectacles, such as synchronized dancing and kung fu performances, to active manufacturing and commercial roles.

China is already the largest global supplier of humanoid robots, with shipments estimated at around 13,000 units last year. While many shipments are used for demonstrations, academic research or testing, the country is pushing for wider adoption of humanoids in real working environments.

Beijing is building infrastructure to train physical artificial intelligence (AI) at a national scale. In June, the Ministry of Industry and Information Technology (MIIT) and the State-owned Assets Supervision and Administration Commission issued a special work plan for training humanoid and embodied-AI robots in work settings. The plan calls for deployment across more than 100 high-value scenarios and 10,000-unit-scale "work mode" deployment capability by the end of 2026.

The early evidence is beginning to appear in controlled environments where tasks are repetitive. Use cases are emerging across warehousing, manufacturing, research and healthcare. Manufacturing and transportation companies have started testing humanoids for material handling, sorting and inspection, while local startups such as Galbot and AgiBot have secured partnerships to deploy robots in industrial environments over the next three years.

Industrial robots are currently common across the globe, with mechanized arms welding sheet metal and mixing paint. But humanoids are now being tested for more complex tasks, such as connecting cables and conducting quality inspections at Chinese auto companies including BYD, Geely, FAW-VW and Audi FAW. BYD's deployment of approximately 100 UBTECH humanoids appears to be the largest known commercial humanoid installation globally. Other deployments remain at the pilot level.

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Healthcare and eldercare are another focus, given China's rapidly aging population and rising demand for care. National programs are exploring rehabilitation assistance, elderly companionship and emergency response. Care settings are less structured than factories, where adoption may take longer than the policy mandate anticipates.

The Scale Advantage

China already accounts for more than 90% of global humanoid robot production by volume. In addition, the country has the world's largest industrial robot base, with more than two million units installed, including roughly 295,000 in 2025.

China's humanoid shipments are forecast to rise to around 28,000 units this year, while the U.S. and the rest of the world are ramping up as well, pushing the global 2026 output above 50,000 units.[1]

Where will those units be put to work? Initial adoption is likely to follow the ministry's priority list, with manufacturing, logistics and inspection leading the first wave. As both hardware and software improve, humanoids will enter into consumer-facing services and household scenarios, which could create a far larger total addressable market (TAM).

Morgan Stanley projects that cumulative humanoid robot adoption could reach one billion units by 2050, with China accounting for about 30% of that volume. Accordingly, it is also estimated that market TAM could reach $7.5 trillion in annual revenue by 2050 (Display 1).

China Hardware vs. U.S. Software

The competitive landscape has been described as "China Hardware vs. U.S. Software." Humanoid robots sit at the intersection of hardware, AI, manufacturing, real-world data and customer integration. Early commercialization may reward hardware scale and deployment speed, whereas longer-term value may depend more on intelligence, software and fleet learning.

China's biggest advantage is hardware scale. It has the world's largest industrial robot market and deep electric vehicle (EV) and electronics supply chains. Component clusters are dense, prototyping cycles are fast and local governments and state-owned enterprises are willing to provide test environments.

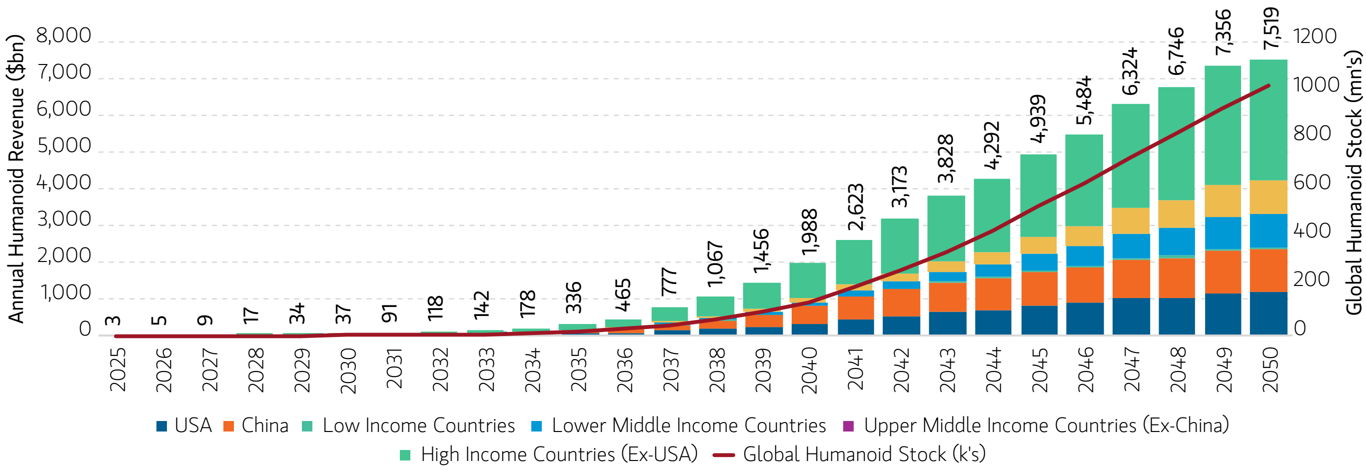
Publicly-listed Unitree and local startups AgiBot, UBTECH and Leju have already shown stronger shipment volumes than U.S. peers, while U.S. companies such as Figure, Tesla, Agility and Apptronik remain at significantly lower levels. However, not all humanoid robots are created equal, as volume numbers don't capture versatility, or value per unit.

Chinese firms are well positioned to win the "good-enough hardware at a falling cost" race. Local parts make Chinese humanoids much cheaper on average than foreign models. China holds roughly a third of global rare-earth reserves but dominates downstream refining. The country currently controls roughly 63% of the global market for core mechanical components, including actuators, motors and reducers, and about 90% of heavy rare-earth processing required for joint motor magnets.

DISPLAY 1

The Humanoid Robot Market Is Expected to Soar

Estimated Global Humanoid Market Size and Stock



Source: Morgan Stanley Research. As of 6/23/2026. Forecasts/estimates are based on current market conditions, subject to change and may not necessarily come to pass.

[1] *Humanoids: The Tide is Rising, Lifting 2026 Forecast*. Morgan Stanley Research. As of May, 2026.

The U.S. retains a clear lead in frontier AI, chips, simulation software and robot foundation-model ecosystems. NVIDIA's humanoid stack, foundation models such as its Generalist Robot 00 Technology (GR00T), and the broader U.S. AI ecosystem around large models, GPUs, simulation and reinforcement learning all remain highly influential.

China's hardware lead is real. The long-term value pool, however, may shift toward robot intelligence, task generalization, data flywheels and fleet-management software, rather than the mechanical body itself.

Furthermore, China consistently leads the U.S., Japan and other countries in monthly patent applications mentioning "humanoid." That lead has widened sharply since late 2024, offering evidence that China's software and AI efforts are scaling alongside its hardware advantage (Display 2).

A Key Investment Theme

By 2027–28, the key markers will be whether profitability broadens beyond Unitree and AgiBot, and whether the government's 10,000-unit "work mode" deployment target translates into real operating use.

Humanoid robotics has already become a major investment theme in the China A-share market. Policy support, localization, large manufacturing base, AI-to-physical-world narratives and IPO catalysts are lifting investor interest. The continued advance of AI strengthens the case for humanoid robotics because it expands what machines can perceive, plan and execute.

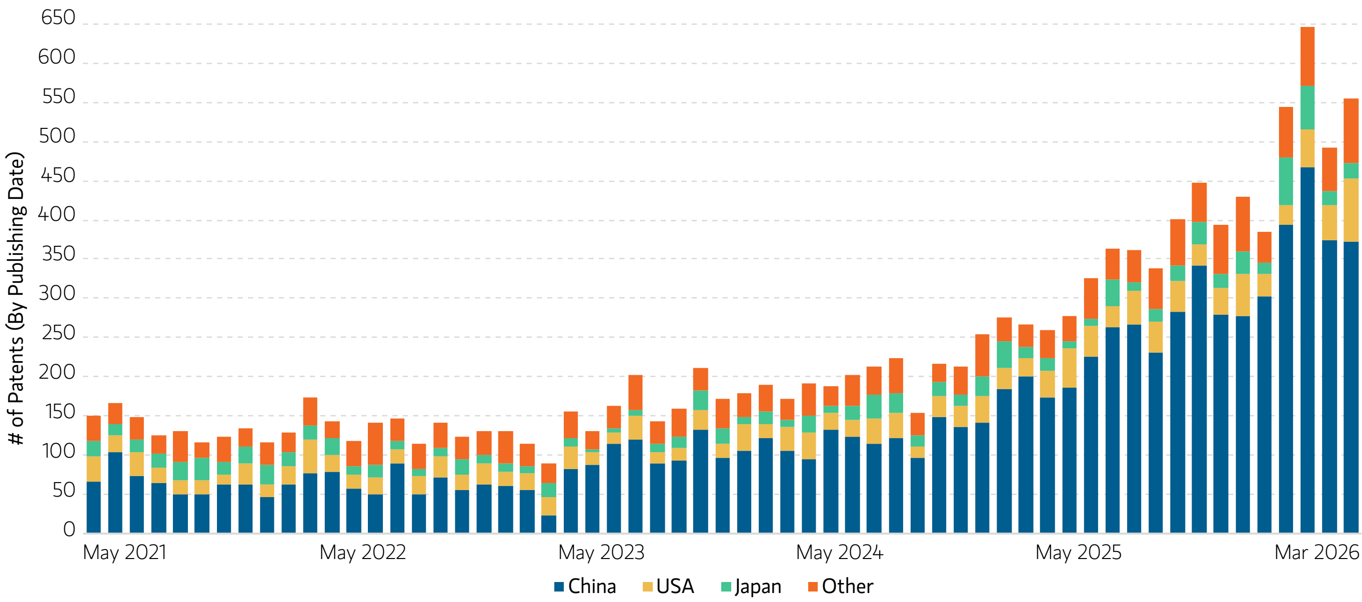
Several Chinese companies are emerging as leaders across critical parts of the supply chain, ranging from reducers and motors to servo drivers, actuators, tactile sensors, vision and light detection and ranging (LiDAR). These areas were historically dominated by developed market companies. In critical areas such as battery, magnets, materials and edge computing, we expect some local Chinese firms to become leaders domestically and also globally.

China is likely to be one of the first markets to test humanoid commercialization at scale. Its advantages are clear: supply chains, cost, manufacturing depth, policy support and real-world testing environments. The open question is whether we can predict who the ultimate winner in this race might be. Much like EVs, where China saw the emergence of more than a hundred brands, we think the humanoid robotics sector will also get quite crowded before the winners emerge.

DISPLAY 2

China Is Well Ahead in Humanoid Patents

Monthly Patent Applications Mentioning "Humanoid" by Country



Source: Google Patents, Morgan Stanley Research. As of 3/31/2026. The data may not capture 100% of patents.

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