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Robotics | North America

Humanoid Horizons: Money Meets Machines

YTD venture funding for humanoid robots has already surpassed 2025 levels- driven by China. Meta continues to build its robotics talent roster with acquisition of US foundation model startup ARI. Meanwhile, humanoids beat human world record at the 2026 Beijing Half Marathon.

Tech Diffusion

A Morgan Stanley Research Key Theme of 2026

Key Highlights:

- **Tesla Optimus: Continued Long-Term Optimism Blended with Near-term Expectations Management.** From the 1Q call, Tesla (covered by Andrew Percoco) continues to believe in the longer-term potential of Optimus and humanoid robots and is still preparing for mass production beginning mid-year in Fremont and later in Austin. After being originally targeted for 1Q, current Gen 3 unveil timing appears a little more uncertain with Elon Musk signaling that mid-2026 is possible but also that the team is being hesitant of showcasing too much to protect its IP. It feels likely to us that Optimus continues to undergo material design iterations. For example, a Tesla patent for the Optimus Gen 3 tendon-driven hand design was recently released via the World Intellectual Property Org (WIPO). After gaining immediate internet attention, Musk posted in a reply on X: *"We already changed the design. This one didn't actually work."*
  - *Our take:* A humanoid robot is an extremely novel technology with electromechanical designs that need to be designed effectively clean slate. It's not surprising that the largest Western company in the space is going through rapid design changes considering they have the capital and operational flexibility (which many competing startups lack) to do so. Expect continued near-term expectation management and additional design/AI changes even after Optimus starts initial 'mass production'.
- **Meta x Metal: Meta Reportedly Acquires Assured Robot Intelligence (Bloomberg).** ARI is an American robotics foundation model startup founded in 2025 by Lerrel Pinto (former Fauna Robotics co-founder) and Xiaolong Wang (former Nvidia researcher), although little is publicly known about the team's work. We note that Wang's scholarly bio indicates past work on "representation learning through videos and physical robotic interaction data". The deal supports Meta's broader effort to build software platforms

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with CTO Andrew Bosworth describing humanoid robots as Meta's next 'AR-size bet' late last year. Financial terms are not reported. Meta to our knowledge has not publicly commented, but Wang later confirmed the agreement on behalf of ARI in a post on X, writing: "Excited to share that Assured Robot Intelligence (ARI) has joined @Meta to help build the future of humanoid intelligence."

- **China drives YTD VC funding above 2025 Levels.** YTD humanoid robot venture funding has already surpassed 2025 levels- particularly due to investment in Asia (~46% of YTD VC funding) according to PitchBook. In April alone, our China Industrials team has tracked 41 separate funding raises for humanoid robots across the country compared to just 16 a year ago and 6 the year prior.

- **Accelerating Capital Markets Activity in the US?** While not specifically involving humanoids, one recently reported large transaction, if confirmed, would point to rising investor interest in physical AI. Jeff Bezos' AI startup, Project Prometheus, is reportedly raising $10bn at a ~$38bn valuation to build AI models for engineering and manufacturing. (The company has not commented on the report and we have no knowledge of any recent fund raise.).

- **Unitree's March IPO Prospectus Shows ~$25k ASP's, Notably High ~60% Gross Margins.** Unitree's prospectus with the Shanghai Stock Exchange highlights strong early monetization, with 5.5k humanoids shipped in 2025 generating RMB1.7bn (~$255mn) revenue and RMB600mn (~$90mn) adjusted net profit. ASP declined to ~RMB168k (~$25k) in 9M25 (-37% YoY), positioning pricing near the sub-RMB200k (~$30k) adoption "sweet spot," while profitability remains standout with ~60% gross margins and ~37% adjusted net margins - the highest among all Chinese robotic and manufacturing companies covered by our China Industrials Team.

    - *See full takeaways from our China Industrials Team here*: China Industrials: Implications from Unitree IPO (23 Mar 2026)

- **China Humanoid/Robotics Trip and Summit feedback:** Commercialization of humanoid robots is accelerating, with China integrators moving from demos to real-world pilots across inspection, tourism, services, manufacturing, logistics, and household assist, while training increasingly shifts toward reinforcement learning. For volume, Dobot and AI² Robotics at 1k units each, UBTECH at 5k industrial humanoids, and Linkerbot at 50–100k dexterous hands (imply potential 5–10x YoY growth). The "robot brain" stack remains unsettled, with world models and VLA models as the main directions but not yet sufficient for high-precision industrial use, supporting near-term adoption of hybrid systems and rule-based safeguards. We see the competitive moat migrating toward proprietary data flywheels, especially scarce real-world robot data. China players' full-stack approach across AI, data infrastructure, and hardware should help accelerate iteration and early commercialization before the industry modularizes. During 1Q26 earnings,

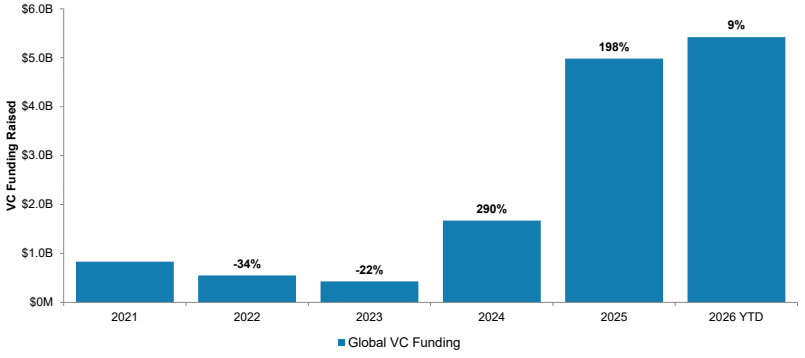
China component suppliers, such as Leaderdrive (covered by Sheng Zhong), Zhaowei, Kinco, and Orbbec (not covered) reported a surge in robot-related delivery and expected to accelerate. We prefer leading players in precision components (Leaderdrive, Hengli, Inovance, Shuanghuan) for their advantage in mass production.

- ***For a copy of our Global Robot Model with forecasts across the full range of embodied AI (not just humanoids), please reach out to your Morgan Stanley representative.***

Humanoid 100 update: The equal-weighted Humanoid 100 is up 45% since its inception on 2/6/2025 (adjusting for additions and deletions), outperforming the S&P 500, MSCI Europe, and MSCI China, but underperforming MSCI Korea and MSCI Taiwan. Top performers YTD include Intel, STMicro, Arm Holdings, Onsemi, and Samsung Electronics.

China Humanoid Value Chain update: In April, the China Humanoid Value Chain is up 4% on an equal-weighted basis, outperforming MSCI China (1%) but its -10% YTD performance is still underperforming MSCI China (-6%).

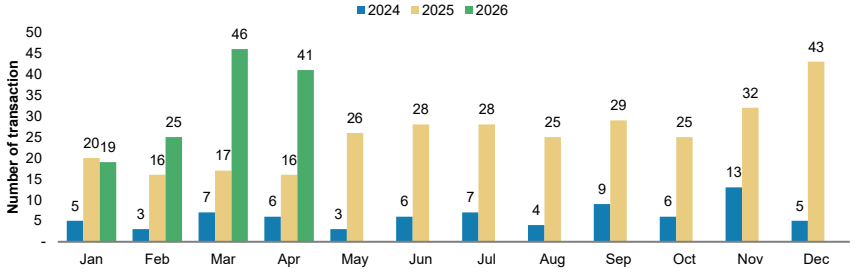
Exhibit 1: 2026 Global Venture Funding for Humanoid Robots Has Already Exceeded the Sum of 2025



Note: As of 4/30/2026. Includes funding for companies classified under 'Humanoid Robotics' in PitchBook.

Source: PitchBook, Morgan Stanley Research

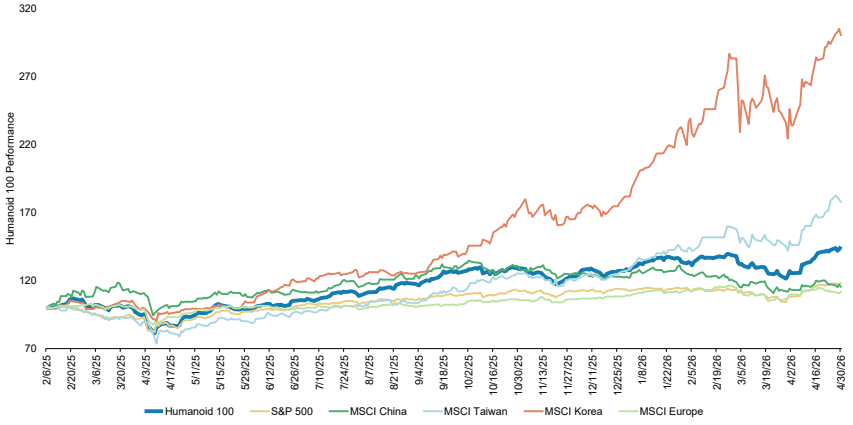
Exhibit 2: China Humanoids Financing Activities



Note: Includes all notable funding disclosed based on our knowledge and research. However, there may still be some not captured. We updated number of transaction in previous months with transaction announced after our published previous Humanoids Horizon.

Source: Company announcement, GGII, Morgan Stanley Research.

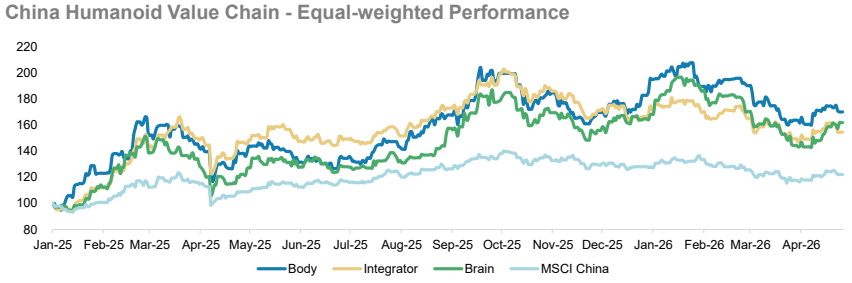
Exhibit 3: Equal-Weighted Humanoid 100 Performance since 2/6/2025 (Date List was Established)



Note: Data as of 4/30/2026 close. Price returns only, does not account for dividend reinvestment or transaction costs.

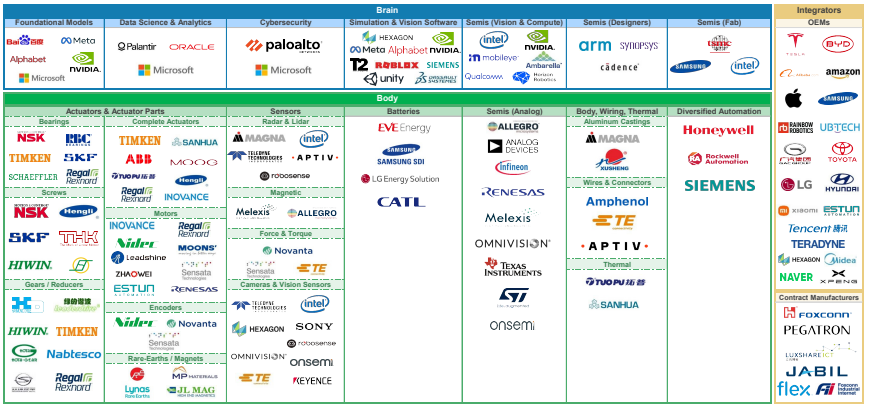
Source: FactSet, Morgan Stanley Research

Exhibit 4: Equal-weighted China Humanoid Value Chain Perf



Source: FactSet, Morgan Stanley Research Note: Data as of May 3 close. Sling and Rongtai were added on January 22, 2026, Beite was removed on January 22, 2026. Results shown represent return excluding dividends, brokerage commissions and transaction costs. These figures are not audited. Past performance is no guarantee of future results. For important disclosures regarding companies that are the subject of this screen, please see the Morgan Stanley Research Disclosure Website at www.morganstanley.com/researchdisclosures

Exhibit 5: The Humanoid 100- Morgan Stanley's List of Global Humanoid Enablers



Note: Public companies only. Not all inclusive.

Source: Morgan Stanley Research

Exhibit 6: China humanoid value chain (including public companies in our stock list - see Exhibit 23 and private players)



Source: Morgan Stanley Research

In this note you will find:

- Recent Robotics Updates & Developments
- China Policy Support Overview
- Humanoid 100 Performance
- China Humanoids Value Chain Performance
- Tracking Humanoid Progress
- US & China Humanoid TAM/Adoption Estimates

For Further Reading on Humanoids & Embodied AI:

- Physical AI: The Morgan Stanley Robot Almanac (7 Dec 2025)
- Robotics: The Robot Almanac (Vol. 3): Humanoids & Industrial Robots (16 Dec 2025)
- China Industrials: 2026 Outlook – Humanoids: Commercialization (21 Jan 2026)
- Global Technology: Humanoid Tech – Grasping the Future (30 Nov 2025)
- China's Emerging Frontiers: From Wheels to Walkers – How Autos Morph into Humanoids (18 Jun 2025)
- China's Emerging Frontiers: Robotics Unleashed, A New Era (16 Jun 2025)
- Humanoids and Global Materials: The robots are coming…for critical minerals (21 May 2025)
- Humanoids: A $5 Trillion Global Market (29 Apr 2025)
- Humanoids: The Humanoid 100: Mapping the Humanoid Robot Value Chain (6 Feb 2025)
- Artificial Intelligence: Humanoids: Investment Implications of Embodied AI

(26 Jun 2024)

Relevant Private Company Disruptor Profiles:

- Robotics: I Just Pre-Ordered a Humanoid Robot (4 Nov 2025)
- Embodied AI: AI Robotics Disruptors: Skild AI (23 May 2025)
- Embodied AI: Humanoid Disruptors: 1X Technologies (7 Apr 2025)
- Embodied AI: Humanoid Disruptors: Apptronik (24 Mar 2025)
- Embodied AI: Humanoid Disruptors: Mentee Robotics (2 Mar 2025)
- Embodied AI: Humanoid Disruptors: Unitree - Humanoids Starting at $16K (28 Jan 2025)

Previous Iterations of Humanoid Horizons:

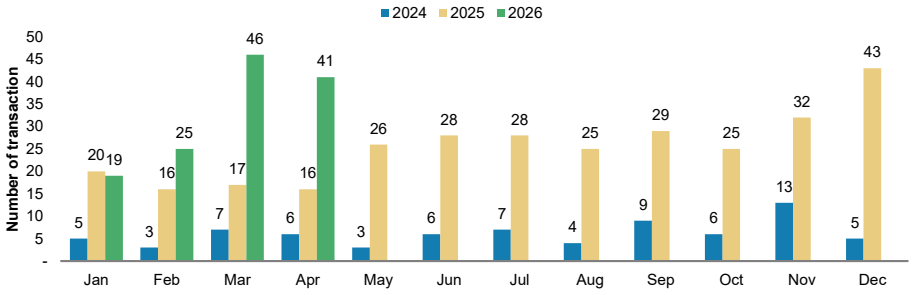
- Humanoids: Humanoid Horizons: National Priority, 'Brain', Unitree IPO (25 Mar 2026)
- Robotics: Humanoid Horizons: Can US and China Collaborate on Robots? (26 Feb 2026)
- Humanoids: Humanoid Horizons: Gaining Momentum Globally (22 Jan 2026)
- Robotics: Humanoid Horizons: What to Watch for 2026 (19 Dec 2025)
- Humanoids: Humanoid Horizons: Overhyped yet Underappreciated (1 Dec 2025)
- Humanoids: Humanoid Horizons: Big Tech 'Doing the Robot'... Softbank/ABB, Apple, Meta, Optimus v3 (26 Oct 2025)
- Humanoids: Humanoid Horizons: Closer to the Real World (19 Sep 2025)
- Humanoids: Humanoid Horizons: First World Humanoid Games, $5k Humanoids? (26 Aug 2025)
- Humanoids: Humanoid Horizons: An Adoption Race (24 Jul 2025)
- Humanoids: Humanoid Horizons: Who Will Build the Android for Androids? (26 Jun 2025)

Recent Robotics Updates & Developments

New Funding:

- **Jeff Bezos' physical AI model startup Project Prometheus reportedly raising $10bn at a ~$38bn valuation per Bloomberg.** The company, founded in 2025 with former Google X executive Vik Bajaj, develops "physical AI" models for applications such as engineering and manufacturing, though details on products and commercialization remain limited. The reported funding round would rank among the largest in the AI sector and suggests capital is shifting toward companies that aim to apply AI in real-world industrial settings rather than purely digital use cases. Project Prometheus would be Bezos's first CEO position since he left the seat at Amazon in 2021. (We are not aware of any recent fund raise and the company has not commented on the report.)
    - *For more details on Prometheus, see here.*

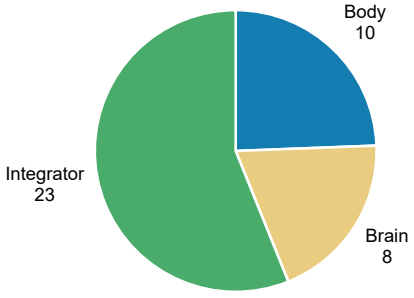
Exhibit 7: China Humanoids Financing Activities



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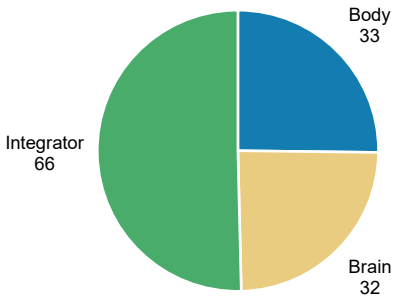
Source: Company announcement, GGII, Morgan Stanley Research.

Exhibit 8: China April 2026 Financing Activities



Source: Company announcement, GGII, Morgan Stanley Research.

Exhibit 9: China 4M26 Financing Activities



Source: Company announcement, GGII, Morgan Stanley Research.

Government & Public Events:

- **Humanoids Beat Human World Record at the 2026 Beijing Half Marathon.** The winning robot ("Lightning," developed by the smartphone manufacturer Honor) completed the race in 50 minutes and 26 seconds, beating the human world record

of 57:20 and marking a sharp improvement from roughly 2 hours 40 minutes for the top robot in 2025, with nearly half of entrants operating autonomously. Honor's humanoid robots swept 1st–3rd place and were purpose-built for the race, featuring 0.9–0.95m legs and liquid cooling for motors and joints. STAR Market Daily reported that Lingyi (covered by Sharon Shih) and Lens (covered by Derrick Yang) supplied structural components, while Huake Cold Core (private) provided liquid-cooling parts (Chinese link for reference).

- *See reaction here: China Industrials: Humanoid Half Marathon – Human World Record Broken (19 Apr 2026)*

New Partnerships/Adoption:

- **Japan Airlines to test humanoids at Tokyo Haneda Airport for ground handling.** Per an official announcement as of 4/27, Japan Airlines plans to test humanoid robots in airport ground handling as it tackles labor shortages and attempts productivity gains. The company will run a pilot at Tokyo's Haneda Airport with partners including GMO AI & Robotics, where robots will assist with tasks such as baggage handling in live operating conditions. JAL aims to evaluate whether automation can reduce staff workload and maintain service levels, though results and scalability remain uncertain.

- **Schaeffler plans to deploy at least 1,000 Hexagon AEON humanoids by 2032.** Schaeffler recently expanded its partnership with Hexagon Robotics to roll out AEON humanoid robots following a 2025 pilot, with deployment set to begin in phases from late 2026. The robots will handle tasks such as machine tending and part inspection in live production environments, using sensor fusion and AI-based control systems. The company aims to improve manufacturing flexibility and reduce manual labor, though large-scale adoption will depend on performance across multiple sites and use cases.
- **BMW testing Hexagon humanoids at its Leipzig vehicle production plant.** The pilot uses Hexagon's AEON robot to perform tasks such as material handling, battery assembly, and component manufacturing in live factory settings, with trials progressing through 2026. BMW aims to assess whether "physical AI" can improve productivity and support workers.
- **Siemens testing HMND 01 robot in live factory logistics to assess whether humanoids can meet industrial performance targets.** According to the company, the HMND 01 Alpha robot autonomously handled tote movement tasks at Siemens' Erlangen facility, achieving around 60 moves per hour, over eight hours of uptime, and pick-and-place success rates above 90% in real operations. The HMND 01 Alpha, developed by UK-based startup Humanoid, is a wheeled humanoid robot designed for industrial use, combining AI-based perception, modular hardware, and advanced manipulation to handle tasks such as material movement and machine support.

Exhibit 10: Honor's 'Lightning' Wins Humanoid Half Marathon



Source: Honor

Exhibit 11: Japan Airlines plans to trial humanoid robots at Tokyo Haneda airport amid labor shortages



Source: Japan Airlines

M&A:

- **Meta acquires Assured Robot Intelligence (ARI) as it pushes to establish leadership in robotics AI development (Bloomberg).** ARI was co-founded in 2025 by Lerrel Pinto (former Fauna Robotics co-founder) and Xiaolong Wang (former Nvidia researcher) to build frontier AI for robots, although little is publicly known about the team's work. We note that Wang's scholarly bio indicates past work on "representation learning through videos and physical robotic interaction data". The deal supports Meta's broader effort to build software platforms with CTO Andrew Bosworth describing humanoid robots as Meta's next 'AR-size bet' late last year. Financial terms are not reported. Meta has not commented, but Wang later confirmed the agreement on behalf of ARI in a post on X.

- **Skild AI acquires Zebra Technologies' Fetch Robotics assets.** Skild AI recently acquired Zebra Technologies' robotics automation unit, including Fetch Robotics assets, to expand deployment of its general-purpose robot intelligence in logistics. The deal integrates Skild's hardware-agnostic "Skild Brain" with Zebra's Symmetry orchestration platform and installed warehouse robot base, as the company aims to unify control across diverse machines and scale end-to-end automation in fulfillment operations, though financial terms were not disclosed.

Software/AI Improvements:

- **Generalist AI releases Gen-1 Foundation Model with claimed 99% success rate on simple physical tasks with minimal required robot training data.** The GEN-1 model, trained on roughly 500,000 hours of real-world data, reportedly achieves about 99% task success rates and completes tasks up to three times faster than prior systems, while requiring limited robot-specific training data (reported only 1 hour of training data for each result) - a notable feat given the data-constrained nature of current robotics AI research.

New Robot Models & Hardware Improvements:

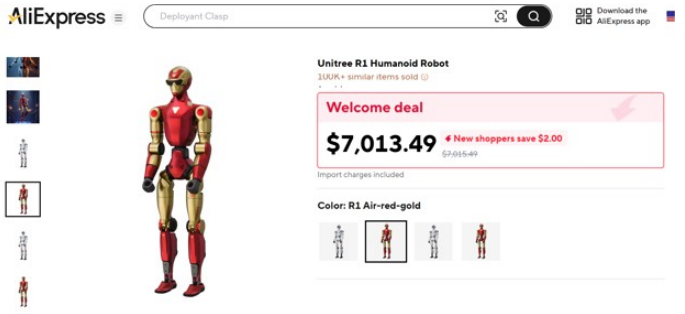
- **Tesla Optimus 1Q26 Call Commentary: Continued Long-Term Optimism Blended with Near-term Expectations Management.** *We summarize Optimus-related highlights from Tesla's 1Q26 earnings call below:*
  - CEO Elon Musk continues to describe Optimus as likely "the biggest product ever", not just Tesla's biggest product, but potentially the biggest product in history and said the company is increasing internal production for testing, with Optimus expected to be useful outside of Tesla sometime in 2027.
  - Tesla is preparing the Fremont factory for the start of Optimus production later in 2026, with a second Optimus factory under construction at Giga Texas expected to begin production around summer 2027.
  - The Gen 3 Optimus design is 'almost ready to demonstrate' and could be shown off by mid-2026, though Tesla is hesitant to reveal it too early given competitors' frame-by-frame analysis of its releases.
  - On production timing, Musk noted that start of production is targeted for the late July–August 2026 timeframe, but cautioned that the ramp will be "quite slow at first" given that Optimus is a completely new product with an entirely new production line.
  - Limited new details on exact hardware designs or current AI approach with Gen 3 - likely to provide last-minute design flexibility and protect IP.
  - We note that a Tesla patent for the Optimus Gen 3 tendon-driven hand design was recently released via the World Intellectual Property Org (WIPO) gathering significant media attention. However, Musk posted in a reply on X: *"We already changed the design. This one didn't actually work."*
- **Toyota shows off latest basketball-playing humanoid robot.** Toyota unveiled CUE7, a seventh-generation humanoid basketball robot that uses vision, motion planning, and hybrid AI control to calculate and execute highly precise shots. The platform builds on earlier record-setting systems, with upgrades such as a lighter 74 kg frame and improved sensing, and serves as a research testbed for embodied AI applications in areas such as manufacturing and robotics control.
- **Unitree selling low-cost R1 humanoid globally via AliExpress.** The robot starts at roughly $4,000–$7,000 and targets markets including the US, Europe, and Japan, with features such as 26 joints, AI-based voice and vision capabilities, and athletic movement, though it lacks the dexterity for complex tasks, focusing mainly on entertainment and embodied AI research.
- **Unitree launches dual-arm humanoid robot starting at Rmb26.9k ($4.29k).** This new low-cost robot features a humanoid upper-body, and a lower-base in either a fixed base or a mobile chassis. It is designed for industrial manufacturing, service interaction, and scientific R&D. It offers flexible configurations with 5 or 7 degrees of freedom per arm, for a total of up to 31 degrees of freedom.

Exhibit 12: Toyota CUE7 Basketball-Playing Humanoid



Source: Toyota Motor

Exhibit 13: Unitree Entry-Level R1 Humanoid Robot Now Available Globally on AliExpress



Source: AliExpress

Shipments/Production:

- **1X opened a California factory to scale production of its NEO humanoid robot as it targets consumer deployment at scale.** The Norwegian-American humanoid startup recently released details of its Hayward production facility, which has capacity for about 10,000 units in its first year, with plans to exceed 100,000 annually by 2027, as the company aims to commercialize home robots that can perform everyday tasks such as cleaning and organizing.
- **Figure is scaling humanoid robot production through a dedicated factory system ('BotQ') as it targets a shift from prototypes to high-volume manufacturing.** The company's BotQ facility is designed to produce about 12,000 robots annually in its initial phase, with plans to reach 100,000 units within several years, while recent updates indicate output has already increased to roughly one robot per hour after a ~24x throughput improvement in under four months.

China Policy Support Overview

Humanoid and embodied intelligence became a clear national priority. Since MIIT issued its Guiding Opinion on Humanoid Innovative Development in February 2023, local governments have released a wide range of policies to support industry development, set up funds for humanoid and embodied AI ventures, and establish institutions and alliances to promote industry cooperation. In 2025 NPC, Li Qiang, the Chinese Premier, first referenced it in the government work report. Subsequently, In the 15th FYP announced on 2026 NPC, robotics was named as a strategic emerging industry for the first time, placing it alongside categories including next-gen IT, NEV, biomedicine, and aerospace.

We see continued government leadership and efforts on supporting this frontier industry. As commercialization begins in 2026, we expect sustained support at both the national and local levels to accelerate development and reinforce China's leadership in this sector, critical to push early adoption and drive the commercialization flywheel. While the 15th FYP does not provide quantitative targets, this aligns with past practice. We expect the government to follow with a sector-specific plan.

Exhibit 14: China national/provincial/municipal government have launched a series of policies to support humanoid/embodied AI development...

Announced Date	Policy/Government Plan	Region	Goals/Policy
Dec-21	14th Five-Year-Plan Robotics Industry Development Plan	Nationwide	To boost industry innovation, breakthrough industry bottlenecks, focus on high-end and extend applications
Jan-23	17 govt. departments issued Robot+ application action plan	Nationwide	Robot+ application action plan, aiming to achieve 100 breakthroughs in robotics technologies and 200 innovative applications by 2025
Nov-23	MIIT's Guiding Opinion on Humanoid Innovative Development	Nationwide	Humanoids to become a key engine for economic growth
Apr-24	Jiangsu Robotics Industry Innovation Development Action Plan	Jiangsu	Core robotics industry to exceed Rmb25bn in scale, with robot density in key manufacturing sectors above 500 units per 10,000 workers
May-24	Shandong Implementation Plan for Humanoid Industry Development 2025-2027	Shandong	To develop 10 core companies with production value of more than Rmb100mn each
May-24	Anhui Action Plan for Humanoid Industry Development 2024-2027	Anhui	To establish humanoid industry ecosystem in 2027
Sep-24	Zhangjiang Implementation Plan for Humanoid Industry Development 2024-2027	Zhangjiang	Production to reach 20k units in 2027, with core value chain reaching Rmb20bn
Oct-24	Chongqing supporting policies for embodied intelligence industry	Chongqing	To break through key technologies and provide necessary capital support
Dec-25	Hangzhou supporting policies for humanoid industry	Hangzhou	To provide R&D subsidies up to Rmb5mn, financing interest subsidy, procurement subsidies up to Rmb5mn, and sale bonuses of Rmb1mn
Feb-25	Beijing Action Plan for Embodied Intelligence Innovation and Industry Development 2025-2027	Beijing	To develop at least 50 key companies across value chain with at least 50 mass-production product
Mar-25	Shenzhen Action Plan for Embodied Intelligence Innovation and Industry Development 2025-2027	Shenzhen	To develop 10 core companies with annual revenue exceeding Rmb10bn, with total industry size reaching Rmb100bn
Apr-25	Establishing national standards	Nationwide	To establish national standards for humanoids, covering dexterous operations, multi-robot collaboration and related areas
May-25	Zhuhai supporting policies for AI and robotics industry	Zhuhai	To provide subsidies on robotics technology R&D, including R&D subsidies up to Rmb30mn and application subsidies up to Rmb500k
Jun-25	Wuhan 3-year plan and policies for Humanoid Industry	Wuhan	To provide R&D subsidies up to Rmb60mn and dual-side subsidies for humanoid deployment, up to Rmb1mn each
Jul-25	Shandong Action Plan for Robotics Industry High Quality Development 2025-2027	Shandong	To subsidize Rmb8mn and Rmb3mn for integrators (revenue >Rmb50mn) and suppliers (revenue >Rmb20mn), respectively, and Rmb2mn per application
Aug-25	Beijing's comprehensive supporting policies for humanoid robots	Beijing	To reach annual production capacity of 10k units by 2027, with subsidies across the entire value chain
Aug-25	Shanghai Embodied Intelligence Industry Development Implementation Plan	Shanghai	To scale the industry to Rmb50bn by 2027, with subsidies of 30% for model R&D, 20% for adoption projects, and 50% for ecosystem projects
Aug-25	Artificial Intelligence (AI) Plus Initiative	Nationwide	To achieve extensive and deep AI integration, with intelligent terminal penetration reaching 70% by 2027
Sep-25	Pilot list for intelligent elderly care service robots	Nationwide	10 application scenarios including emotional companionship and daily care, with at least 200 units deployed for home-based elderly care
Sep-25	Hangzhou Action Plan for AI terminal industry development 2025-27	Hangzhou	To scale the embodied robotics industry above Rmb20bn and related industries above Rmb30bn by 2027
Oct-25	The 15th FYP outline	Nationwide	"Strategic emerging sectors" expanded to include humanoids and related fields
Nov-25	Formation of The Standardization Technical Committee for Humanoid Robots	Nationwide	To develop and implement standards for humanoids, covering basic features, safety, key technologies, components, and applications
Nov-25	NDRC guidance	Nationwide	To establish standards and an entry/exit mechanism to foster fair competition and support technology and infrastructure development
Mar-26	The 15th Five-Year Plan (15th FYP)	Nationwide	Named robotics as a strategic emerging industry for the first time
Mar-26	Humanoid Robots and Embodied Intelligence Standardization	Nationwide	Comprising six key elements, basic commonality, intelligent computing, limbs & components, systems, application, safety and ethics

Note: Includes all notable funding disclosed based on our knowledge and research. However, there may still be some not captured.

Source: Government Announcements, Morgan Stanley Research

Exhibit 15: ...with a number of funds totaling ~Rmb187bn to provide capital for industry development...

Announced Date	Fund	Size	Remarks
Jan-25	Beijing Robotics Industry Development Investment Fund	Rmb10bn	Focus on robotics, supply chain, and value chain innovations
Jun-25	National-Local Joint Innovation Centre for Humanoid -Industry Fund	Rmb10bn	Focus on humanoid value chain
Jul-25	Shanghai Humanoid AI Fund	Rmb1bn	Focus on humanoid value chain
Sep-24	Henan Computing Power Industry Fund	Rmb10bn	Focus on digital infra, AI large model, embodied AI, etc.
Oct-24	Tangshan High-tech Robotics Innovation Venture Capital Fund	Rmb200mn	Invests in technology companies in the Angel period and early to mid-term, with the focus on robotics and related fields
Jan-25	Ganzhou-Huangpujiang Intelligent Robotics Industry Fund	Rmb1bn	Led by Jiangxi Provincial Government
Feb-25	Shenzhen AI and Robotics Industry Fund	Rmb10bn	Focus on AI and robotics industries
Feb-25	Shenzhen Policy Fund	Rmb4.5bn	Various subsidies for model and scenarios training, open for application in Mar-25
Feb-25	Beijing Government Investment Fund	Rmb100bn	Focus on AI and robotics industries
Mar-25	Guangdong Investment Fund	Rmn10bn	Focus on AI and robotics industries
Mar-25	Hefei Future Industry Fund	Rmb10bn	Focus on robotics industries, as well as additional Rmb100mn subsidies for robotics R&D
Jun-25	Hong Kong Innovation and Technology Industry-Oriented Fund	HKD10bn	Focus on AI, robotics and emerging industries
Jun-25	Wuhan Humanoid Industry Investment Fund	Rmb1bn	To invest in seed/angel round of humanoid companies
Jun-25	Hubei Provincial AI and Robotics Mother Fund	Rmb10bm	-
Total		~Rmb187bn	

Source: Government Announcements, Morgan Stanley Research`

Humanoid 100 Performance

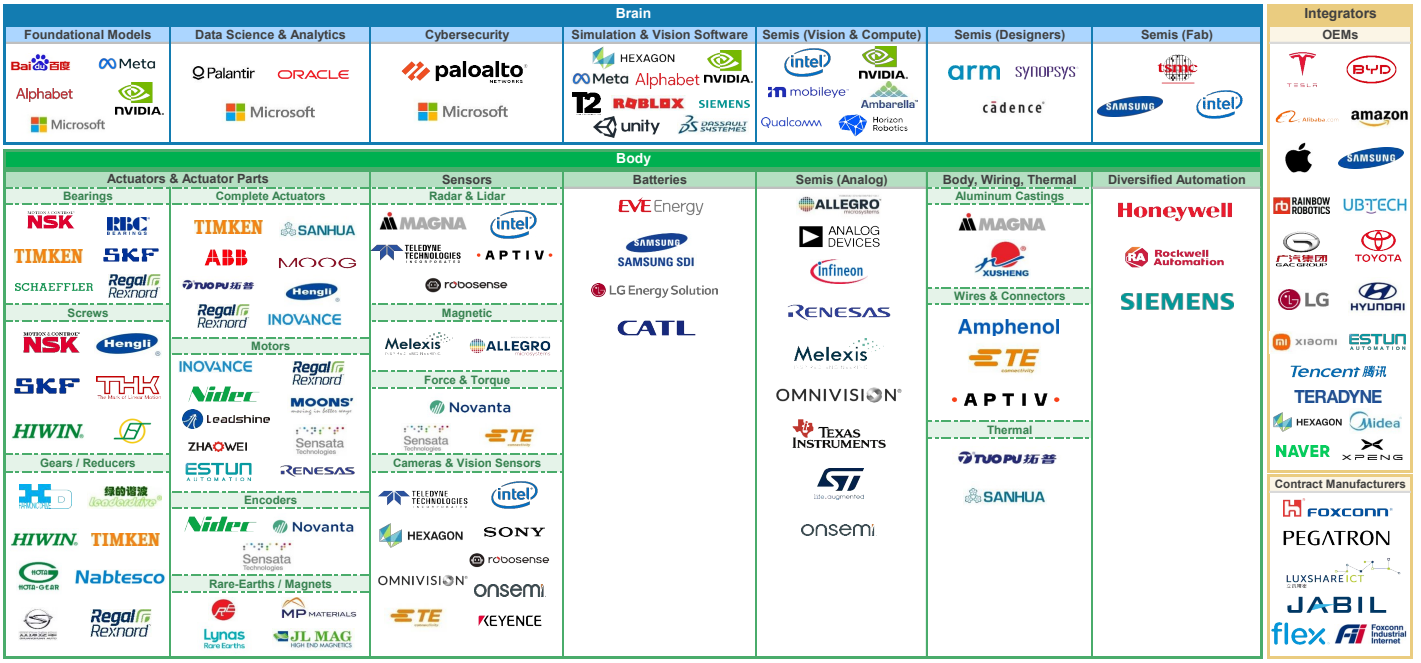
The Humanoid 100 is Morgan Stanley's list of public companies currently involved in or otherwise materially exposed to the humanoid market. We compiled the list through a mix of discussions with our global team of analysts, conversations with clients on their preferred names to play, and our own proprietary research to find names that are involved in the value chain. We then divided the names into **Brain** (Semis/Software), **Body** (Industrial Components), and **Integrators** (Developing Full Humanoids). For every name in the Humanoid 100, we include details on size/liquidity, core business competencies, rationale for inclusion, and current humanoid involvement if applicable.

For a copy of the underlying Humanoid 100 database or our Global Humanoid TAM model, please reach out to your Morgan Stanley representative.

See Initial Note: Humanoids: The Humanoid 100: Mapping the Humanoid Robot Value Chain (6 Feb 2025)

See Latest Update: Embodied AI: Who's Gonna Make the Bots? Adding Contract Manufacturers to the Humanoid 100 (26 Mar 2026)

Exhibit 16: The Humanoid 100- Morgan Stanley's List of Global Humanoid Enablers



Note: Public companies only. Not all inclusive.

Source: Morgan Stanley Research

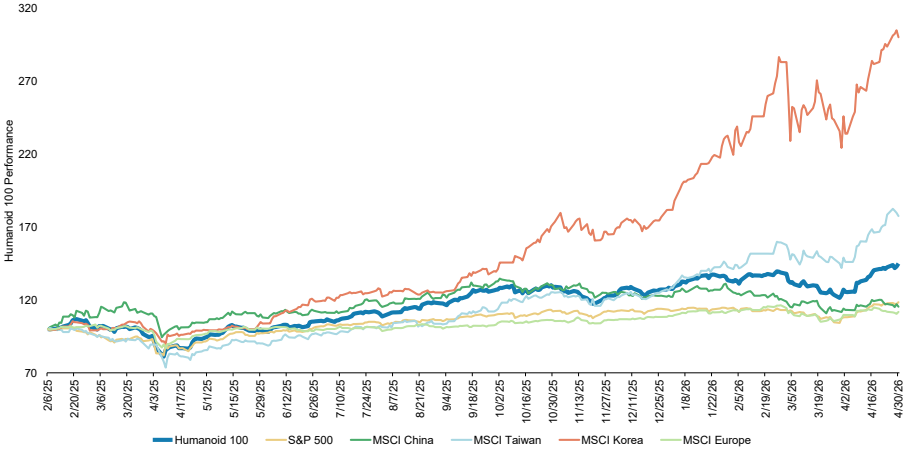
Exhibit 17: Top and Bottom Performing Stocks Since Each Stock's Date of Addition to the Humanoid 100 List

Top Performing Stocks (Since Addition Date)					
Rank	**Company**	**Date Added**	**Ticker**	**Country**	**Performance**
1	Intel	2/6/2025	INTC-US	USA	+389%
2	Samsung Electronics	2/6/2025	005930-KR	Korea	+319%
3	Foxconn Industrial Internet (FII)	2/6/2025	601138-CN	Taiwan	+224%
4	Lynas Rare Earths	2/6/2025	LYC-AU	Australia	+201%
5	Hyundai	2/6/2025	005380-KR	Korea	+173%
6	Teradyne	2/6/2025	TER-US	USA	+169%
7	MP Materials	2/6/2025	MP-US	USA	+154%
8	STMicroelectronics	2/6/2025	STM-US	Switzerland	+131%
9	Northern Rare Earths	2/6/2025	600111-CN	China	+118%
10	Amphenol	2/6/2025	APH	USA	+112%

Bottom Performing Stocks (Since Addition Date)					
Rank	**Company**	**Date Added**	**Ticker**	**Country**	**Performance**
1	Dassault Systemes	2/6/2025	DSY-FR	France	(53%)
2	Mobileye	2/6/2025	MBLY-US	USA	(47%)
3	Roblox	6/17/2025	RBLX-US	USA	(44%)
4	Xiaomi	2/6/2025	1810-HK	China	(26%)
5	Tuopu	2/6/2025	601689-CN	China	(23%)
6	Moons Electric	2/6/2025	603728-CN	China	(22%)
7	Hexagon	2/6/2025	HEXA.B-SE	Sweden	(21%)
8	Novanta	2/6/2025	NOVT-US	USA	(19%)
9	Ambarella	2/6/2025	AMBA-US	USA	(16%)
10	Zhaowei	2/6/2025	003021-CN	China	(15%)

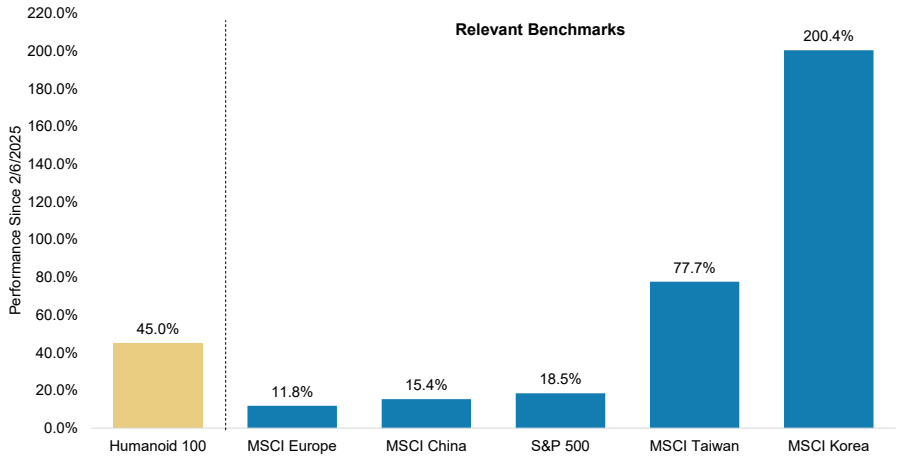
Note: Data as of 2/20/2025 close. Price returns only, does not account for dividend reinvestment. Source: FactSet, Morgan Stanley Research

Exhibit 18: Equal-Weighted Humanoid 100 Performance since 2/6/2025 (Date List was Established)



Note: Data as of 4/30/2026 close. Price returns only, does not account for dividend reinvestment or transaction costs.
Source: FactSet, Morgan Stanley Research

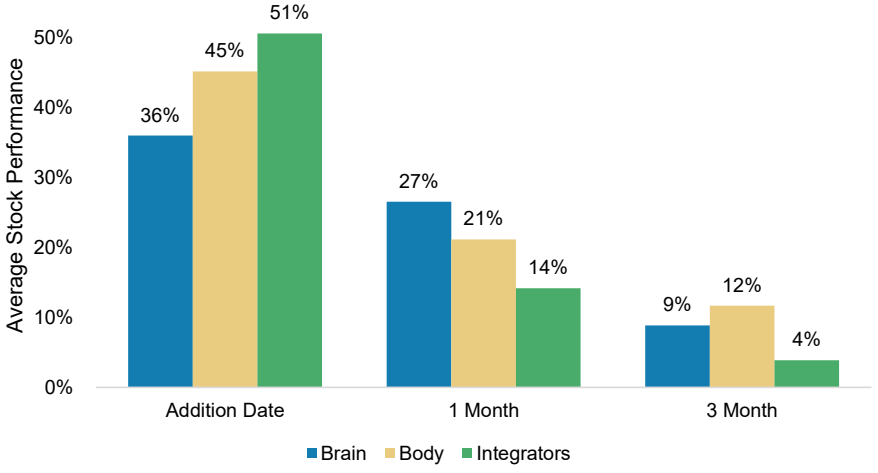
Exhibit 19: The equal-weighted Humanoid 100 is up 45% since 2/6/2025 (adjusting for additions and deletions), outperforming the S&P 500, MSCI Europe, MSCI China, but underperforming MSCI Taiwan and Korea.



Note: Data as of 4/30/2026 close. Price returns only, does not account for dividend reinvestment or transaction costs.

Source: FactSet, Morgan Stanley Research

Exhibit 20: Average Stock Performance across Brain, Body, and Integrator Categories



Note: Data as of 4/30/2026 close. 1 month and 3 month performance does not adjust for companies added after beginning of measurement period. Price returns only, does not account for dividend reinvestment.

Source: FactSet, Morgan Stanley Research

Exhibit 21: Performance Across Each Stock in the Humanoid 100 List

Ranked

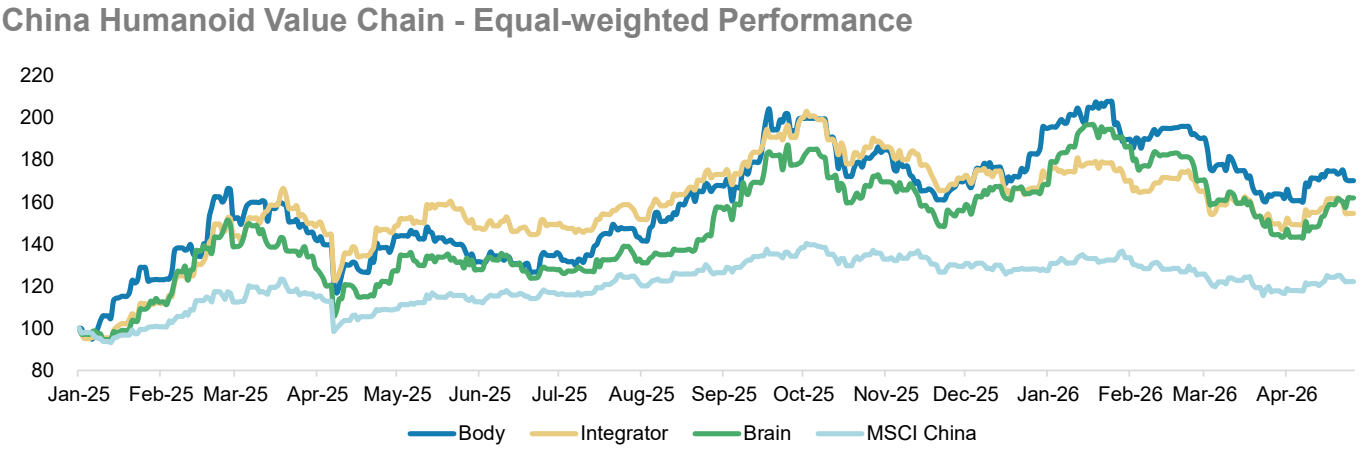
General						Trading Data		Performance					
Company	Date Added	Ticker	Country	Analyst	MS Rating	Mkt Cap ($mn)	Price ($)	Addition Date	1 Month	3 Month	6 Month	1 Year	YTD
Intel	2/6/2025	INTC-US	USA	Joseph Moore		476,214	94.75	389%	129%	103%	135%	370%	156%
STMicroelectronics	2/6/2025	STM-US	Switzerland	Lee Simpson		46,813	52.67	131%	76%	98%	126%	143%	113%
Arm Holdings	2/6/2025	ARM-US	UK	Lee Simpson		214,195	201.69	20%	54%	100%	27%	84%	92%
Onsemi	2/6/2025	ON-US	USA	Joseph Moore		38,884	98.86	89%	81%	68%	98%	154%	86%
Samsung Electronics	2/6/2025	005930-KR	Korea	Shawn Kim		1,002,328	152.87	319%	25%	37%	112%	297%	84%
Allegro Microsystems	2/6/2025	ALGM-US	USA	Joseph Moore		8,166	44.07	76%	73%	31%	60%	154%	84%
Hyundai	2/6/2025	005380-KR	Korea	Young Suk Shin		98,779	376.08	173%	13%	6%	100%	179%	79%
Teradyne	2/6/2025	TER-US	USA	Shane Brett		47,959	306.33	169%	24%	42%	94%	363%	77%
Texas Instruments	2/6/2025	TXN-US	USA	Joseph Moore		245,015	269.22	47%	51%	30%	75%	76%	62%
Hiwin Technologies	2/6/2025	2049-TW	Taiwan	Derrick Yang		3,457	9.77	-5%	27%	25%	42%	42%	61%
LG Electronics	2/6/2025	066570-KR	Korea	Shawn Kim		16,540	91.86	68%	30%	42%	61%	97%	53%
Regal Rexnord	2/6/2025	RRX	USA	NC		13,567	203.82	43%	21%	33%	48%	103%	53%
Lynas Rare Earths	2/6/2025	LYC-AU	Australia	Shannon Sinha		14,146	14.05	201%	-4%	28%	29%	122%	53%
Flex	2/6/2025	FLEX	USA	NC		33,311	90.60	105%	51%	45%	43%	167%	52%
Infineon	2/6/2025	IFX-DE	Germany	Lee Simpson		84,859	65.17	49%	53%	37%	66%	98%	51%
Renesas	2/6/2025	6723-JP	Japan	Kazuo Yoshikawa		33,090	18.24	26%	43%	25%	76%	92%	50%
Analog Devices	2/6/2025	ADI	USA	Joseph Moore		190,063	389.31	87%	33%	29%	73%	106%	48%
Jabil	2/6/2025	JBL	USA	NC		35,223	333.86	101%	36%	42%	52%	130%	48%
THK	2/6/2025	6481-JP	Japan	Lisa Jiang		4,066	36.32	53%	27%	28%	42%	67%	47%
Samsung SDI	2/6/2025	096770-KR	Korea	Shawn Kim		17,005	101.33	20%	29%	31%	9%	55%	44%
Rainbow Robotics	2/6/2025	277810-KR	Korea	NC		8,713	449.13	77%	23%	-9%	89%	145%	41%
Nabtesco	2/6/2025	6268-JP	Japan	Lisa Jiang		3,689	31.47	87%	32%	25%	34%	143%	39%
Harmonic Drive Systems	2/6/2025	6324-JP	Japan	Lisa Jiang		2,812	29.71	-1%	38%	54%	81%	56%	38%
RBC Bearings	2/6/2025	RBC-US	USA	Kristine Liwag		18,481	584.49	60%	14%	20%	47%	82%	34%
Timken	2/6/2025	TKR-US	USA	Angel Castillo		7,433	106.53	31%	16%	19%	41%	73%	32%
MP Materials	2/6/2025	MP-US	USA	Carlos De Alba		10,891	61.30	154%	45%	12%	2%	170%	31%
TSMC	2/6/2025	TSM-US	Taiwan	Charlie Chan		2,042,599	393.83	87%	25%	20%	31%	138%	30%
NSK	2/6/2025	6471-JP	Japan	NC		3,744	7.65	92%	15%	18%	62%	103%	30%
Teledyne	2/6/2025	TDY-US	USA	Kristine Liwag		29,213	630.56	24%	11%	4%	25%	39%	26%
Keyence	2/6/2025	6861-JP	Japan	Yoshinao Ibara		112,064	462.07	18%	29%	26%	19%	19%	26%
Sensata	2/6/2025	ST-US	USA	NC		5,755	39.57	55%	25%	20%	28%	95%	25%
LG Energy Solution	2/6/2025	373220-KR	Korea	Young Suk Shin		74,866	319.94	38%	12%	16%	-5%	42%	25%
Melexis	2/6/2025	MELE-BE	Belgium	Nigel van Putten		3,121	78.98	24%	38%	12%	9%	36%	24%
Moog	2/6/2025	MOG.A	USA	Kristine Liwag		9,569	302.02	56%	6%	-1%	45%	80%	24%
Alphabet Inc.	2/6/2025	GOOGL-US	USA	Brian Nowak		4,239,877	349.94	83%	41%	14%	37%	142%	23%
Pegatron	2/6/2025	4938-TW	Taiwan	Howard Kao		6,962	2.60	-15%	5%	18%	8%	2%	20%
Magna	2/6/2025	MGA-US	Canada	Andrew Percoco		17,224	61.78	61%	19%	25%	43%	83%	19%
CATL	2/6/2025	300750-CN	China	Jack Lu		295,141	65.12	76%	6%	25%	9%	88%	19%
Luxshare	2/6/2025	002475-CN	China	Sharon Shih		73,188	10.05	65%	37%	30%	3%	117%	18%
LeaderDrive	2/6/2025	688017-CN	China	Sheng Zhong		5,769	31.47	22%	17%	-2%	40%	52%	17%
Northern Rare Earths	2/6/2025	600111-CN	China	NC		26,955	7.46	118%	13%	3%	0%	128%	15%
Amazon	2/6/2025	AMZN-US	USA	Brian Nowak		2,828,811	263.04	10%	32%	11%	19%	44%	15%
Nidec	2/6/2025	6594-JP	Japan	Shoji Sato		17,024	14.85	-9%	21%	9%	23%	-5%	12%
EVE Energy	2/6/2025	300014-CN	China	Jack Lu		22,492	10.84	67%	5%	14%	-13%	77%	10%
Honeywell	2/6/2025	HON-US	USA	Chris Snyder		133,257	210.30	6%	-4%	-6%	7%	8%	10%
Amphenol	2/6/2025	APH	USA	NC		182,423	148.38	112%	24%	2%	6%	91%	9%
Novanta	2/6/2025	NOVT-US	USA	NC		4,314	120.89	-19%	15%	-4%	3%	9%	9%
NVIDIA	2/6/2025	NVDA-US	USA	Joseph Moore		5,084,775	209.25	63%	21%	4%	-2%	83%	7%
JL Mag	2/6/2025	6680-HK	China	Rachel Zhang		3,515	2.56	97%	1%	-11%	-21%	48%	6%
Siemens	2/6/2025	SIE-DE	Germany	Max Yates		220,064	288.70	19%	23%	-1%	2%	25%	6%
Cadence Design Systems	2/6/2025	CDNS-US	USA	Lee Simpson		91,097	329.95	9%	22%	11%	-2%	11%	5%
BYD	2/6/2025	002594-CN	China	Tim Hsiao		140,439	15.42	2%	-3%	13%	-1%	-13%	5%
Rockwell Automation	2/6/2025	ROK-US	USA	Chris Snyder		44,966	400.20	49%	17%	-3%	12%	65%	5%
Qualcomm	2/6/2025	QCOM-US	USA	Joseph Moore		164,424	156.00	-8%	41%	18%	1%	21%	5%
Leadshine	2/6/2025	002979-CN	China	NC		1,989	6.36	9%	24%	9%	0%	-8%	4%
Midea	2/6/2025	000333-CN	China	Lillian Lou		90,473	11.90	13%	12%	5%	8%	10%	4%
Synopsys	2/6/2025	SNPS-US	USA	Lee Simpson		92,183	481.22	-10%	26%	4%	9%	5%	3%
Foxconn Industrial Internet (FII)	2/6/2025	601138-CN	Taiwan	Sharon Shih		192,422	9.70	224%	28%	9%	-19%	248%	1%
Apple	2/6/2025	AAPL-US	USA	Erik Woodring		3,966,393	270.17	16%	10%	5%	0%	28%	0%
Palo Alto Networks	6/17/2025	PANW-US	USA	Keith Weiss		148,137	181.54	-10%	16%	1%	-18%	-4%	-3%
Ambarella	2/6/2025	AMBA-US	USA	Joseph Moore		2,887	65.94	-16%	41%	7%	-19%	43%	-3%
Baidu	2/6/2025	BIDU-US	China	Gary Yu		33,668	121.01	36%	19%	-17%	4%	44%	-3%
Schaeffler	2/6/2025	SHA0-DE	Germany	NC		8,512	9.01	82%	15%	-19%	15%	114%	-3%
Jiangsu Hengli	2/6/2025	601100-CN	China	Sheng Zhong		20,603	15.37	56%	8%	-3%	9%	41%	-4%
Shanghai Beite	6/17/2025	603009-CN	China	NC		2,304	6.65	2%	1%	-17%	-6%	1%	-5%
Xusheng	2/6/2025	603305-CN	China	Shelley Wang		2,538	2.21	-12%	5%	-14%	5%	20%	-5%
Hon Hai Precision (Foxconn)	2/6/2025	2317-TW	Taiwan	Sharon Shih		99,786	7.13	30%	13%	0%	-16%	55%	-5%
Aptiv	2/6/2025	APTV-US	USA	Andrew Percoco		12,433	58.33	8%	7%	-6%	-13%	25%	-7%
SKF	2/6/2025	SKF.b-SE	Sweden	Michael Harleaux		11,188	24.57	3%	5%	-1%	-8%	21%	-7%
TE Connectivity	2/6/2025	TEL	USA	NC		59,912	205.25	40%	7%	-5%	-13%	45%	-7%
Meta	2/6/2025	META-US	USA	Brian Nowak		1,698,260	669.12	-6%	14%	-15%	-8%	11%	-7%
Hota	2/6/2025	1536-TW	Taiwan	Cindy Huang		455	1.63	-15%	3%	-17%	-16%	-19%	-8%
Estun	2/6/2025	002747-CN	China	Sheng Zhong		2,946	3.04	3%	9%	-7%	-10%	9%	-8%
Shenzhen Inovance	2/6/2025	300124-CN	China	Sheng Zhong		26,626	9.89	-3%	2%	-8%	-11%	-4%	-9%
Robosense	2/6/2025	2498-HK	China	NC		2,004	4.24	-11%	-4%	-2%	-6%	-12%	-9%
Hexagon	2/6/2025	HEXA.B-SE	Sweden	Adam Wood		28,688	10.69	-21%	11%	-1%	-15%	6%	-9%
Toyota	2/6/2025	7203-JP	Japan	Shinji Kakiuchi		253,952	19.48	7%	-6%	-14%	-5%	11%	-10%
Alibaba	2/6/2025	BABA-US	China	Gary Yu		312,908	130.43	30%	8%	-22%	-24%	10%	-10%
Naver	2/6/2025	035420-KR	Korea	Seyon Park		22,259	148.81	-5%	2%	-23%	-17%	5%	-13%
Tesla	2/6/2025	TSLA-US	USA	Andrew Percoco		1,400,132	372.80	0%	7%	-11%	-13%	35%	-15%
Sanhua	2/6/2025	002050-CN	China	Shelley Wang		27,583	6.56	27%	9%	-8%	-8%	75%	-15%
Microsoft	2/6/2025	MSFT-US	USA	Keith Weiss		3,153,072	424.46	2%	14%	-5%	-22%	3%	-16%
UBTech	2/6/2025	9880-HK	China	NC		6,779	13.49	29%	21%	-24%	-25%	22%	-16%
Horizon Robotics	2/6/2025	9660-HK	China	Tim Hsiao		13,592	0.93	33%	7%	-12%	-20%	11%	-16%
Take-Two	6/17/2025	TTWO-US	USA	Matthew Cost		39,876	215.34	-9%	11%	-3%	-15%	-8%	-17%
Mobileye	2/6/2025	MBLY-US	USA	Andrew Percoco		7,352	8.73	-47%	32%	-3%	-32%	-40%	-17%
Shuanghuan	2/6/2025	002472-CN	China	Sheng Zhong		4,725	5.60	1%	9%	-5%	-9%	17%	-17%
Oracle	2/6/2025	ORCL-US	USA	Keith Weiss		471,183	163.83	-5%	16%	-2%	-37%	15%	-17%
Moons Electric	2/6/2025	603728-CN	China	NC		3,583	8.55	-22%	3%	-15%	-17%	-10%	-18%
XPENG	2/6/2025	XPEV-US	China	Tim Hsiao		12,393	15.86	-7%	-3%	-9%	-29%	-12%	-20%
Dassault Systemes	2/6/2025	DSY-FR	France	Adam Wood		29,275	22.17	-53%	13%	-18%	-22%	-42%	-20%
Palantir	2/6/2025	PLTR-US	USA	Sanjit Singh		329,979	137.97	24%	1%	-5%	-28%	17%	-22%
Tencent	2/6/2025	700-HK	China	Gary Yu		553,038	61.15	14%	-3%	-23%	-28%	-2%	-22%
OmniVision	2/6/2025	603501-CN	China	Charlie Chan		18,691	14.87	-11%	-2%	-19%	-26%	-25%	-22%
Tuopu	2/6/2025	601689-CN	China	Shelley Wang		14,644	8.43	-23%	5%	-17%	-14%	15%	-22%
Zhaowei	2/6/2025	003021-CN	China	NC		3,667	13.74	-15%	-1%	-17%	-18%	-24%	-22%
Xiaomi	2/6/2025	1810-HK	China	Andy Meng		98,826	3.85	-26%	-10%	-18%	-34%	-42%	-26%
GAC Group	2/6/2025	2238-HK	China	Joey Xu		3,814	0.38	-7%	-6%	-23%	-15%	3%	-31%
Roblox	6/17/2025	RBLX-US	USA	Matthew Cost		40,285	56.28	-44%	6%	-16%	-51%	-18%	-32%
Unity	6/17/2025	U-US	USA	Matthew Cost		11,393	26.11	11%	29%	-9%	-27%	25%	-40%
Average								**41%**	**20%**	**9%**	**14%**	**59%**	**15%**

Note: Data as of 4/30/2026 close. Price returns only, does not account for dividend reinvestment.

Source: FactSet, Morgan Stanley Research

China Humanoids Value Chain Performance

Exhibit 22: Equal-weighted China Humanoid Value Chain Perf



Source: FactSet, Morgan Stanley Research Note: Data as of May 3 close. Results shown represent return excluding dividends, brokerage commissions and transaction costs. These figures are not audited. Past performance is no guarantee of future results. For important disclosures regarding companies that are the subject of this screen, please see the Morgan Stanley Research Disclosure Website at www.morganstanley.com/researchdisclosures.

Exhibit 23: China – humanoid value chain list: 46 stocks in total, including three in brains, 32 in body components, and 11 integrators.

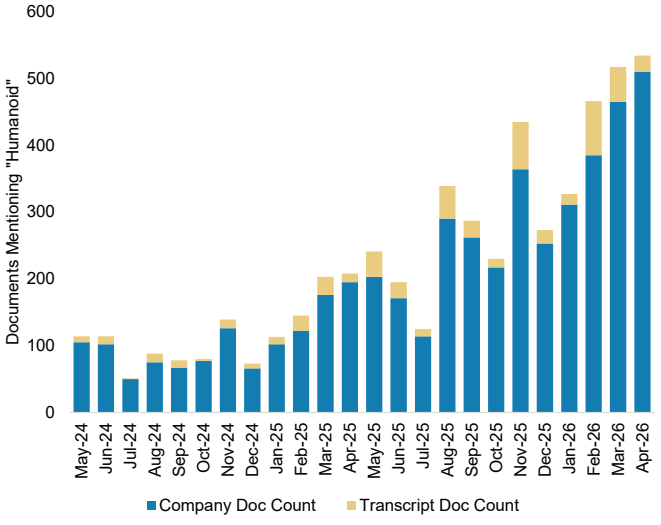
	Ticker	Company	Analyst	Market Cap (USD'mn)	Last Close (LCY)	Price Change 1W	3M	YTD	1Y	Notes
Brain	BIDU-US	Baidu	Yu, Gary	35,201	125.9	(2%)	(13%)	(4%)	40%	Providing AI model ERINE 5.0, computing platform
Brain	002230-CN	iFlytek	Shih, Sharon	15,309	47.8	(4%)	(18%)	(5%)	2%	Offers full-stack "SuperBrain + Spark Desk" AI platform and multimodal model, taps into 450+ robot makers
Brain	9660-HK	Horizon Robotics	Hsiao, Tim	11,594	7.4	(3%)	(9%)	(15%)	NA	Its subsidiary D-Robotics launched system-on-chip (SoC) development kit RDK S100 for humanoids
Actuator	002050-CN	Sanhua	Wang, Shelley	27,640	46.9	2%	(10%)	(15%)	75%	One of Tesla EV T1 suppliers, developing humanoid actuators
Actuator	601689-CN	Tuopu	Wang, Shelley	15,294	60.1	2%	(17%)	(22%)	15%	One of Tesla EV T1 suppliers, developing humanoid actuators
Battery	300750-CN	CATL	Lu, Jack	288,540	436.0	0%	25%	19%	88%	CATL led the investment in Galbot, its leading powertrain solutions can be used to power humanoids
Battery	002245-CN	Azure	NC	3,280	20.7	1%	22%	16%	63%	Azure is a battery supplier to Unitree, DeepRobotics, Fourier and other humanoids integrators
Bearing	300718-CN	Changsheng	NC	3,607	70.5	3%	(12%)	(17%)	(12%)	Provides bearing products, screw products under R&D/sample stage, in collaboration with Unitree
Exterior	603305-CN	Xusheng	Wang, Shelley	2,606	15.4	3%	(18%)	(5%)	20%	Working with humanoid players to supply casting parts, expects to book revenue from humanoid in 2025
Hands	003021-CN	Zhaowei	NC	4,504	96.6	(4%)	(19%)	(22%)	(24%)	Offers dexterous hands, motors and modules; guides revenue of Rmb20-30mn for 2025 and Rmb100mn for 2026
Hands	002979-CN	Leadshine	NC	2,023	43.9	(1%)	9%	4%	(8%)	Investing Rmb500mn to develop and manufacture humanoid parts, released dexterous hands product
LiDAR	HSAI-US	Hesai	Hsiao, Tim	2,874	22.0	(6%)	(8%)	(2%)	20%	Robotics LiDAR reached ~240k units in 2025
LiDAR	2498-HK	Robosense	NC	2,059	33.1	(3%)	(0%)	(9%)	(14%)	Robot products surpassed 300k units in 2025
Magnets	300748-CN	JL Mag	Zhang, Rachel	6,087	33.0	3%	(11%)	(3%)	61%	Investing US$144mn in Mexico factory citing growing demand for humanoids and EVs
Motor	300124-CN	Inovance	Zhong, Sheng	24,078	68.6	4%	(9%)	(9%)	(4%)	Launched a series of humanoid components, also developing screw, linear actuator for humanoids
Motor	600580-CN	Wolong	NC	8,627	37.9	(0%)	(15%)	(23%)	77%	Received small order for frameless torque motor, partnership with Zhangjiang humanoid center
Motor	603728-CN	Moons	NC	3,638	59.4	3%	(16%)	(18%)	(10%)	Offers coreless motor, frameless torque motor, encoder, reducer products for humanoids
Motor	688698-CN	Veichi	NC	2,137	68.2	2%	(25%)	(31%)	35%	Formed JV with Rongtai in Thailand for robotics products
Motor	688160-CN	Kinco	NC	1,428	107.4	0%	(19%)	(30%)	3%	Offers frameless torque motor for humanoids, collaborating with leading humanoid players
Reducer	002472-CN	Shuanghuan	Zhong, Sheng	4,301	39.3	2%	(5%)	(17%)	17%	Leading supplier of gears, currently used in other robotics, developing new type of reducer for humanoids
Reducer	688017-CN	Leaderdrive	Zhong, Sheng	6,013	224.1	5%	(0%)	17%	52%	Holds leading market share in humanoid harmonic reducers, with potential to contribute half of its 2026 revenue
Reducer	603915-CN	Guomao	Zhong, Sheng	1,510	15.7	2%	(9%)	(15%)	(1%)	Supplier of planetary reducer for DeepRobotics (a leading quadruped robot player)
Reducer	002896-CN	ZhongdaLeader	NC	2,021	70.3	(2%)	(14%)	(21%)	0%	Certified supplier for a key domestic integrator, announced to invest Rmb200mn for precision core components
Reducer	301550-CN	Sling	NC	3,302	160.0	1%	(3%)	15%	183%	Established production line for robotics, products include harmonic reducers, actuators, and bearings
Screw	601100-CN	Hengli Hydraulic	Zhong, Sheng	20,598	105.0	8%	(8%)	(4%)	41%	It is believed to be the major screw supplier to a North American integrator, with its Mexican capacity
Screw	300100-CN	Shuanglin	NC	2,386	28.5	(5%)	(20%)	(28%)	(50%)	Developed roller screw and grinding machine that can be used in humanoid, sent sample to domestic clients
Screw	603119-CN	Rongtai	NC	2,462	82.5	7%	(21%)	(29%)	72%	To invest US$77mn in Thailand for 7mn sets of robotics components, formed JV with Veichi in Thailand for robots
Screw	603667-CN	XCC	NC	3,722	66.4	(0%)	(17%)	(5%)	78%	To invest Rmb1.1bn for a new plant with an annual capacity of 980k sets of planetary roller screws
Semi	603501-CN	OmniVision	Chan, Charlie	17,966	98.3	(6%)	(17%)	(22%)	(25%)	Its existing sensor technology can be easily applied to humanoid's vision
Semi	688279-CN	Fortior	NC	3,058	197.5	(4%)	2%	(3%)	(19%)	Offers motor ASIC, driver IC, MCU, and established JV with Sanhua to develop dexterous hands
Sensor	600699-CN	Joyson	Wang, Shelley	5,986	28.5	(0%)	1%	(9%)	73%	Developed 6-axis force sensors, tactile sensors, IMU, and has placed commercial orders for humanoid robots
Sensor	603662-CN	Keli	NC	2,310	56.2	(1%)	(16%)	(22%)	(17%)	Developed 6-axis force sensor, and deploying humanoid robots in production line
Sensor	300007-CN	Hanwei	NC	2,058	43.0	(0%)	(23%)	(20%)	4%	Focus on soft, flexible sensor, cooperating with multiple leading integrators
Vision	688322-CN	Orbbec	NC	3,006	79.6	1%	(14%)	(11%)	34%	A key stuctured light camera supplier to leading domestic players
Vision	688400-CN	Luster LightTech	NC	2,058	59.3	27%	36%	40%	110%	Providing motion capturing solution - FZMotion for Unitree
Integrator	700-HK	Tencent	Yu, Gary	544,944	475.6	(1%)	(18%)	(21%)	(3%)	Tencent established a Robotics X lab in Shenzhen in 2018, unveiled XiaoWu
Integrator	BABA-US	Alibaba	Yu, Gary	308,636	131.5	(1%)	(20%)	(10%)	5%	Ant Group's subsidiary Robbyant unveiled LingBot VA (robot brain model) and R1 humanoid robot
Integrator	1810-HK	Xiaomi	Meng, Andy	79,473	31.8	2%	(8%)	(19%)	(40%)	Unveiled Xiaomi-Robotics-0, an open-source VLA model
Integrator	1211-HK	BYD	Hsiao, Tim	100,746	103.8	(2%)	15%	9%	(19%)	Developing humanoid project - Yao Shun Yu, testing UBTECH humanoids; invested in Paxini
Integrator	300-HK	Midea/KUKA	Lou, Lillian	88,771	88.8	(0%)	2%	5%	N/A	The self-developed 6-arm wheel-based humanoid Robot Ultra has entered its washing machine factory
Integrator	XPEV-US	XPENG	Hsiao, Tim	12,190	15.8	(4%)	(8%)	(22%)	(20%)	Its humanoid robot - Iron, is expected to enter mass production stage in 2026
Integrator	002747-CN	Estun	Zhong, Sheng	2,662	21.9	4%	(9%)	(8%)	9%	One of Huawei's 16 partners, developed humanoid motors, unveiled humanoid Codroid 02
Integrator	9880-HK	UBTECH	NC	5,855	107.5	0%	(20%)	(15%)	23%	Launched Walker S2, received over Rmb1.4bn order in 2025
Integrator	2432-HK	Dobot	NC	1,599	32.3	1%	(10%)	(15%)	N/A	Delivered its third batch of mass produced, full-size humanoid Atom robots
Integrator	002779-CN	Zhongjian	NC	2,165	80.1	(14%)	(20%)	(30%)	6%	One of Huawei's 16 partners, invested in 1X, launched quadruped robot P1
OEM	002600-CN	Lingyi iTech	Shih, Sharon	15,036	14.1	(3%)	(6%)	(10%)	76%	OEM for multiple integrators, will invest Rmb50mn in components and assembly capacity

Source: FactSet, Morgan Stanley Research Note: Data as of May 3 close. This is a constantly evolving list of Chinese companies involved in humanoids. Companies are included based on the following criteria: (1) MS covered companies; (2) Non-MS covered companies - either announced cooperation with key humanoid companies, or a certain revenue level in products to be applied in humanoid robots. Results shown represent return excluding dividends, brokerage commissions and transaction costs. These figures are not audited. Past performance is no guarantee of future results. For important disclosures regarding companies that are the subject of this screen, please see the Morgan Stanley Research Disclosure Website at www.morganstanley.com/researchdisclosures

Tracking Humanoid Progress

Humanoid Company & News Mentions

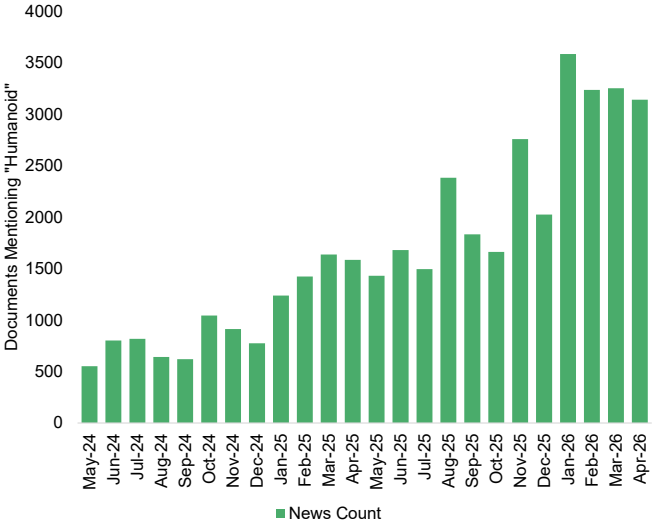
Exhibit 24: Time series of company transcripts mentioning "Humanoid "



Note: 'Company Documents' include filings, presentations, and press releases. Data is global.

Source: AlphaSense, Morgan Stanley Research

Exhibit 25: Time series of news/media reports mentioning "Humanoid"

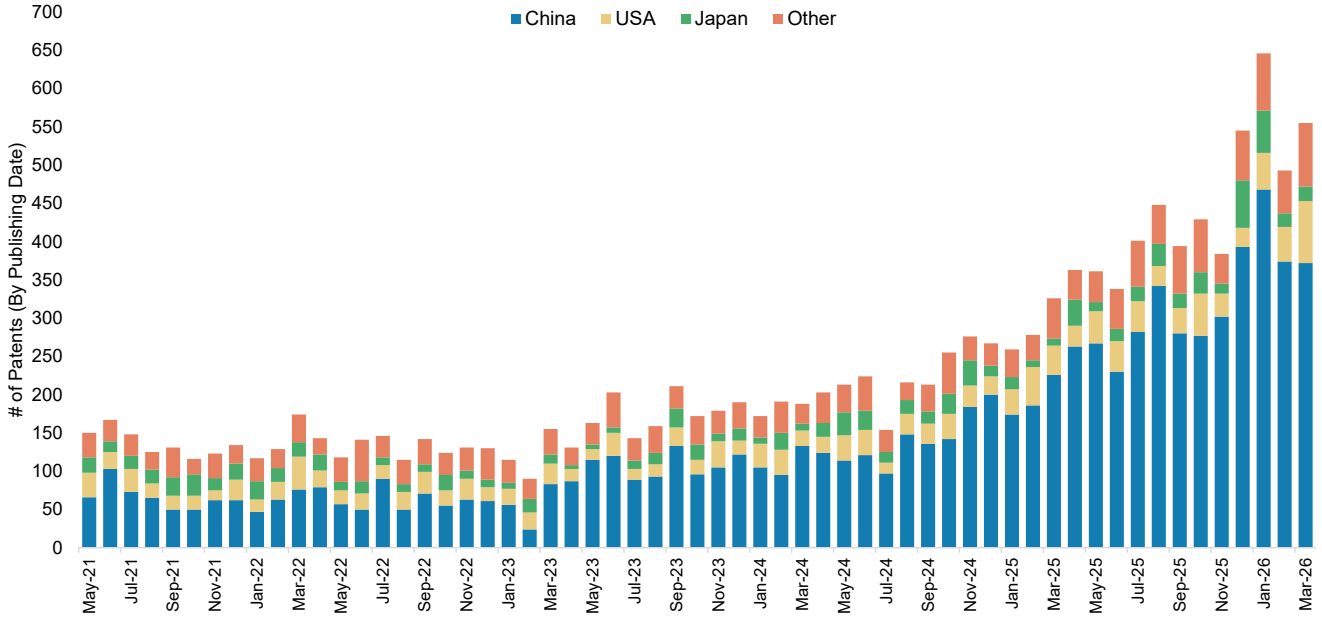


Note: Data is global.

Source: AlphaSense, Morgan Stanley Research

Global Patents

Exhibit 26: Monthly Patent Applications Mentioning "Humanoid" by Country



Note: Ordered by publishing date. According to Google Patents, may not capture 100% of patents.

Source: Google Patents, Morgan Stanley Research

Exhibit 27: Global Patent Applications Mentioning "Humanoid" by Office Over the Past 5 Years *(According to Google Patents, may not capture all)*

Patents Mentioning "Humanoid" By Office (Past 5 Years)

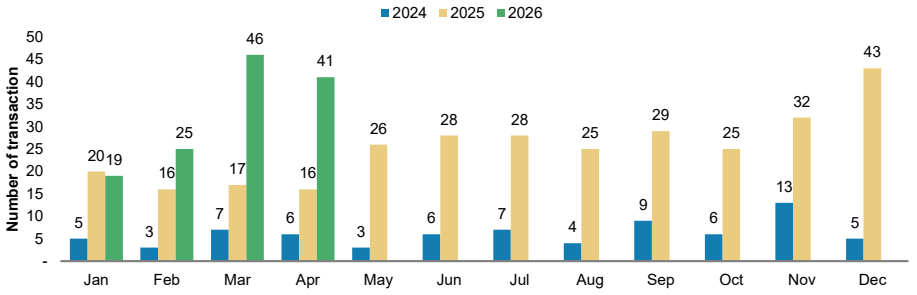
Rank	Patent Office	# Count
1	China	8,469
2	United States	1,647
3	World Intellectual Property Organization (WIPO)	1,101
4	Japan	1,088
5	South Korea	330
6	European Patent Office (EPO)	230
7	Taiwan	196
8	Germany	114
9	Australia	31
10	Brazil	23
11	Canada	21
12	Turkey	17
13	Poland	17
14	Great Britain	13
15	France	11
16	Italy	10
17	Spain	6
18	Eurasian Patent Organisation (EAPO)	6
19	Sweden	4
20	Romania	3

Note: Exhibit limited to top 20.

Source: Google Patents, Morgan Stanley Research

China Financing Activity

Exhibit 28: China Humanoids Financing Activities



Note: Includes all notable funding disclosed based on our knowledge and research. However, there may still be some not captured. We updated number of transaction in previous months with transaction announced after our published previous Humanoids Horizon.

Source: Company announcement, GGII Morgan Stanley Research.

Tech Firms Supporting the Development of Humanoids

Exhibit 29: Humanoid or Robotics Involvement of Major Tech Firms in the US & China

Humanoid or Robotics Involvement of Big Tech Firms

Company	Involvement
Alibaba.com ANT GROUP	In Sept, ANT Group's robotics unit, Robbyant, unveiled 'R1' robot at trade show in Shanghai
amazon	Major in-house robotics team and deep experience with automation. Backer and partner of Agility Robotics. FAR (Frontier AI Robotics) Team building Robot Foundation models.
Apple	Reportedly planning a tabletop robot and have explored humanoid designs. Have released numerous AI frameworks & datasets for humanoid and non-humanoid robots.
Baidu 百度	UBTech's humanoids leverage Baidu's Ernie AI model. DEEPX leverages Baidu PaddlePaddle deep learning framework.
ByteDance	Unveiled general purpose VLA model ('GR3') and ByteMini robot
Google	Google Deepmind partnered with Apptronik and Others. Gemini Robotics is a major focus within Google Deepmind. Also develop MuJoCo physics engine for robotics.
HUAWEI	Embodied AI Innovation Center' in Shenzhen. Develop CloudRobo embodied intelligence platform based on Pangu AI model. Partnered with UBTech.
Meta	Reportedly forming new team within Reality Labs to conduct robotics work. CTO Andrew Bosworth described humanoids as 'next AR-sized bet'.
Microsoft	Partner and backer of Figure AI. Have an internal autonomous systems & robotics research team.
NVIDIA	Partnered with majority of humanoid developers under Project Gr00t. Bulk of humanoid players leverage Isaac Lab, Gr00t Models, Cosmos, or other tools.
Tencent 腾讯	In-house robotics team working on humanoid and non-humanoid robots. Tencent Cloud has partnership with Dobot.
TESLA	Developing 'Optimus' humanoid.
xiaomi	Developing 'CyberOne' humanoid

Source: Company announcements, Bloomberg, Reuters, Morgan Stanley Research

US & China Humanoid TAM/Adoption Estimates

Note: The underlying Excel file for the TAM model discussed in this section is available upon request. Please reach out to your Morgan Stanley representative to obtain the model.

Global Adoption Estimates

According to Our Estimates:

- **By 2036, ~24.4 million (~2% of ~1 billion total) humanoid adoptions will have occurred.**
  - Low Income Countries: ~0.2 million (~1.8% of ~14 million total) humanoids have been adopted.
    - LI Countries Include: Rwanda, Ethiopia, Madagascar, Afghanistan, Yemen, etc.
  - Lower Middle Income Countries: ~3.7 million (~1.8% of ~204 million total) humanoids have been adopted.
    - LMI Countries Include: India, Honduras, Vietnam, Zimbabwe, Egypt, etc.
  - Upper Middle Income Countries (Inc. China): ~13.1 million (~2.6% of ~504 million total) humanoids have been adopted.
    - UMI Countries Include: China, Brazil, Belarus, Indonesia, South Africa, Mexico, etc.
  - High Income Countries (Inc. US): ~7.4 million (~2.5% of ~296 million total) humanoids have been adopted.
    - HI Countries Include: USA, Australia, Germany, Canada, United Arab Emirates, Japan, etc.
- **By 2040, ~137.9 million (~14% of ~1 billion total) humanoid adoptions will have occurred.**
  - Low Income Countries: ~1.1 million (~7.8% of ~14 million total) humanoids have been adopted.
  - Lower Middle Income Countries: ~16.2 million (~7.9% of ~204 million total) humanoids have been adopted.
  - Upper Middle Income Countries (Inc. China): ~80.9 million (~16.0% of ~504 million total) humanoids have been adopted.
  - High Income Countries (Inc. US): ~39.7 million (~13% of ~296 million total) humanoids have been adopted.
- **By 2044, ~430 million (~42% of ~1 billion total) humanoid adoptions will have occurred.**
  - Low Income Countries: ~3.9 million (~27.9% of ~14 million total) humanoids have been adopted.
  - Lower Middle Income Countries: ~57.6 million (~28.1% of ~204 million total) humanoids have been adopted.
  - Upper Middle Income Countries (Inc. China): ~245.7 million (~48.7% of ~504 million total) humanoids have been adopted.
  - High Income Countries (Inc. US): ~123.2 million (~41.6% of ~296 million total) humanoids have been adopted.
- **By 2050, ~1 billion humanoid adoptions will have occurred.**

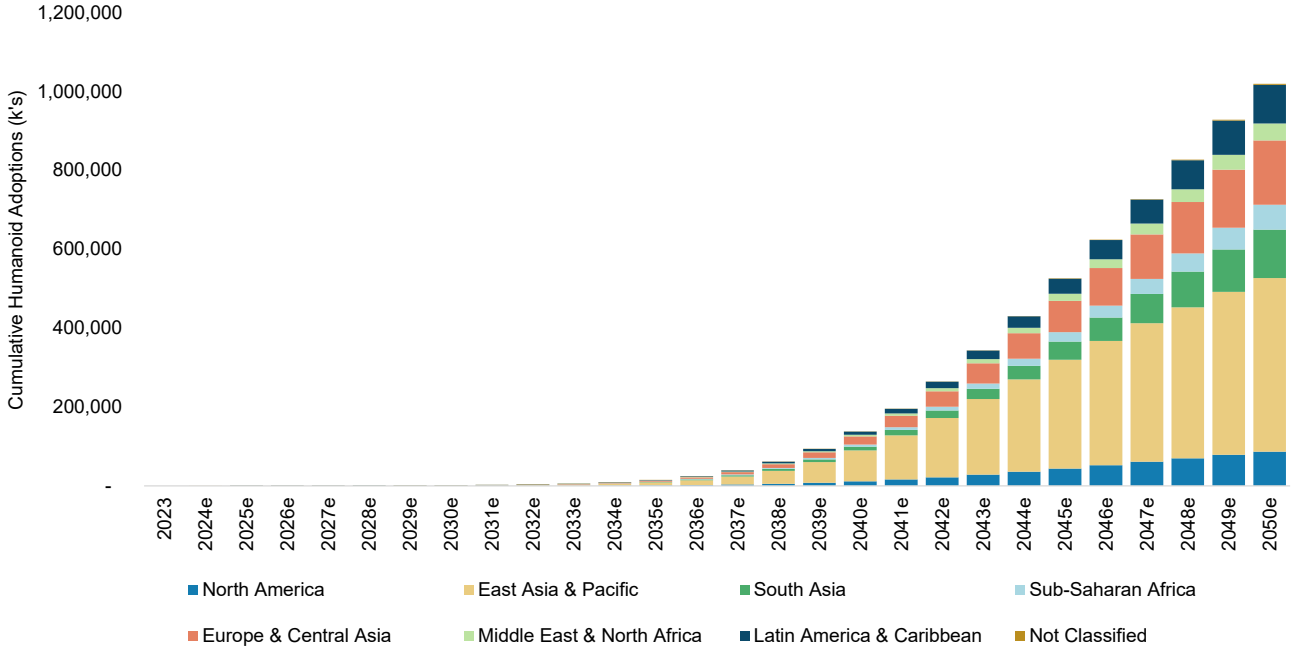
- Low Income Countries: ~14 million humanoids have been adopted.
- Lower Middle Income Countries: ~204 million humanoids have been adopted.
- Upper Middle Income Countries (Inc. China): ~504 million humanoids have been adopted.
- High Income Countries (Inc. US): ~296 million humanoids have been adopted.

Exhibit 30: Key Adoption Estimates

Cumulative Adoptions (k's)				
Classification	**2036**	**2040**	**2044**	**2050**
Low Income	246	1,099	3,901	14,006
Lower Middle Income	3,745	16,248	57,553	204,498
Upper Middle Income	13,082	80,863	245,743	504,307
High Income	7,363	39,714	123,249	296,427
North America	2,159	11,512	35,816	86,866
East Asia & Pacific	12,216	78,423	234,002	439,936
South Asia	2,258	9,797	34,705	122,733
Sub-Saharan Africa	1,137	4,967	17,617	62,938
Europe & Central Asia	3,902	20,617	64,798	163,370
Middle East & North Africa	861	4,146	13,871	42,532
Latin America & Caribbean	1,862	8,289	29,032	98,361
Not Classified	41	173	607	2,501
USA	1,934	10,289	32,017	77,703
China	9,345	64,583	187,937	302,316
Other	13,157	63,051	210,492	639,219
Commercial	22,818	131,251	409,823	935,052
Household	1,618	6,673	20,623	84,185
Global	**24,436**	**137,923**	**430,447**	**1,019,238**

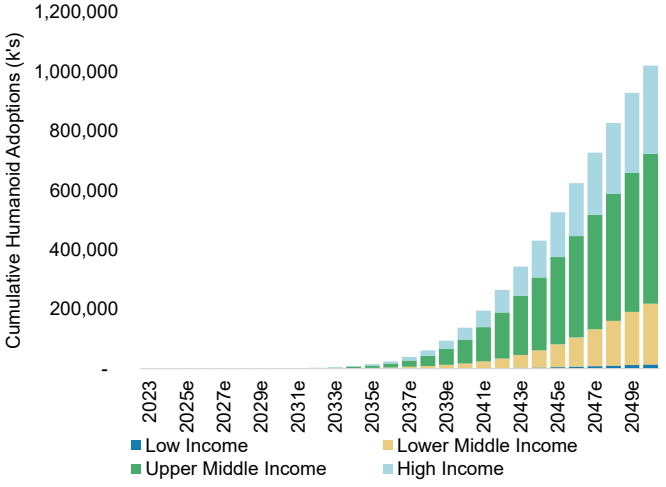
Source: Morgan Stanley Research estimates

Exhibit 31: Cumulative Humanoid Adoptions by Region



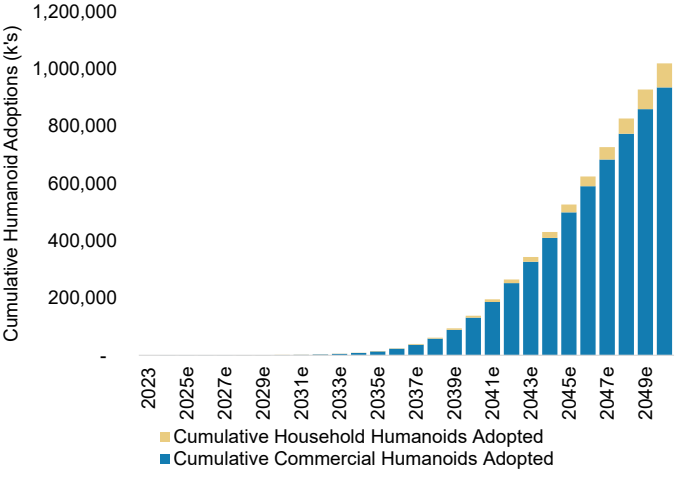
Source: Morgan Stanley Research estimates

Exhibit 32: Cumulative Humanoid Adoptions by Country Income Classification (United Nations)



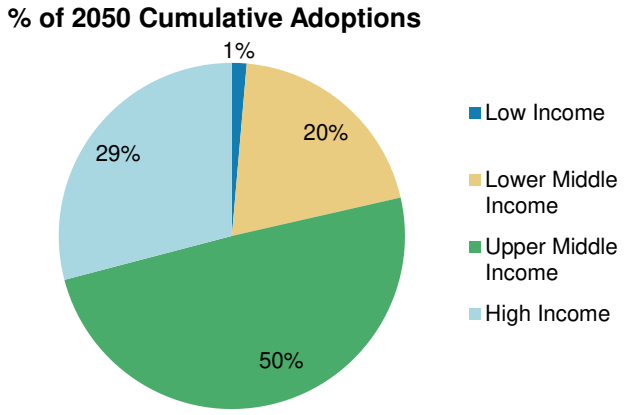
Source: Morgan Stanley Research estimates

Exhibit 33: Cumulative Humanoid Adoptions: Household vs. Commercial End-Markets



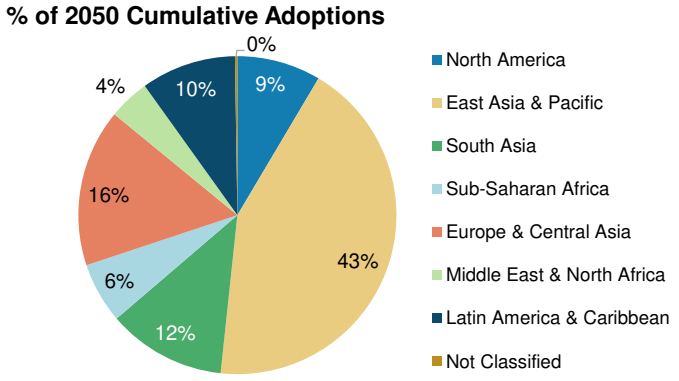
Source: Morgan Stanley Research estimates

Exhibit 34: 2050 Cumulative Adoptions by Income Classifications



Source: Morgan Stanley Research estimates

Exhibit 35: 2050 Cumulative Adoptions by Region



Source: Morgan Stanley Research estimates

Sizing the Global Market

We estimate that the global humanoid market could reach $7.5 trillion in annual revenue by 2050. Assuming a 6 year replacement cycle and the below ASP assumptions, we estimate that the global humanoid market could reach $7.5 trillion in annual revenue by 2050 ($322 billion by 2035 and $2.0 trillion by 2040). For comparison, in 2024, the 20 largest global auto makers booked an aggregate of ~$2.5 trillion in revenue.

Average Selling Price (ASP) assumptions:

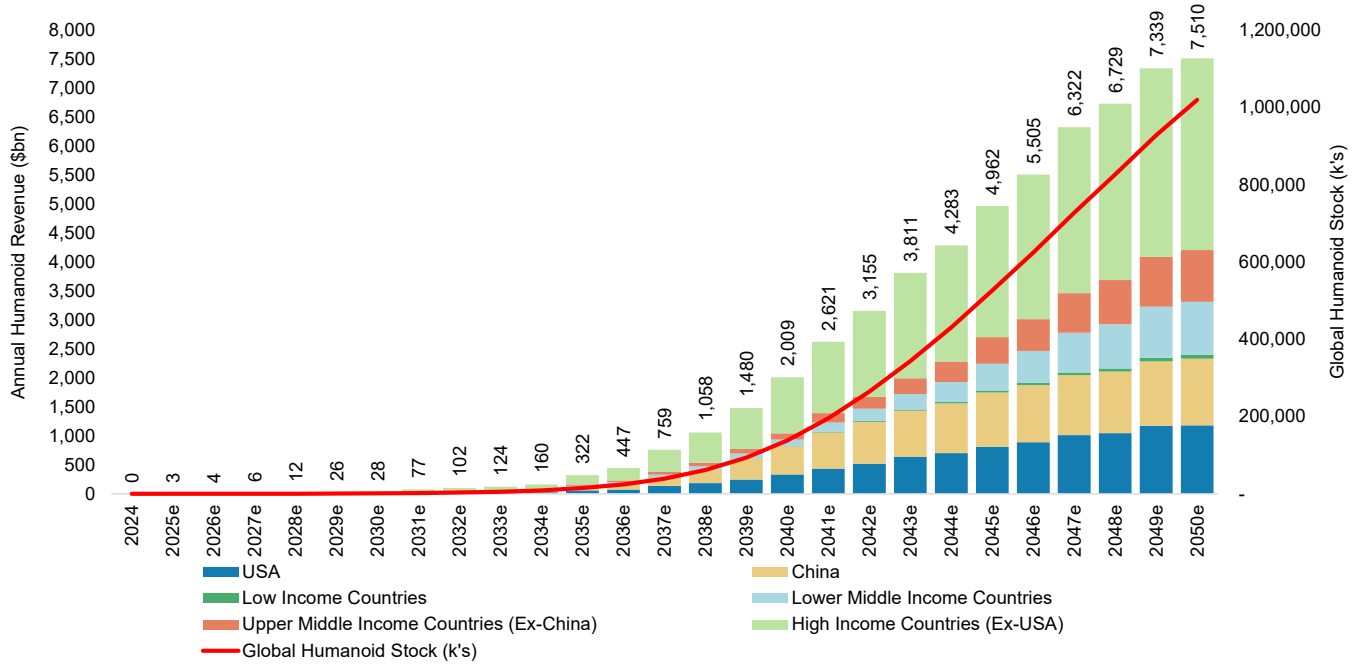
- High Income Countries: We assume that the initial ASP of humanoids was $200k in 2024 (largely research-oriented humanoids), with this declining to $150k each by 2028, and further declines to $96k by ~2040 and ~$75k by 2050 driven by supply chain development and improvements in mass-production. Assume initial ASPs are inflated given the current lack of domestic supply chains, which get mitigated overtime with onshoring of AI/robotics-enabled manufacturing.
- Upper Middle/Lower Middle/Low Income Countries: We assume these humanoids are lower-cost with greater benefits of mass-production, localized supply chains, and production based in cost-efficient countries. Assume meaningful price deflation throughout 2050. We assume an initial ASP of ~$50k (Rmb350k) in 2024, declining to ~$21k (~Rmb150k) by 2050.

Exhibit 36: Global Humanoid Market / Revenue Estimates Through 2050 (Assumes 6 Year Replacement Cycle)

Market Size Analysis																	
USA	**2024**	**2025e**	**2026e**	**2027e**	**2028e**	**2029e**	**2030e**	**2032e**	**2034e**	**2036e**	**2038e**	**2040e**	**2042e**	**2044e**	**2046e**	**2048e**	**2050e**
New Humanoid Units Adopted (mn)	-	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.7	1.6	3.3	5.0	6.5	7.4	7.7	7.4
Replacement Units (mn)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0	0.0	0.0	0.2	0.2	0.7	1.8	3.5	5.7	8.3
Total Humanoid Units Sold (mn)	-	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.7	1.8	3.5	5.7	8.3	10.9	13.4	15.7
Average Selling Price Per Humanoid ($k)	200.0	187.5	175.0	162.5	150.0	137.5	130.0	122.3	115.1	108.3	101.9	95.9	90.2	84.9	81.5	78.3	75.2
USA Revenue ($bn)	**-**	**0.6**	**0.9**	**1.3**	**2.9**	**5.3**	**4.2**	**21.2**	**25.9**	**74.7**	**182.8**	**334.7**	**517.6**	**703.3**	**888.5**	**1,048.6**	**1,179.4**
China	**2024**	**2025e**	**2026e**	**2027e**	**2028e**	**2029e**	**2030e**	**2032e**	**2034e**	**2036e**	**2038e**	**2040e**	**2042e**	**2044e**	**2046e**	**2048e**	**2050e**
New Humanoid Units Adopted (mn)	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.4	1.3	3.9	10.4	22.0	31.4	31.9	24.9	15.3	11.5
Replacement Units (mn)	N/A	N/A	N/A	N/A	N/A	N/A	0.0	0.0	0.1	0.2	0.4	1.4	4.1	10.8	23.3	35.5	42.7
Total Humanoid Units Sold (mn)	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.4	1.4	4.1	10.8	23.3	35.5	42.7	48.2	50.8	54.1
Average Selling Price Per Humanoid ($k)	49.0	45.6	42.5	39.6	36.9	34.3	32.0	27.7	24.1	22.1	21.4	20.9	20.5	20.1	20.5	20.9	21.3
China Revenue ($bn)	**0.1**	**0.3**	**0.6**	**1.1**	**2.1**	**3.5**	**6.1**	**12.0**	**32.9**	**89.6**	**231.3**	**487.4**	**725.3**	**855.5**	**986.8**	**1,059.6**	**1,152.4**
Low Income Countries	**2024**	**2025e**	**2026e**	**2027e**	**2028e**	**2029e**	**2030e**	**2032e**	**2034e**	**2036e**	**2038e**	**2040e**	**2042e**	**2044e**	**2046e**	**2048e**	**2050e**
New Humanoid Units Adopted (mn)	-	-	-	-	-	-	0.0	0.0	0.0	0.1	0.2	0.3	0.6	1.0	1.5	1.8	1.8
Replacement Units (mn)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0	0.0	0.0	0.1	0.2	0.3	0.7	1.2
Total Humanoid Units Sold (mn)	-	-	-	-	-	-	0.0	0.0	0.0	0.1	0.2	0.3	0.7	1.2	1.8	2.5	3.0
Average Selling Price Per Humanoid ($k)	49.0	45.6	42.5	39.6	36.9	34.3	32.0	27.7	24.1	22.1	21.4	20.9	20.5	20.1	20.5	20.9	21.3
LI Country Revenue ($bn)	**-**	**-**	**-**	**-**	**-**	**-**	**0.1**	**0.3**	**1.1**	**2.2**	**4.3**	**7.2**	**14.1**	**23.9**	**37.6**	**52.3**	**63.3**
Lower Middle Income Countries	**2024**	**2025e**	**2026e**	**2027e**	**2028e**	**2029e**	**2030e**	**2032e**	**2034e**	**2036e**	**2038e**	**2040e**	**2042e**	**2044e**	**2046e**	**2048e**	**2050e**
New Humanoid Units Adopted (mn)	-	-	-	-	0.0	0.0	0.0	0.2	0.6	1.4	2.6	4.5	8.8	14.5	21.9	26.4	25.7
Replacement Units (mn)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0	0.0	0.2	0.6	1.5	2.8	5.1	10.2	17.3
Total Humanoid Units Sold (mn)	-	-	-	-	0.0	0.0	0.0	0.2	0.6	1.5	2.8	5.1	10.2	17.3	27.0	36.7	43.0
Average Selling Price Per Humanoid ($k)	49.0	45.6	42.5	39.6	36.9	34.3	32.0	27.7	24.1	22.1	21.4	20.9	20.5	20.1	20.5	20.9	21.3
LMI Country Revenue ($bn)	**-**	**-**	**-**	**-**	**0.7**	**1.4**	**1.5**	**4.8**	**15.0**	**32.7**	**59.2**	**106.0**	**209.6**	**346.7**	**551.5**	**764.9**	**915.0**
Upper Middle Income Countries (Ex-China)	**2024**	**2025e**	**2026e**	**2027e**	**2028e**	**2029e**	**2030e**	**2032e**	**2034e**	**2036e**	**2038e**	**2040e**	**2042e**	**2044e**	**2046e**	**2048e**	**2050e**
New Humanoid Units Adopted (mn)	-	-	-	-	0.0	0.0	0.0	0.2	0.6	1.4	2.6	4.5	8.8	14.6	21.8	26.2	24.6
Replacement Units (mn)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0	0.0	0.2	0.6	1.5	2.8	5.1	10.3	17.4
Total Humanoid Units Sold (mn)	-	-	-	-	0.0	0.0	0.0	0.2	0.6	1.5	2.8	5.1	10.3	17.4	26.9	36.4	42.0
Average Selling Price Per Humanoid ($k)	49.0	45.6	42.5	39.6	36.9	34.3	32.0	27.7	24.1	22.1	21.4	20.9	20.5	20.1	20.5	20.9	21.3
UMI Country Revenue ($bn)	**-**	**-**	**-**	**-**	**0.7**	**1.2**	**1.5**	**5.1**	**14.8**	**32.8**	**59.9**	**105.9**	**209.9**	**349.7**	**549.7**	**760.6**	**894.6**
High Income Countries (Ex-USA)	**2024**	**2025e**	**2026e**	**2027e**	**2028e**	**2029e**	**2030e**	**2032e**	**2034e**	**2036e**	**2038e**	**2040e**	**2042e**	**2044e**	**2046e**	**2048e**	**2050e**
New Humanoid Units Adopted (mn)	-	0.0	0.0	0.0	0.0	0.1	0.1	0.5	0.6	1.9	4.6	9.5	14.4	18.5	20.5	22.5	20.3
Replacement Units (mn)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0	0.0	0.1	0.5	0.6	2.0	5.1	10.1	16.4	23.6
Total Humanoid Units Sold (mn)	-	0.0	0.0	0.0	0.0	0.1	0.1	0.5	0.6	2.0	5.1	10.1	16.4	23.6	30.6	38.9	44.0
Average Selling Price Per Humanoid ($k)	200.0	187.5	175.0	162.5	150.0	137.5	130.0	122.3	115.1	108.3	101.9	95.9	90.2	84.9	81.5	78.3	75.2
HI Country Revenue ($bn)	**-**	**1.8**	**2.6**	**4.0**	**5.7**	**14.2**	**14.3**	**58.5**	**70.1**	**214.9**	**520.6**	**967.9**	**1,478.7**	**2,004.2**	**2,491.0**	**3,043.0**	**3,305.2**
Global	**2024**	**2025e**	**2026e**	**2027e**	**2028e**	**2029e**	**2030e**	**2032e**	**2034e**	**2036e**	**2038e**	**2040e**	**2042e**	**2044e**	**2046e**	**2048e**	**2050e**
New Humanoid Units Adopted (mn)	0.0	0.0	0.0	0.1	0.2	0.3	0.4	1.4	3.3	9.4	22.0	43.9	69.0	87.0	97.9	99.9	91.3
Replacement Units (mn)	N/A	N/A	N/A	N/A	N/A	N/A	0.0	0.0	0.2	0.4	1.5	3.5	9.8	23.5	47.4	78.8	110.5
Total Humanoid Units Sold (mn)	0.0	0.0	0.0	0.1	0.2	0.3	0.4	1.5	3.5	9.8	23.5	47.4	78.8	110.5	145.4	178.7	201.8
Average Selling Price Per Humanoid ($k)	49.0	138.3	119.8	105.7	79.6	80.0	64.6	70.2	45.8	45.6	45.1	42.4	40.1	38.8	37.9	37.7	37.2
Global Revenue ($bn)	***0.1***	***2.8***	***4.0***	***6.4***	***12.1***	***25.7***	***27.7***	***101.9***	***159.8***	***446.8***	***1,058.1***	***2,009.1***	***3,155.3***	***4,283.3***	***5,505.2***	***6,728.9***	***7,510.0***
Global Humanoid Stock (k's)	***2***	***22***	***55***	***115***	***267***	***587***	***1,015***	***3,352***	***8,753***	***24,436***	***61,424***	***137,923***	***264,400***	***430,447***	***624,103***	***826,858***	***1,019,238***

Source: Morgan Stanley Research estimates

Exhibit 37: Global Humanoid Revenue by Year (Hardware Sales Only)



Source: Morgan Stanley Research estimates

Notes

Public companies mentioned

Google, Amazon, Meta (covered by Brian Nowak)

Alibaba, Baidu, Tencent (Gary Yu)

UBTech (not covered)

NVIDIA (Joe Moore)

Microsoft (Keith Weiss)

Tesla (Andrew Percoco)

Apple (Erik Woodring)

Minth Group (Shelley Wang)

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Zhaowei (not covered)

Kinco (not covered)

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(as of April 30, 2026)

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Equal-weight/Hold	1568	43%	358	39%	23%	715	44%
Not-Rated/Hold	4	0%	0	0%	0%	1	0%
Underweight/Sell	555	15%	84	9%	15%	202	12%
Total	3,673		909			1627	

Data include common stock and ADRs currently assigned ratings. Investment Banking Clients are companies from whom Morgan Stanley received investment banking compensation in the last 12 months. Due to rounding off of decimals, the percentages provided in the "% of total" column may not add up to exactly 100 percent.

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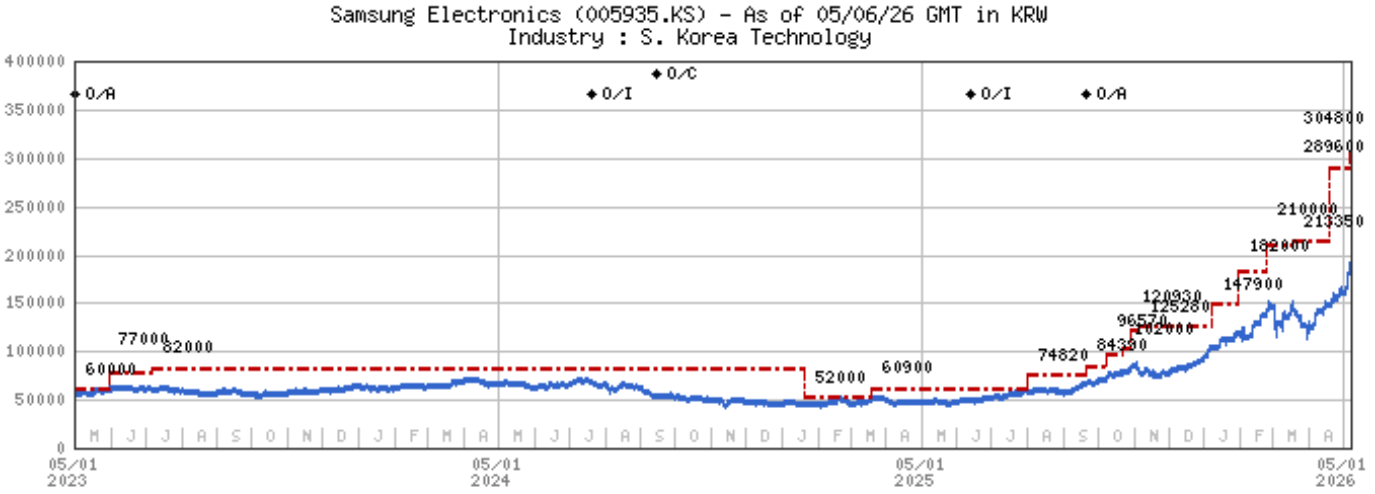
Attractive (A): The analyst expects the performance of his or her industry coverage universe over the next 12-18 months to be attractive vs. the relevant broad market benchmark, as indicated below.

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Stock Price, Price Target and Rating History (See Rating Definitions)



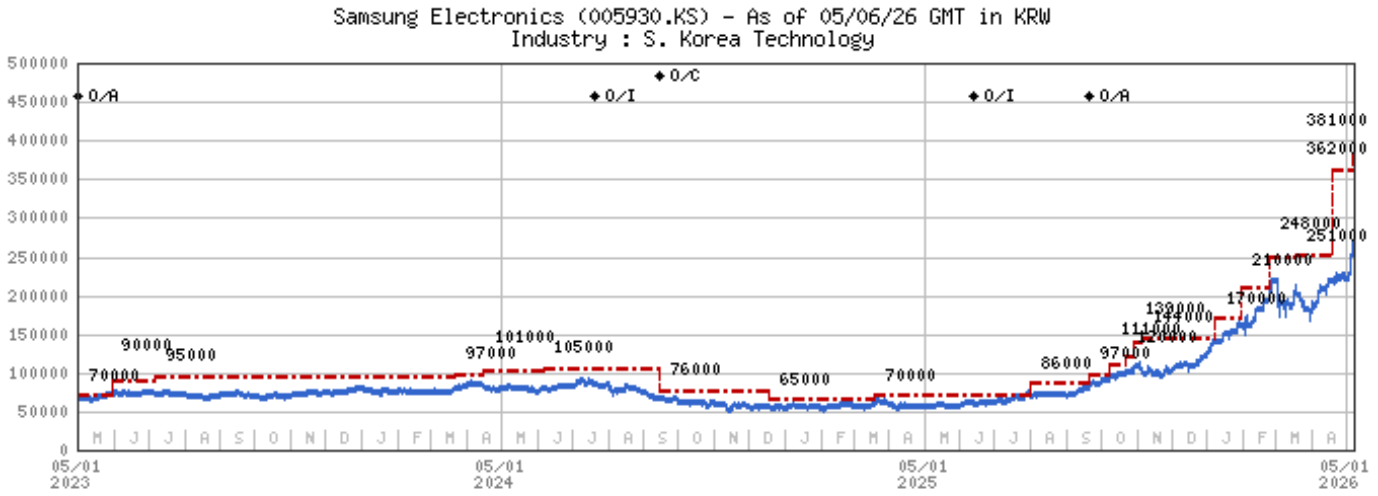
Stock Rating History: 5/1/21 : O/A; 7/19/21 : O/I; 8/12/21 : O/C; 10/4/22 : O/A; 7/21/24 : O/I; 9/15/24 : O/C; 6/13/25 : O/I; 9/21/25 : O/A

Price Target History: 1/12/21 : 90000; 5/18/21 : 80000; 6/8/21 : 84000; 8/12/21 : 77000; 9/15/21 : 82000; 12/3/21 : 83000; 3/18/22 : 82000; 4/28/22 : 73000; 6/10/22 : 69000; 7/5/22 : 65000; 7/22/22 : 60000; 9/17/22 : 58000; 3/21/23 : 60000; 5/30/23 : 77000; 7/7/23 : 82000; 1/20/25 : 52000; 3/19/25 : 60900; 8/1/25 : 74820; 9/21/25 : 84390; 10/8/25 : 96570; 10/23/25 : 102000; 10/30/25 : 120930; 11/5/25 : 125280; 1/8/26 : 147900; 1/30/26 : 182000; 2/24/26 : 210000; 3/18/26 : 213350; 4/19/26 : 289600; 5/6/26 : 304800

Source: Morgan Stanley Research Date Format : MM/DD/YY Price Target No Price Target Assigned (NA)
Stock Price (Not Covered by Current Analyst) Stock Price (Covered by Current Analyst)
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Stock Ratings: Overweight (O) Equal-weight (E) Underweight (U) Not-Rated (NR) No Rating Available (NA)
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Price Target History: 2/25/21 : 115000; 5/18/21 : 93000; 6/8/21 : 98000; 8/12/21 : 89000; 9/15/21 : 95000; 12/3/21 : 97000; 3/18/22 : 95000; 4/28/22 : 85000; 6/10/22 : 80000; 7/5/22 : 75000; 7/22/22 : 70000; 9/17/22 : 68000; 3/21/23 : 70000; 5/30/23 : 90000; 7/7/23 : 95000; 3/22/24 : 97000; 4/16/24 : 101000; 6/6/24 : 105000; 9/15/24 : 76000; 12/18/24 : 65000; 3/19/25 : 70000; 8/1/25 : 86000; 9/21/25 : 97000; 10/8/25 : 111000; 10/23/25 : 120000; 10/30/25 : 139000; 11/5/25 : 144000; 1/8/26 : 170000; 1/30/26 : 210000; 2/24/26 : 248000; 3/18/26 : 251000; 4/19/26 : 362000; 5/6/26 : 381000

Source: Morgan Stanley Research Date Format : MM/DD/YY Price Target No Price Target Assigned (NA)
Stock Price (Not Covered by Current Analyst) Stock Price (Covered by Current Analyst)
Stock and Industry Ratings (abbreviations below) appear as ◆ Stock Rating/Industry View
Stock Ratings: Overweight (O) Equal-weight (E) Underweight (U) Not-Rated (NR) No Rating Available (NA)
Industry View: Attractive (A) In-line (I) Cautious (C) No Rating (NR)

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INDUSTRY COVERAGE: China Industrials

COMPANY (TICKER)	RATING (AS OF)	PRICE* (05/06/2026)
Chelsea Wang		
China Railway Group (601390.SS)	E (05/12/2022)	Rmb5.07
China Railway Group (0390.HK)	E (08/11/2025)	HK$3.78
China State Construction Engineering (601668.SS)	U (08/11/2025)	Rmb4.92
Han's Laser (002008.SZ)	O (10/02/2025)	Rmb102.19
Hefei Meyer Optoelectronic Technology (002690.SZ)	E (09/08/2025)	Rmb17.47
iRay Technology Company Limited (688301.SS)	E (01/16/2025)	Rmb115.05
Neway Valve (Suzhou) Co., Ltd (603699.SS)	O (09/12/2025)	Rmb66.20
Shanghai BOCHU Electronic Technology (688188.SS)	O (08/22/2024)	Rmb142.63
Shenzhen Envicool Technology Co Ltd (002837.SZ)	O (08/19/2024)	Rmb97.77
Sheng Zhong		
Beijing Geekplus Technology Co., Ltd. (2590.HK)	O (08/07/2025)	HK$17.15
Centre Testing International Group (300012.SZ)	E (11/18/2024)	Rmb16.30
CRRC Corp Ltd (1766.HK)	U (01/22/2026)	HK$5.15
CRRC Corp Ltd (601766.SS)	U (01/22/2026)	Rmb5.94
DR Laser (300776.SZ)	E (12/17/2021)	Rmb105.91
Estun Automation Co Ltd (002747.SZ)	U (06/30/2022)	Rmb22.83
Haitian International Holdings Limited (1882.HK)	E (09/08/2025)	HK$21.58
Hongfa Technology Co Ltd (600885.SS)	O (05/23/2023)	Rmb33.43
Jiangsu Guomao Reducer Co Ltd (603915.SS)	U (01/08/2025)	Rmb15.94
Jiangsu Hengli Hydraulic Co.Ltd (601100.SS)	O (05/23/2023)	Rmb105.05
Jingsheng Mechanical & Electrical Co (300316.SZ)	U (01/08/2025)	Rmb44.61
Leader Harmonious Drive Systems (688017.SS)	O (01/22/2026)	Rmb226.81
Sany Heavy Industry Co., Ltd. (600031.SS)	O (01/08/2025)	Rmb20.91

Shenzhen Inovance Technology (300124.SZ)	O (05/19/2025)	Rmb71.07
Shenzhen SC New Energy Technology Corp (300724.SZ)	U (09/08/2025)	Rmb92.38
Sinotruk (Hong Kong) Limited (3808.HK)	E (05/19/2025)	HK$39.32
Suzhou Maxwell Technologies Co Ltd (300751.SZ)	U (09/15/2023)	Rmb247.00
Times Electric (3898.HK)	E (01/22/2026)	HK$37.10
WeiChai Power (2338.HK)	O (03/30/2026)	HK$44.66
WeiChai Power (000338.SZ)	O (03/30/2026)	Rmb34.32
Wuxi Autowell Technology Co Ltd (688516.SS)	U (09/08/2025)	Rmb84.35
Wuxi Lead Intelligent (300450.SZ)	O (09/08/2025)	Rmb57.01
Zhejiang Dingli Machinery Co Ltd. (603338.SS)	O (11/05/2025)	Rmb55.90
Zhejiang Hangke Technology (688006.SS)	O (09/08/2025)	Rmb33.19
Zhejiang Shuanghuan Driveline Co. Ltd. (002472.SZ)	O (08/25/2023)	Rmb39.81
Zoomlion Heavy Industry (1157.HK)	O (09/08/2025)	HK$8.08
Zoomlion Heavy Industry (000157.SZ)	O (09/08/2025)	Rmb8.02

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* Historical prices are not split adjusted.

INDUSTRY COVERAGE: Autos & Shared Mobility

COMPANY (TICKER)	RATING (AS OF)	PRICE* (05/05/2026)
Andrew S Percoco		
Adient PLC (ADNT.N)	E (12/07/2025)	$20.67
Aptiv Plc (APTV.N)	E (12/07/2025)	$54.83
Avis Budget Group Inc (CAR.O)	E (12/07/2025)	$160.10
BorgWarner Inc. (BWA.N)	E (12/07/2025)	$57.26
Dauch Corporation (DCH.N)	E (12/07/2025)	$5.38
Ford Motor Company (F.N)	E (09/25/2024)	$11.69
General Motors Company (GM.N)	O (12/07/2025)	$76.15
Hertz Global Holdings Inc (HTZ.O)	E (02/08/2024)	$6.09
Lear Corporation (LEA.N)	E (12/07/2025)	$131.65
Lucid Group Inc (LCID.O)	U (12/07/2025)	$6.25
Magna International Inc. (MGA.N)	E (09/25/2024)	$60.05
Mobileye Global Inc (MBLY.O)	E (08/02/2024)	$8.77
Quantumscape Corp (QS.O)	E (12/07/2025)	$7.26
Rivian Automotive, Inc. (RIVN.O)	U (12/07/2025)	$14.60
Tesla Inc (TSLA.O)	E (12/07/2025)	$389.37
Visteon Corporation (VC.O)	E (06/01/2022)	$110.23
Daniela M Haigian		
Asbury Automotive Group Inc (ABG.N)	E (09/25/2024)	$198.50
AutoNation Inc. (AN.N)	O (09/25/2024)	$202.29
Carmax Inc (KMX.N)	E (11/10/2025)	$37.25
Carvana Co (CVNA.N)	O (08/07/2025)	$379.09
Group 1 Automotive, Inc (GPI.N)	O (09/25/2024)	$341.35
Lithia Motors Inc. (LAD.N)	E (09/25/2024)	$286.52
Penske Automotive Group, Inc (PAG.N)	O (09/25/2024)	$168.81
Sonic Automotive Inc (SAH.N)	E (09/25/2024)	$78.79
Javier Martinez de Olcoz Cerdan		
Goodyear Tire & Rubber Company (GT.O)	U (09/28/2025)	$7.08

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