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Robotics | North America

Humanoid Horizons: Putting the Robots to Work

After years of proving they can build robots, humanoid companies now face a new question: who will hire the robots? Early employers want success rates and operating hours, and we think the firms that win the first jobs will gather the data that drives the next model improvements.

PrivateCompany

Private Companies Highlighted: Figure, D-Robotics, Fourier Intelligence, Booster Robotics, World Labs, Boston Dynamics, Agility Robotics, Chestnut Robotics, Dyna Robotics, Apptronik

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We provide our latest thoughts and key highlights across the robotics ecosystem:

- **Who Will Hire the Robots?** For much of the last two years, the humanoid debate has centered on supply, with investors focused on who will build the robots and supply the "brain," and on how quickly costs can come down. This month, manufacturers and governments gave clearer evidence of where humanoids will first be deployed. On the commercial side, BMW is putting humanoids into battery and component production and Hyundai is building an Atlas training environment around logistics and parts sequencing. Toyota is contemplating a much broader automation program that would require up to 400,000 robots, while South Korea and Singapore are creating dedicated industrial and public-safety settings for robots to operate in. We think the early adopters tend to operate large physical footprints with repetitive or hazardous work, and they typically have existing automation budgets along with the patience to tolerate a learning period while the technology improves. **The next phase of the humanoid market may be defined by who is willing to provide the first jobs and which environments allow humanoids to iterate fastest**, consistent with the shift toward scenario-specific commercial deployment we highlighted previously.
- **The Bar Is Moving Toward Reliability.** A growing number of demonstrations now show humanoids walking through factories and completing useful tasks, though the more informative developments this month came with numbers attached. Xiaomi reported a 98% success rate on a defined factory task after several months of deployment, and Figure reported 56% whole-task success across unseen homes. The two experiments differ widely in setting and difficulty, yet both report the kind of metric that determines whether a robot earns a place on a shift. Economic viability will depend first on success rate and cycle time, and then on how often a robot needs intervention and

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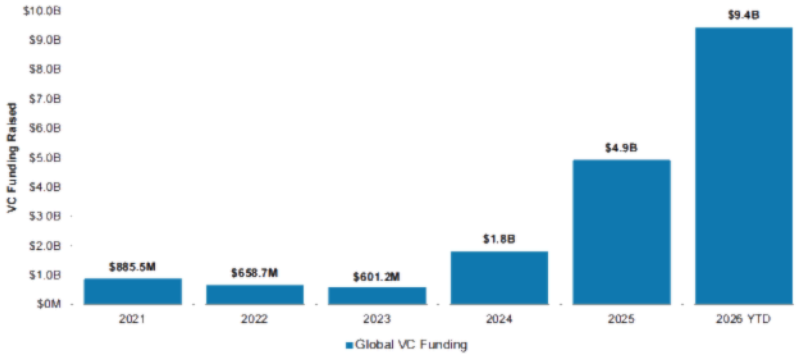
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how consistently it performs across environments. *We continue to think productive operating hours and realized output will become the main measures of progress for the sector.*

- **Public Markets Are Starting to Quantify Humanoid Economics.** Agility's S-4 provides a clearer view of revenue and operating losses, along with cash consumption and the metrics attached to its reported order book. Unitree's public-market valuation is focusing the discussion on ASPs and competitive intensity, and on whether commercial demand will prove durable. Production targets and partnership announcements have historically been easier to find in this sector than financial results, so the added disclosure gives investors considerably more to work with. As more robot companies approach public markets, investors should get better visibility into how much demand comes from research and demonstrations versus recurring industrial use, and filings should also show what gross margins look like at scale and how much capital is needed to get there. Customers are beginning to demand proof of robot performance, and public markets may hold the industry's commercialization claims to a similar standard. For full details, see Morgan Stanley's initiation report: Yushu Technology Co., Ltd.: Building a Full-Stack Intelligent Robotics Platform
- **Robotics Policy Is Both Industrial Policy and National Security Policy.** Governments are increasingly influencing the market from both directions. South Korea and Singapore are funding deployment environments and assigning robots to specific industrial and public-service applications, while the proposed GUARD Act could restrict Chinese humanoid and quadruped platforms from the U.S. market. China has gone further on the demand side by directing provinces and state-owned enterprises to identify real operating sites for humanoid training and deployment. As a result, governments may subsidize adoption and create early demand while also shaping where training data is generated and deciding which hardware is allowed to compete. For physical AI, geography looks to matter earlier in the commercialization curve than it does for other forms of AI.
- ***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, Arm Holdings, LG Electronics, Samsung Electronics, and Teradyne.

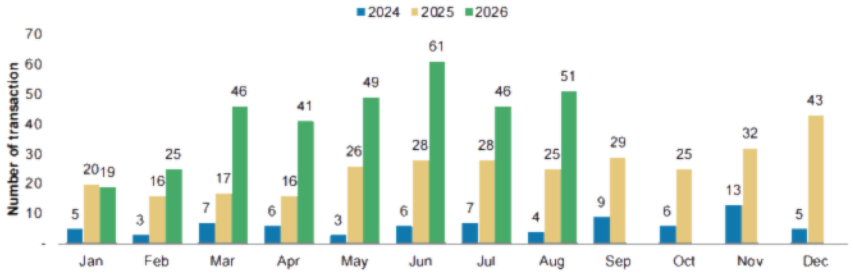
Exhibit 1: 2026 Global Venture Funding for Humanoid Robots is On Track to More than Double vs. 2025



Note: As of 10/3/2025. Includes funding for companies classified under 'Humanoid Robotics' in PitchBook.

Source: PitchBook, Morgan Stanley Research

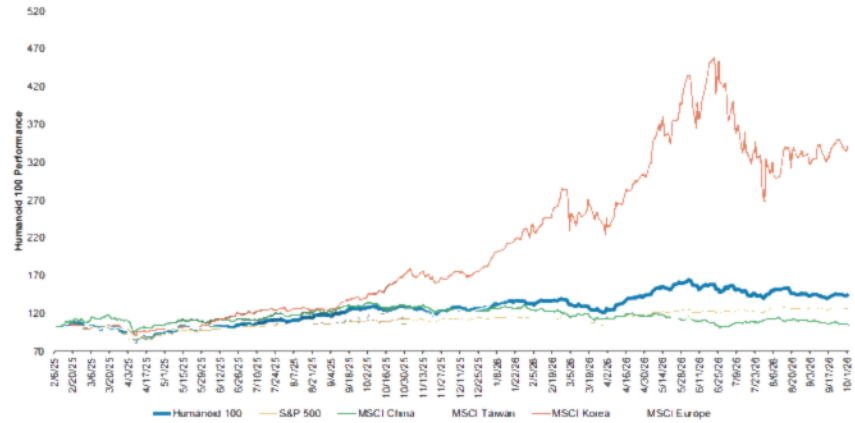
Exhibit 2: China Humanoids Financing Activities



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, EGII, Morgan Stanley Research

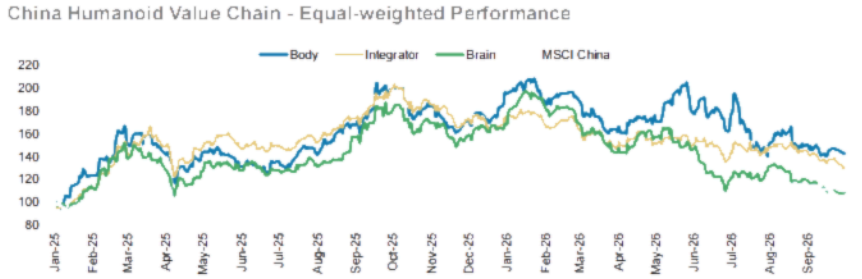
Exhibit 3: Equal-Weighted Humanoid 100 Performance since 2/6/2025 (Date List was Established)



Note: Data as of 10/5/2025 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 September 30, 2026 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 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)



Source: Morgan Stanley Research

In this note you will find:

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

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The valuation information provided here is included for illustrative purposes only. The information is based on publicly available information (funding rounds, company disclosure, third-party vendors, etc.) and was not produced or endorsed by Morgan Stanley Research.

Further Reading

Sector Blue Paper/Foundation/Insight

- Robotics: Actuators: Robot Muscle Needs American Hustle (13 Sep 2026)
- China's Emerging Frontiers: China's Next Industrial Revolution (9 Sep 2026)
- Rewiring the Home: A Roadmap of Appliances in AI Diffusion (8 Jul 2026)
- Humanoids and Robots – The Next Chapter in China's Dominance in Global Manufacturing (4 May 2026)
- When Factory = Robot (26 Mar 2026)
- Who's Gonna Make the Bots? Adding Contract Manufacturers to the Humanoid 100 (26 Mar 2026)
- World Models: AI's Journey from Digital to Physical (22 Mar 2026)
- Humanoids: A $5 Trillion Global Market (29 Apr 2025)
- Investment Implications of Embodied AI (26 Jun 2024)

Single Stock Foundation/Insight

- Yushu Technology Co., Ltd.: Building a Full-Stack Intelligent Robotics Platform (29 Sep 2026)
- Tesla Inc: Beyond the Wheel – Mapping Tesla's Journey into Physical AI (7 Dec 2025)
- Apple, Inc.: Apple Robotics — What's Cooking In Cupertino's Kitchen? (6 Nov 2025)
- Hyundai Motor: Hyundai's Robotics Ambition (17 Aug 2025)
- Samsung Electronics: Humanoids – From Digital to Physical AI (14 Sep 2025)

The Robot Almanac

- Robotics: The Robot Almanac (Vol. 1): AI Gets Physical; Cambrian Explosion of Bots (7 Dec 2025)
- Robotics: The Robot Almanac (Vol. 2): How to Train Your Robot; Geopolitics; Rare Earths; Sagan's Prophecy (14 Dec 2025)
- Robotics: The Robot Almanac (Vol. 3): Humanoids & Industrial Robots (16 Dec 2025)
- Robotics: The Robot Almanac (Vol. 4): Drones & Air Mobility (17 Dec 2025)
- Robotics: The Robot Almanac (Vol. 5): Space & Defense (18 Dec 2025)
- Robotics: The Robot Almanac (Vol. 6): Autonomous Vehicles (21 Dec 2025)
- Robotics: The Robot Almanac (Vol. 7): Brain Computer Interfaces & Other Form Factors (22 Dec 2025)
- Robotics: The Robot Almanac (Vol. 8): Big Tech's Physical AI Journey (28 Dec 2025)

Trip/Meetings Takeaways

- Humanoids: China BEST Conference 2026 Feedback (20 Sep 2026)

- WRC 2026 Takeaways: Productivity Matters (23 Aug 2026)
- WAIC 2026 Takeaways: More Physical AI (20 Jul 2026)
- China Industrials: Humanoid Supply Chain Trip Takeaways: The Emerging Gap (28 Jan 2026)
- The Rowdy Robot: The Robots Take Over Las Vegas (8 Jan 2026)
- Humanoids: WRC 2025 Takeaways: Embracing the Future (10 Aug 2025)

Humanoid Horizons

- Humanoids: Humanoid Horizons: Moravec's Paradox (1 Sep 2026)
- Humanoid Horizons: Do Robots Have a PR Problem? (28 Jul 2026)
- Humanoid Horizons: Humanoids Coming to Your Bloomberg Screen (May 29)
- Humanoid Horizons: Money Meets Machines (7 May 2026)
- 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)

The Humanoid Signal

- 2026 Outlook – Humanoids: Commercialization (21 Jan 2026)
- Humanoids: The Tide is Rising, Lifting 2026 Forecast (23 Jun 2026)
- The Humanoid Signal – Broad Verification (5 Feb 2026)
- The Humanoid Signal - How Will the Robot "Brain" Evolve? (26 Feb 2026)
- The Humanoid Signal - Robot Fingers Crossed (6 Mar 2026)
- The Humanoid Signal - Going Global, Capturing Early Ground (14 May 2026)
- The Humanoid Signal: Progress Check, WRC Preview (17 Aug 2026)

AlphaWise Survey

- Humanoids: China Humanoids Survey: High Willingness to Adopt Meets Premature Products (2 Dec 2025)
- Humanoids: China Survey (2): What work are humanoids expected to do? (14 Dec 2025)
- Humanoids: Humanoid Robot Consumer and Intern Surveys: China Enthusiasm, US Divided (4 Aug 2025)

Relevant Private Company Profiles

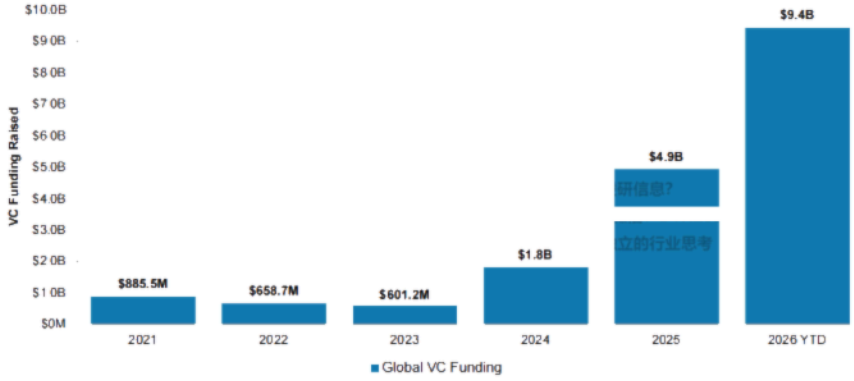
- Robotics: Agile Robots: Das Bot (17 Mar 2026)
- Embodied AI: AI Robotics Disruptors: Skild AI (23 May 2025)
- Embodied AI: Humanoid Disruptors: 1X Technologies (7 Apr 2025)
- Embodied AI: Humanoid Disruptors: Apptronik (24 Mar 2025)
- Embodied AI: Humanoid Disruptors: Unitree - Humanoids Starting at $16K (28 Jan 2025)
- Embodied AI: AI Robotics Disruptors: Physical Intelligence (19 Dec 2024)

Recent Robotics Updates & Developments

Financing & M&A:

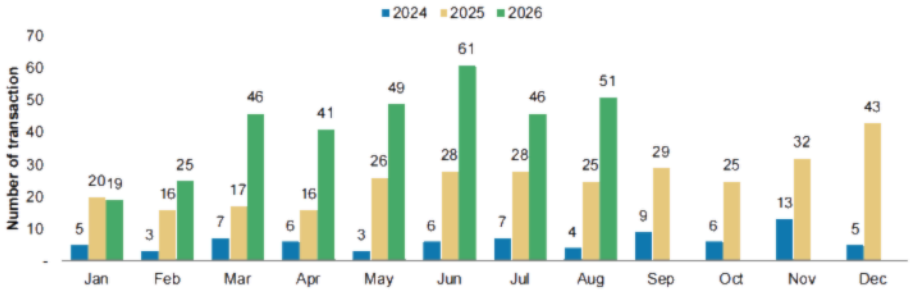
- **D-Robotics closes a $400mn Series C to expand its robotics compute and software platform**. The company said the financing will support its Sunrise chip portfolio and an integrated software platform spanning robot development from established categories through general-purpose humanoids. D-Robotics reports cumulative Sunrise chip shipments above 8mn units and says its S600 embodied-AI processor has been adopted by more than 20 customers including UBTECH, Fourier, and Booster Robotics, with several programs already in mass production. The 8mn shipment figure covers the broader robotics and edge-AI market, not just humanoid robots, showing how capital is forming around the compute layer underneath the robot makers.
- **Unitree's post-IPO valuation has come into focus following its public listing**, with the company establishing a primary valuation benchmark for China's humanoid and embodied-AI sector. Our China Industrials team initiated coverage on Yushu Technology Co., Ltd. ("Unitree") with an Equal-weight rating and a Rmb500 price target. The initiation notes that while Unitree's hardware locomotion and low-cost manufacturing capabilities are well recognized, the moat around its engineering, rapid iteration speed, and disciplined cost control remains underappreciated. As the broader debate transitions toward robot productivity, intelligence, and commercial deployment, the team views current valuation levels as fair in its base case, derived from a 10-year DCF model (implying 42x 2027E P/S), balancing substantial long-term humanoid TAM growth against declining blended ASPs, rising industrial competition, and the necessity to build proprietary intelligence. For full details, see Morgan Stanley's initiation report: Yushu Technology Co., Ltd.: Building a Full-Stack Intelligent Robotics Platform
- **AMD agrees to acquire World Labs, the spatial-intelligence lab led by Fei-Fei Li, in an all-stock deal valued at about $8.2bn that is expected to close by end-2026, subject to regulatory approvals.** World Labs builds models that generate, reconstruct and simulate interactive 3D environments from text, image and video inputs, along with technology for robotic learning and simulation, and Li will join AMD as EVP and chief scientist reporting to Lisa Su. AMD (covered by Joe Moore) frames the deal as a way to see how model workloads are evolving across reasoning, robotics, simulation and physical AI so it can shape its hardware, software and systems roadmaps, which shows chipmakers moving upstream into model research to anchor demand for their compute.

Exhibit 7: 2026 Global Venture Funding for Humanoid Robots is On Track to More than Double vs. 2025



Note: As of 10/4/2026. Includes funding for companies classified under 'Humanoid Robotics' in PitchBook
Source: PitchBook, Morgan Stanley Research

Exhibit 8: 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 announcements, CGII, Morgan Stanley Research

Government & Public Events:

- **South Korea adds an industrial-factory program to its humanoid policy support**. T-Robotics was selected to lead a KRW 4.5bn government project with KAIST and a major Korean display manufacturer through December 2030. The project will develop mobile humanoids and test them in production-line applications, giving Korea's humanoid initiative a defined manufacturing environment for collecting deployment data and evaluating productivity. The program turns national support from a technology roadmap into a named factory-use case.
- **Singapore opens the Home Team Humanoid Robotics Centre for public-safety applications**. The Ministry of Home Affairs said humanoid robots are intended to work alongside officers by 2028 in applications including hazardous-material operations, post-blast forensics, ambulance resupply and prison searches. Approximately $100mn has been committed to the center, and the 29,000-square-foot facility includes motion capture, human-demonstration collection, simulation and physical testing capabilities. Singapore is treating the deployment environment as part of their robotics strategy, building a dedicated center for training and hardware testing.

Manufacturing:

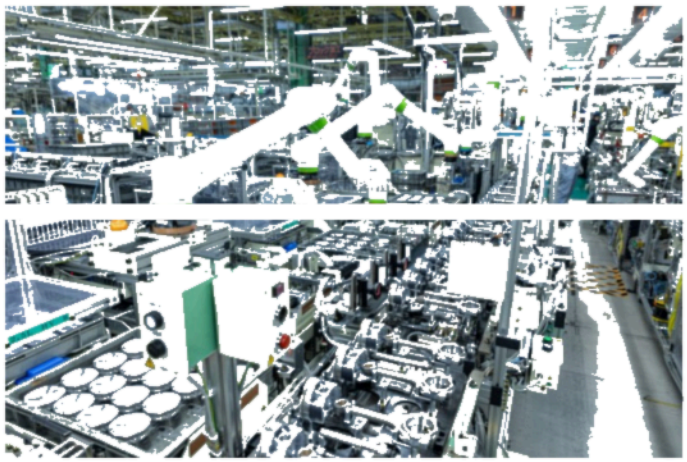
- **Tesla's Fremont Optimus line reportedly reaches several hundred robots per week**. Reporting from The Information indicates output increased from a few dozen units per week in the second quarter to several hundred per week in August on the former Model S and Model X production floor, with managers targeting more than 1,000 robots per week by year-end. Most units reportedly remain inside Tesla for testing, training and data collection. The integration of hands has proven difficult, with 100+ components in Optimus' hands requiring manual assembly. Supplier readiness and model generalization additionally remain key bottlenecks to the initial ramp. The line is increasingly useful as a data-generation engine even before external shipments become the primary measure of output.
- **Boston Dynamics and Hyundai expand Atlas training at the Georgia Robotics Metaplant Application Center (RMAC)**. The RMAC has moved from its initial pilot phase into broader operation, with Atlas being trained on logistics preparation and parts sequencing before potential assembly applications later in the decade. Hyundai has discussed deploying roughly 25,000 Atlas robots across Hyundai and Kia factories and developing U.S. production capacity of up to 30,000 robots annually from 2028 onward. Boston Dynamics has also pointed to Spot's installed customer base and reported sub-two-year payback as a potential commercial template. RMAC is becoming the bridge between Atlas as a robotics program and Atlas as a factory system.
- **Toyota estimates network-wide factory automation could require approximately 400,000 robots and ¥1tn of annual spending from 2028**. Toyota told investors that modernization across its own operations, group companies and major suppliers could require roughly 400,000 robots. This figure includes replacement equipment and new installations, with potential spending of approximately ¥1tn, or $6.4bn, per year from 2028. The program spans conventional industrial robots, automated logistics systems and future human-robot collaboration rather than 400,000 humanoids specifically. The comments provide a useful datapoint to the size of the automation budget that robots will eventually compete to capture.
- **XPeng shows the first IRON robot walking off its dedicated production line**. The company presented an IRON unit leaving the facility under its own locomotion, with 76 degrees of freedom, 21-DoF hands and three in-house AI chips providing up to 2,250 TOPS of compute. XPeng continues to target mass production by the end of 2026, with initial robots expected to operate in its own stores and campuses. XPeng has further claimed to have automated more than 80% of the primary operating on its new lines.
- **Xiaomi reports improved performance on a defined CyberOne factory task**. After approximately four months on a self-tapping-nut station at Xiaomi's Beijing EV plant, the company said CyberOne's task success rate increased from about 90% to 98% while operating within the production line's 76-second cycle. The same robot generation later appeared at IFA in Berlin in a demonstration setting. A single task does not establish general-purpose factory capability, but does show how quickly performance can improve when one robot stays on one job long enough to generate its own training loop.

Exhibit 9: Boston Dynamics Spot robot operating in a factory setting



Source: Boston Dynamics

Exhibit 10: Toyota's digitization and automation of the Kamigo plant



Source: Toyota

New Use Cases & Adoption:

- **BMW begins its first in-network humanoid production pilot in Germany at Plant Leipzig**. BMW is testing Hexagon's AEON in high-voltage battery assembly and component-production applications. AEON is a 1.65-meter, 60-kilogram wheeled humanoid with approximately three hours of battery life, and BMW describes Leipzig as its European test environment for Physical AI. The pilot is expected to run through year-end before potential expansion to other facilities, while Figure robots continue to be tested separately at Spartanburg. BMW now has two humanoid suppliers running different tasks inside the same manufacturing network, creating a useful internal comparison for future deployment decisions.

New Models & Hardware Improvements:

- **Agility unveils Digit 5 with additional safety features and a broader industrial task set**. Digit 5 is designed for operation in shared workspaces, using a separate safety controller that can stop or reposition the robot when people enter its operating area. The robot has a 7.2-foot reach and a 90-minute battery that Agility says can recharge in nine minutes, supporting more than 20 operating hours per day under the intended workflow. Agility is expanding the target application set beyond tote handling into machine tending, kitting, inspection and packing/unpacking pallets. Digit 5 is increasingly being designed around the requirements of an actual employee rather than a single warehouse demonstration.
- **Chestnut launches Aero Hand and Aero UMI as an integrated manipulation and data-collection system**. The platform combines an 18-degree-of-freedom robotic hand with a wearable capture and teleoperation system intended to translate human demonstrations into robot training data. The development reflects the industry's growing focus on dexterous manipulation as well as lower-cost methods of collecting diverse human-task data outside dedicated robot teleoperation setups, designing hardware and data collection as one system.
- **Dyna Robotics introduces Dyna-2.1 and the Taku robot, a full-stack "physical**

agent" built to run entire workflows rather than isolated tasks. Taku is a semi-humanoid with a human-sized upper body, a folding lower body to reach high and low, a four-wheel steerable base and two 7-DoF arms. Three model layers control it. A reinforcement-learning whole-body controller runs at 100 Hz, a DYNA-2 world-action policy plans the motion, and a vision-language orchestrator with text-based long-term memory decides each next step. A shared "Unified Robot Representation" lets human video, UMI and teleoperation data train both the policy and the controller. The policy was pre-trained on about one million hours of human video, and a hardware revision retrains only the controller, so older robot data stays usable. Dyna says Taku completed an uncut, one-hour hotel laundry-room workflow autonomously, and that the system also learned server servicing and drink retrieval. Dyna also reports that new stationary-folding sites now reach their production bar in as little as three days. The company argues customers pay for a role, not a task, and that the goal is a robot that works as a "whole employee". The next milestone is customer-site deployment to build a data flywheel.

Software/AI Improvements:

- **Google DeepMind extends Gemini Robotics to whole-body humanoid control**. Gemini Robotics 2 combines a vision-language-action model for whole-body control, an embodied-reasoning model for multi-step planning and coordination, and an on-device VLA that DeepMind says can adapt to a new robot embodiment with several hours of data. Demonstrations using Apptronik's Apollo 2 included walking, pick-and-place, bagging and changing a light bulb, while the harder dustpan benchmark succeeded in 32% of reported trials. The architectural direction is clear, using the same model family to reason, manipulate and move the robot body.
- **Figure reports improved zero-shot household generalization with Helix 2.5**. Figure evaluated an Index pre-trained robot across 30 previously unseen Bay Area homes on toy tidying, towel folding and bed making without collecting data or fine-tuning in the test homes. The company reports 237 successful whole-task trials out of 420, or 56%, compared with 9% for an otherwise similar policy trained from scratch, and says the model matched a representative in-environment Helix 02 policy using approximately half as much task-specific data. The key result is the reduction in how much new data is needed for each new environment, which is increasingly the question behind generalization.

Exhibit 11: Figure CEO Brett Adcock showcasing Figure's capabilities with the Index pre-trained Helix 2.5 model



Source: Figure

Exhibit 12: Agility's newly unveiled Digit 5 humanoid



Source: Agility

Global Policy Support Overview

Globally, governments are placing greater emphasis on physical AI. To interact with the physical world, humanoid robots rely on a broad array of sensors, including cameras, LiDAR and force/torque sensors, combined with AI models that perceive and map their surroundings. This could raise data security and surveillance concerns, while AI-enabled robots also have clear dual-use characteristics from a national security perspective.

In China, 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 established institutions and alliances to promote industry cooperation. In 2025, NPC, Li Qiang, the Chinese Premier, first referenced this in the government work report. Subsequently, in the 15th Five-Year Plan announced during the 2026 NPC, robotics became a strategic emerging industry for the first time, placing it alongside categories including next-gen IT, NEV, biomedicine, and aerospace. Earlier in June, MIIT and SASAC reportedly announced a new initiative that targets 10k-level deployment capacity and >100 high-value applications by end-2026. Local governments and SOEs must identify operational sites (≥20/province, ≥10/central SOE) for humanoid training.

- **We see continued government leadership and efforts in 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.

Exhibit 13: China – national and local policies

National Policies	Release Date	Target
MIIT Guiding Opinions On The Innovative Development Of Humanoid Robots	Jan-23	• By 2025, products reach internationally advanced levels and achieve mass production; cultivate **2–3 ecosystem companies** with global influence
Standards System For Humanoid Robots And Embodied Intelligence	Feb-26	• Covers six pillars: basic commonality, brain/intelligent computing, limbs and components, robots and systems, applications, and safety and ethics
"15th Five-year Plan"	Mar-26	• Lists **robotics as a strategic emerging industry** for the first time
2026 Humanoid Robots And Embodied Intelligence Real-world Training Special Initiative	Jun-26	• By end-2026, humanoid robots complete application validation and routine deployment across a set of representative scenarios • Forming **100+ high-value applications**, targeting **10k-level deployment capacity** • Identifying real operational sites (**≥20 per province, ≥10 per central SOE**)
Local Government Policies	**Release Date**	**2027 Target**
Zhejiang Province Implementation Plan For Innovative Development Of The Humanoid Robot Industry (2024–2027)	Sep-24	• Provincial annual robot output reaches **20k units** • Reaching core-industry scale of **Rmb20bn**; related-industry scale of **Rmb50bn**
Shenzhen Embodied Intelligence Robot Technology Innovation And Industrial Development Action Plan (2025–2027)	Mar-25	• Cultivating **10+ new companies valued over Rmb10bn**, 20+ companies with revenue over Rmb1bn • Achieving **50+ billion-yuan-level application deployments**; related-industry scale of **>Rmb100bn**
Shanghai Embodied Intelligence Industry Development Implementation Plan	Jul-25	• Reaching industry scale of **Rmb50bn** • Providing 30% subsidy for model R&D, 20% for application projects, 50% for ecosystem projects
Beijing Economic-technological Development Zone: Measures To Promote Innovative Development Of Embodied Intelligence Robots	Aug-25	• Forming **10k-unit-scale mass-production capability** for embodied intelligence robots • Building **tens-of-millions-scale** real-world embodied dataset
Hangzhou Embodied Intelligence Robot "Chain Strengthening" Action Plan (2026–2027)	Jan-26	• Integrator enterprises' total output **exceeds Rmb20bn** • Value-chain total output **exceeds Rmb50bn**

Source: Government announcement, news report, Morgan Stanley Research

Exhibit 14: Non-China government policies

Country	Date / status	Major policy / initiative	Key details	Targets
South Korea	Apr-25	K-Humanoid Alliance	MOTIE **launched a dedicated humanoid alliance** with ~40 companies, universities and other organizations.	- **Robot-AI foundation model by 2028.** - By 2028 humanoid hardware targeted at ≤60 kg weight, ≥50 DoF, ≥20 kg payload, ≥2.5 m/s speed.
	Feb-26	K-Humanoid Moonshot	The government designated humanoids **as a core K-Moonshot national mission** and established a strategic council. Launched the Public-Private AI Humanoid Core Technology Advancement Project (2026–2030) in May, **to invest KRW50.4bn through 2030.**	Korea aims to establish humanoid **production capacity of 30,000 units annually, by 2030.**
Japan	Jun-26	AI Robotics Strategy	**Major shift toward Physical AI**, domestic multimodal robotics foundation models, robot adoption and large-scale social implementation. Noetra + AIST were selected to lead a domestic multimodal foundation-model project.	Japan aims **10m robots (not only humanoids) deployed by 2040** across 18 sectors, including manufacturing, food, healthcare etc.
US	Jul-26	FCC included foreign-made advanced robotic devices into the Covered List	The addition prohibits FCC authorization, generally **blocking importation, marketing, or sale in the US**. Robots that had already received FCC authorization are not affected.	-
UK	Jan-26	Robotics Adoption Programme + Regulatory Innovation Office robotics priority	Focus is on accelerating **commercial adoption of broad robotics** and removing regulatory barriers.	~5 Robotics Adoption Hubs, expected to operate from 2H26. Each receives at least £2m over four years.

Source: Government announcement, news report, 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 15: The Humanoid 100- Morgan Stanley's List of Global Humanoid Enablers



Note: Public companies only. Not all inclusive

Source: Morgan Stanley Research

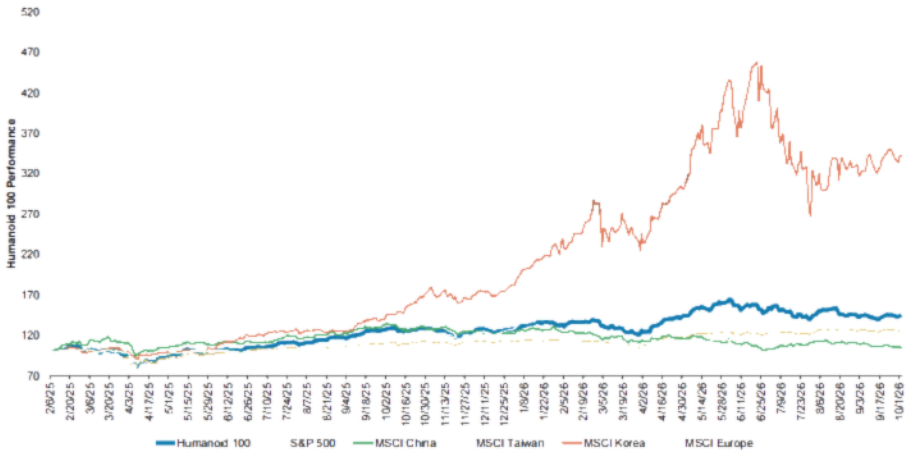
Exhibit 16: Top and Bottom Performing Stocks Since Each Stock's Date of Addition to the Humanoid 100 List

Top Performing Stocks (Since Addition Date)					
Rank	**Company**	**Date Added**	**Ticker**	**Country**	**Performance**
1	Intel	2/6/2025	INTC-US	USA	+516%
2	Samsung Electronics	2/6/2025	005930-KR	Korea	+411%
3	Teradyne	2/6/2025	TER-US	USA	+294%
4	Foxconn Industrial Internet (FII)	2/6/2025	601138-CN	Taiwan	+184%
5	LG Electronics	2/6/2025	066570-KR	Korea	+168%
6	Flex	2/6/2025	FLEX-US	USA	+164%
7	STMicroelectronics	2/6/2025	STM-US	Switzerland	+152%
8	Amphenol	2/6/2025	APH-US	USA	+148%
9	TSMC	2/6/2025	TSM-US	Taiwan	+125%
10	Moog	2/6/2025	MOG.A	USA	+103%

Bottom Performing Stocks (Since Addition Date)					
Rank	**Company**	**Date Added**	**Ticker**	**Country**	**Performance**
1	Robosense	2/6/2025	2498-HK	China	(57%)
2	Roblox	6/17/2025	RBLX-US	USA	(56%)
3	Mobileye	2/6/2025	MBLY-US	USA	(55%)
4	Dassault Systemes	2/6/2025	DSY-FR	France	(49%)
5	XPENG	2/6/2025	XPEV-US	China	(46%)
6	Xiaomi	2/6/2025	1810-HK	China	(40%)
7	Tuopu	2/6/2025	601689-CN	China	(38%)
8	Zhaowei	2/6/2025	003021-CN	China	(37%)
9	Xusheng	2/6/2025	603305-CN	China	(35%)
10	Moons Electric	2/6/2025	603728-CN	China	(32%)

Note: Data as of 10/5/26 close. Price returns only, does not account for dividend reinvestment. Source: FactSet, Morgan Stanley Research

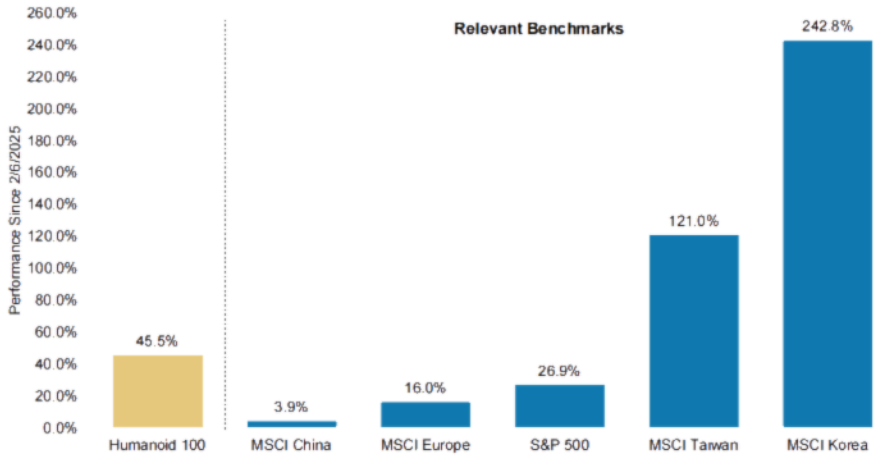
Exhibit 17: Equal-Weighted Humanoid 100 Performance since 2/6/2025 (date list was established)



Note: Data as of 10/5/26 close. Price returns only, does not account for dividend reinvestment or transaction costs.

Source: FactSet, Morgan Stanley Research

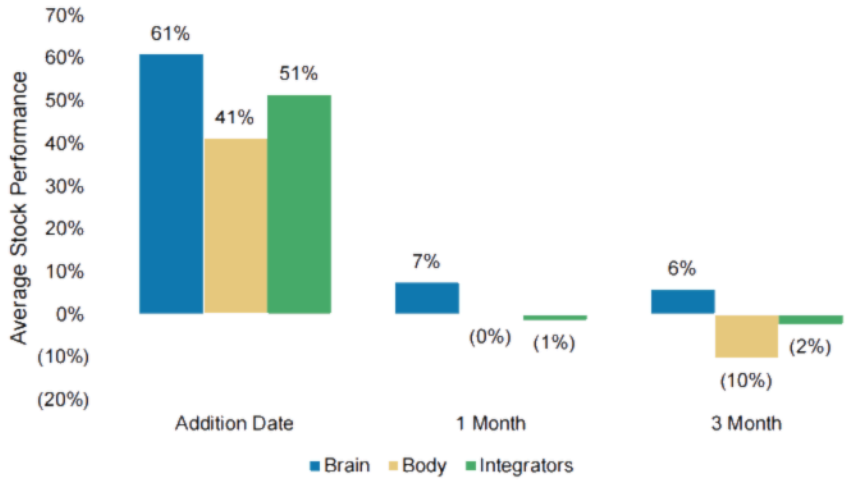
Exhibit 18: The equal-weighted Humanoid 100 is up 45% since 2/6/2025 (adjusting for additions and deletions), outperforming the S&P 500, MSCI Europe, MSCI China, but underperforming MSCI Taiwan and Korea



Note: Data as of 12/5/2026 close. Price returns only, does not account for dividend reinvestment or transaction costs.

Source: FactSet, Morgan Stanley Research

Exhibit 19: Average Stock Performance across Brain, Body, and Integrator Categories



Note: Data as of 12/5/2026 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 20: Performance Across Each Stock in the Humanoid 100 List

Ranked

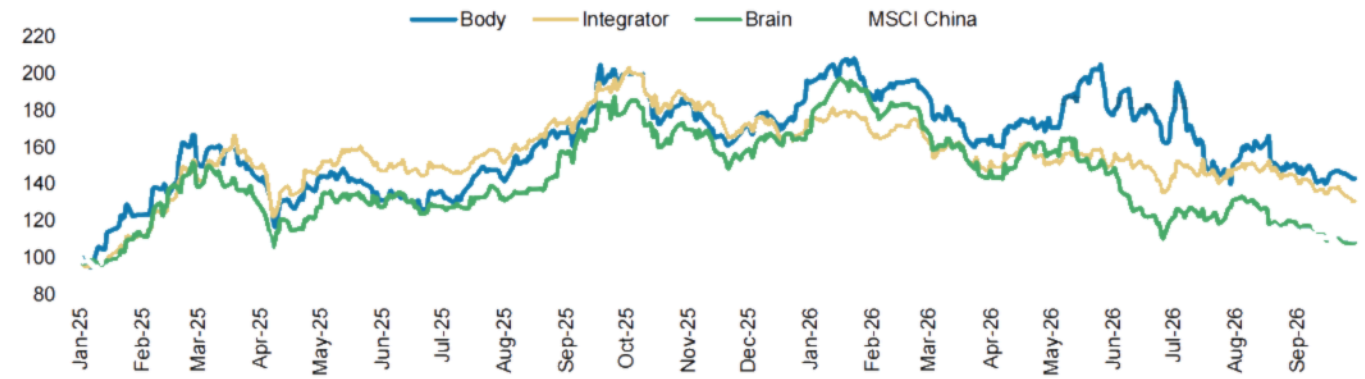
General						Trading Data		Performance				
Company	Date Added	Ticker	Country	Analyst	MS Rating	Mkt Cap ($mn)	Price ($)	Addition Date	1 Month	3 Month	6 Month	1 Year	YTD
Intel	2/6/2025	INTC-US	USA	Joseph Moore		630,792	119.33	516%	21%	-3%	131%	215%	215%
Arm Holdings	2/6/2025	ARM-US	UK	Lee Simpson		328,399	307.49	84%	20%	-4%	103%	88%	177%
LG Electronics	2/6/2025	066570-KR	Korea	Shawn Kim		28,689	159.97	168%	8%	12%	99%	183%	136%
Samsung Electronics	2/6/2025	005930-KR	Korea	Shawn Kim		1,342,249	204.41	411%	10%	-3%	55%	210%	130%
Teradyne	2/6/2025	TER-US	USA	Shane Brett		70,203	449.04	294%	25%	20%	44%	205%	130%
STMicroelectronics	2/6/2025	STM-US	Switzerland	Lee Simpson		51,107	57.26	152%	10%	-16%	68%	100%	122%
Palo Alto Networks	6/17/2025	PANW-US	USA	Meta Marshall		329,850	403.24	100%	22%	17%	149%	96%	121%
Flex	2/6/2025	FLEX-US	USA	NC		43,076	116.61	164%	7%	-15%	70%	108%	93%
Harmonic	2/6/2025	6723-JP	Japan	Kazuo Yoshikawa		41,435	2267	55%	17%	-20%	70%	113%	80%
Hiwin Technologies	2/6/2025	2049-TW	Taiwan	Dwrlqh Yang		3,648	1042	3%	-5%	-1%	52%	59%	78%
Harmonic Drive Systems	2/6/2025	6324-JP	Japan	Lisa Jiang		3,945	4167	38%	16%	-25%	76%	142%	76%
Texas Instruments	2/6/2025	TXN-US	USA	Joseph Moore		268,312	293.80	60%	14%	1%	51%	64%	70%
THK	2/6/2025	6481-JP	Japan	Lisa Jiang		4,632	4133	72%	6%	-13%	36%	68%	69%
Infineon	2/6/2025	IFX-DE	Germany	Lee Simpson		94,936	72.91	73%	12%	-18%	63%	86%	68%
TSMC	2/6/2025	TSM-US	Taiwan	Charlie Chan		2,452,054	472.78	125%	13%	12%	43%	86%	60%
Onsemi	2/6/2025	ON-US	USA	Joseph Moore		33,049	84.89	62%	16%	-6%	38%	74%	59%
Moog	2/6/2025	MOG.A	USA	Kristine Liwag		12,438	392.73	103%	3%	-9%	31%	83%	56%
Analog Devices	2/6/2025	ADI	USA	Joseph Moore		282,136	417.15	101%	16%	11%	32%	73%	55%
Samsung SDI	2/6/2025	006770-KR	Korea	Shawn Kim		19,408	114.05	24%	17%	64%	33%	47%	52%
Allegro Microsystems	2/6/2025	ALGM-US	USA	Joseph Moore		7,398	39.53	138%	5%	-31%	18%	36%	46%
Keyence	2/6/2025	6861-JP	Japan	Yoshinao Ibara		123,466	509.09	28%	5%	2%	41%	43%	44%
Timken	2/6/2025	TKR-US	USA	Angel Castillo		8,485	122.44	51%	-3%	-14%	21%	57%	43%
LeaderDrive	2/6/2025	688017-CN	China	Sheng Zhong		7,485	40.83	55%	-6%	-34%	43%	51%	43%
Nabtesco	2/6/2025	6268-JP	Japan	Lisa Jiang		3,662	31.24	84%	12%	-12%	26%	49%	33%
Jabil	2/6/2025	JBL-US	USA	NC		31,898	304.41	84%	-3%	-12%	12%	49%	32%
Sensata	2/6/2025	ST-US	USA	NC		6,332	43.51	71%	0%	-5%	25%	39%	30%
Pegatron	2/6/2025	4938-TW	Taiwan	Howard Kao		7,464	2.80	-8%	-7%	5%	14%	24%	20%
Amphenol	2/6/2025	APH-US	USA	NC		214,441	86.96	148%	5%	6%	36%	43%	29%
NVIDIA	2/6/2025	NVDA-US	USA	Joseph Moore		5,638,195	233.95	82%	4%	23%	35%	27%	28%
Novanta	2/6/2025	NOVT-US	USA	NC		5,645	149.27	0%	2%	-7%	26%	44%	27%
Leadshine	2/6/2025	002979-CN	China	NC		2,454	7.83	31%	-7%	-6%	49%	11%	25%
Apple	2/6/2025	AAPL-US	USA	Erik Woodring		4,869,939	333.69	43%	4%	8%	30%	29%	22%
Magna	2/6/2025	MGA-US	Canada	Andrew Percoco		17,140	64.57	88%	-6%	4%	18%	32%	22%
Teledyne	2/6/2025	TDY-US	USA	Kristine Liwag		28,609	617.17	21%	1%	-5%	-1%	5%	21%
Melexis	2/6/2025	MELE-BE	Belgium	Nigel van Putten		3,085	78.39	28%	4%	-13%	27%	0%	19%
Estun	2/6/2025	002747-CN	China	Sheng Zhong		4,081	4.21	39%	-10%	-24%	40%	10%	19%
Rockwell Automation	2/6/2025	ROK-US	USA	Chris Snyder		50,455	454.35	69%	5%	-4%	25%	30%	17%
Hyundai	2/6/2025	005380-KR	Korea	Young Suk Shin		66,549	256.62	70%	-8%	-28%	-26%	58%	17%
NSK	2/6/2025	6471-JP	Japan	NC		3,436	7.02	74%	1%	-5%	0%	48%	15%
Siemens	2/6/2025	SIE-DE	Germany	Max Yates		237,379	311.41	33%	1%	-3%	29%	14%	15%
Regal Rexnord	2/6/2025	RRX	USA	NC		10,648	159.87	12%	-1%	-26%	-12%	9%	15%
RBC Bearings	2/6/2025	RBC-US	USA	Kristine Liwag		16,322	515.56	41%	5%	-15%	-6%	37%	14%
Cadence Design Systems	2/6/2025	CDNS-US	USA	Lee Simpson		96,759	351.35	18%	21%	-5%	27%	2%	13%
Meta	2/6/2025	META-US	USA	Brian Nowak		1,854,790	728.08	2%	20%	27%	29%	4%	12%
SKF	2/6/2025	SKF.b-SE	Swedish	Michael Halloran		12,525	27.51	24%	0%	3%	23%	15%	12%
Hexagon	2/6/2025	HEXA.B-SE	Swedish	George Webb		27,100	10.10	-5%	6%	23%	36%	4%	11%
Alphabet Inc.	2/6/2025	GOOGL-US	USA	Brian Nowak		4,201,005	343.50	79%	2%	-4%	17%	41%	11%
Hon Hai Precision (Foxconn)	2/6/2025	2317-TW	Taiwan	Sharon Shih		110,737	7.87	45%	-1%	6%	32%	12%	10%
Amazon	2/6/2025	AMZN-US	USA	Brian Nowak		2,712,970	251.52	5%	-3%	4%	20%	15%	9%
Microsoft	2/6/2025	MSFT-US	USA	Josh Baer		3,842,945	517.53	24%	5%	34%	41%	2%	9%
Palantir	2/6/2025	PLTR-US	USA	Sanjit Singh		453,577	188.75	70%	9%	48%	28%	9%	7%
Qualcomm	2/6/2025	QCOM-US	USA	Joseph Moore		194,156	184.87	9%	7%	3%	43%	7%	6%
Honeywell	2/6/2025	HON-US	USA	Chris Snyder		67,822	213.99	3%	2%	-7%	-11%	4%	5%
Synopsys	2/6/2025	SNPS-US	USA	Lee Simpson		93,883	489.90	-8%	24%	12%	23%	4%	4%
Unity	6/17/2025	U-US	USA	Matthew Cost		19,192	43.61	85%	10%	56%	101%	21%	3%
Midea	2/6/2025	000333-CN	China	Lillian Lou		91,033	11.95	11%	-7%	6%	11%	10%	2%
Nidec	2/6/2025	6594-JP	Japan	Shoji Sato		15,391	13.43	-18%	-12%	-22%	-5%	-17%	2%
Lynas Rare Earths	2/6/2025	LYC-AU	Australia	Shannon Sinha		9,084	9.03	98%	-18%	-31%	-35%	-30%	2%
LG Energy Solution	2/6/2025	373220-KR	Korea	Young Suk Shin		64,295	274.76	8%	7%	5%	-8%	-7%	1%
Ambarella	2/6/2025	AMBA-US	USA	Joseph Moore		3,030	68.65	-13%	9%	-13%	35%	-19%	-4%
TE Connectivity	2/6/2025	TEL-US	USA	NC		63,797	220.36	50%	5%	11%	5%	-1%	-4%
Rainbow Robotics	2/6/2025	277810-KR	Korea	NC		6,458	332.90	20%	3%	-7%	-17%	46%	-4%
Shanghai Baite	6/17/2025	603009-CN	China	NC		2,370	6.84	3%	0%	-4%	1%	-17%	-5%
Foxconn Industrial Internet (FII)	2/6/2025	601138-CN	Taiwan	Sharon Shih		171,768	8.68	164%	-9%	-19%	18%	-12%	-6%
MP Materials	2/6/2025	MP-US	USA	Carlos De Alba		8,365	40.97	95%	-14%	-12%	-6%	-34%	-7%
Dassault Systemes	2/6/2025	DSY-FR	France	Adam Wood		30,806	23.27	-49%	2%	16%	21%	-27%	-10%
Luxshare	2/6/2025	002475-CN	China	Sharon Shih		57,034	7.37	19%	-13%	-30%	1%	-24%	-13%
Toyota	2/6/2025	7203-JP	Japan	Shinji Kakeuchi		214,531	18.12	-2%	-6%	2%	-11%	2%	-14%
BYD	2/6/2025	002594-CN	China	Tim Hsiao		113,144	12.42	-20%	-10%	5%	-21%	-24%	-15%
Tesla	2/6/2025	TSLA-US	USA	Andrew Percoco		1,463,664	370.59	-1%	7%	-4%	5%	-12%	-16%
Hota	2/6/2025	1536-TW	Taiwan	Cindy Huang		408	1.46	-23%	-7%	-12%	-4%	-25%	-17%
Jiangsu Hengli	2/6/2025	601100-CN	China	Sheng Zhong		18,058	13.47	35%	-11%	-18%	-7%	-6%	-18%
JL Mag	2/6/2025	6680-HK	China	Rachel Zhang		2,599	1.89	45%	-9%	-22%	-21%	-33%	-18%
Shuanghuan	2/6/2025	002472-CN	China	Sheng Zhong		4,828	5.68	0%	7%	-8%	6%	-24%	-20%
Take-Two	6/17/2025	TTWO-US	USA	Matthew Cost		37,906	202.73	-15%	-5%	-20%	2%	-21%	-21%
CATL	2/6/2025	300750-CN	China	Jack Lu		199,657	434.1	15%	-21%	-26%	-30%	-28%	-21%
Naver	2/6/2025	035420-KR	Korea	Seyon Park		20,633	142.34	-17%	-8%	-4%	-2%	-24%	-21%
Northern Rare Earths	2/6/2025	600111-CN	China	NC		19,031	5.26	51%	-13%	-27%	-25%	-27%	-23%
EVE Energy	2/6/2025	300014-CN	China	Jack Lu		16,144	7.43	12%	-8%	-23%	-28%	-46%	-24%
Alibaba	2/6/2025	BABA-US	China	Gary Yu		263,328	105.85	5%	-2%	15%	-5%	-41%	-24%
Schaeffler	2/6/2025	SHA6-DE	Germany	NC		6,640	7.03	48%	-16%	-29%	-13%	3%	-25%
Mobileye	2/6/2025	MBLY-US	USA	Andrew Percoco		6,308	7.42	-55%	-11%	-21%	2%	-48%	-27%
Moons Electric	2/6/2025	603728-CN	China	NC		3,217	7.68	-32%	7%	-15%	-11%	-39%	-29%
Hesai Technology	7/23/2026	HSAI-US	China	Tim Hsiao		2,002	15.38	4%	-16%	-7%	-23%	-42%	-29%
Tencent	2/6/2025	700-HK	China	Gary Yu		483,509	536.7	0%	-4%	-2%	-14%	-37%	-29%
Xusheng	2/6/2025	603305-CN	China	Shelley Wang		1,923	1.67	-35%	-1%	-8%	-23%	-38%	-31%
Shenzhen Inovance	2/6/2025	300124-CN	China	Sheng Zhong		20,942	7.74	-25%	-16%	-22%	-23%	-38%	-31%
Aptiv	2/6/2025	APTV-US	USA	Andrew Percoco		9,040	43.54	-19%	-6%	-25%	-28%	-41%	-32%
Baidu	2/6/2025	BIDU-US	China	Gary Yu		23,289	84.32	-5%	-13%	-23%	-22%	-39%	-33%
Omnivision	2/6/2025	603501-CN	China	Charlie Chan		15,333	122.6	-28%	0%	-13%	-18%	-46%	-35%
Sanhua	2/6/2025	002050-CN	China	Shelley Wang		22,647	5.33	1%	-1%	-19%	-17%	-25%	-35%
Xiaomi	2/6/2025	1810-HK	China	Andy Meng		79,221	3.09	-40%	-16%	4%	-23%	-57%	-39%
Tuopu	2/6/2025	601689-CN	China	Shelley Wang		12,057	6.94	-38%	-1%	-18%	-19%	-43%	-40%
UBTech	2/6/2025	9880-HK	China	NC		4,758	9.37	-10%	-12%	-31%	-27%	-52%	-41%
GAC Group	2/6/2025	2238-HK	China	Joey Xu		3,936	0.39	-27%	8%	6%	-24%	-30%	-43%
Zhaowei	2/6/2025	003021-CN	China	NC		2,802	10.48	-37%	0%	-20%	-28%	-49%	-43%
Roblox	6/17/2025	RBLX-US	USA	Matthew Cost		31,518	44.12	-56%	3%	-20%	-26%	-54%	-46%
XPENG	2/6/2025	XPEV-US	China	Tim Hsiao		7,250	9.25	-46%	-14%	-28%	-47%	-59%	-54%
Horizon Robotics	2/6/2025	9660-HK	China	Tim Hsiao		8,151	0.52	-26%	-8%	-14%	-40%	-59%	-54%
Robosense	2/6/2025	2498-HK	China	NC		988	2.05	-57%	-13%	-37%	-52%	-63%	-57%
Average								41%	1%	-6%	15%	17%	15%

Note: Data as of 12/5/2026 close. Price returns only, does not account for dividend reinvestment.

Source: FactSet, Morgan Stanley Research

China Humanoids Value Chain Performance

Exhibit 21: Equal-weighted China Humanoid Value Chain Perf



Source: FactSet, Morgan Stanley Research Note: Data as of September 30, 2026 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 22: China Humanoid Value Chain list: 45 stocks in total, including three in brains, 32 in body components, and 10 integrators.

	Ticker	Company	Analyst	Market Cap	Last Close (LCY)	Price Change 1W	3M	YTD	1Y	Notes
Brain	BIDU-US	Baidu	Yu, Gary	23,997	86.7	(3%)	(23%)	(34%)	(34%)	ERNIE 5.0, a natively multimodal foundation model that supports the "Toser Multiform" layer.
Brain	002230-CN	iFlytek	Shih, Sharon	12,148	37.2	(4%)	(6%)	(26%)	(34%)	Deepened cooperation with Beijing Humanoid Innovation Center; also delivered the first ~100-unit collaborative order.
Brain	9660-HK	Horizon Robotics	Hsiao, Tim	7,311	4.2	3%	(3%)	(52%)	NA	Co-Robotics' RMK S1 (605,000 platforms targeting ~200 robotics workbots including humanoids.
Actuator	002050-CN	Sanhua	Wang, Shelley	21,320	36.7	(1%)	(2.1%)	(35%)	(26%)	One of Tesla tier-1 suppliers, developing humanoid actuators
Actuator	601689-CN	Tuopu	Wang, Shelley	12,275	48.5	1%	(1.8%)	(40%)	(43%)	One of Tesla tier-1 suppliers, developing humanoid actuators
Battery	300750-CN	CATL	Liu, Jack	196,701	297.1	(3%)	(2.4%)	(21%)	(28%)	Gained 51 has reportedly entered CATL's production line, and CATL pre-visually led Gallot financing
Battery	002245-CN	Aulne	NC	3,868	16.2	(4%)	(11%)	3%	15%	Aulne supplies robot batteries to UBTech, DeepRobotics, Fourier and others
Bearing	300718-CN	Changsheng	NC	3,807	54.0	2%	(11%)	(37%)	(48%)	Provides bearing products across products under R&D/sample stage, in collaboration with Unitree
Exterior	300433-CN	Lens	Yang, Dennis	24,167	32.3	(6%)	(36%)	7%	(3%)	Supplies domestic customers with joint-module/structural components, and overseas clients with head modules
Hands	603021-CN	Zhejiawei	NC	4,504	70.3	(1%)	(2.3%)	(43%)	(49%)	Offers dexterous hands, motors and modules; guides revenue to double in 2026, Thailand capacity is largely ready
Hands	002979-CN	LeadsHito	NC	2,440	52.5	(3%)	(1.7%)	25%	11%	Fair-electric torque motor shipments increased to ~10K+ units in 2025, targeting the million-unit level in 2026
LiDAR	HSAI-US	Hesai	Hsiao, Tim	2,037	15.5	(6%)	(10%)	(31%)	(65%)	1H26 robotics LiDAR shipments were 118k units, up 137.8% YoY
LiDAR	2465-HK	Robosense	NC	1,918	16.7	2%	(10%)	(54%)	(61%)	1H26 robotics LiDAR shipments were 186k units, up 1,458.8% YoY
Magnets	300748-CN	JL Mag	Zhang, Rachel	4,547	24.1	(1%)	(2.7%)	(29%)	(30%)	Investing US$14mn in Mexico magnet component project, to improve competitiveness in humanoid and EVs
Motor	300124-CN	Inovance	Zhang, Sheng	18,890	57.9	(2%)	(2.4%)	(31%)	(38%)	--
Motor	688160-CN	Weilong	NC	6,202	28.4	(3%)	(2.7%)	(45%)	(45%)	Received small order for frameless torque motor, partnership with Zhongguang humanoid center
Motor	603728-CN	Moons	NC	3,279	51.5	3%	(1.9%)	(29%)	(39%)	Offers coreless motor, frameless torque motor, encoder, reducer products for humanoids
Motor	688696-CN	Volcn	NC	1,353	41.6	(6%)	(2.9%)	(55%)	(56%)	Formed JV with Rongtai in Thailand for robotics products
Motor	688160-CN	Keeo	NC	1,293	44.7	(3%)	(2.9%)	(36%)	(9%)	Offers frameless torque motor and modules, collaborating with leading humanoid players
Reducer	002472-CN	Shuanghuan	Zhang, Sheng	4,370	38.1	1%	(1.1%)	(20%)	(24%)	Leading supplier of gears, developing new type of reducer for humanoids with a key North America client
Reducer	688017-CN	LeaderDrive	Zhang, Sheng	7,537	273.8	(5%)	(3.4%)	43%	51%	Monthly shipment reached 0.5K+ units and capacity expansion continues, involved in module-related projects
Reducer	002850-CN	Kedali	Zhang, Sheng	6,758	155.8	(9%)	(2.4%)	1%	(20%)	Confident in getting orders from leading humanoid integrators, the Harmonic reducer has fastest progress
Reducer	002896-CN	Zhongda Leader	NC	1,784	59.6	(2%)	(2.3%)	(30%)	(38%)	Certified supplier for a key domestic integrator, announced to invest Rmb200mn for precision core components
Reducer	301150-CN	Sieg	NC	2,878	100.2	8%	6%	1%	17%	Claims its harmonic reducer will have a significant share in the North American integrator
Screw	601100-CN	Hengli Hydraulic	Zhang, Sheng	19,186	90.3	(1%)	(1.8%)	(18%)	(6%)	Hengli's share of ball screw products is indicated at 70%+. The capacity is being prepared mainly in Mexico
Screw	300100-CN	Shuanglin	NC	1,353	22.3	7%	(2.3%)	(44%)	(50%)	Developed roller screw and grinding machine for humanoid, 10k-unit capacity was planned for Jun-2026
Screw	603119-CN	Rongtai	NC	3,886	52.6	(7%)	(2.4%)	(41%)	(39%)	To invest US$77mn in Thailand for 7mn sets of robotics components, formed JV with Volcn in Thailand for robots.
Screw	603667-CN	KCC	NC	2,849	49.4	(1%)	(3.0%)	(29%)	7%	To invest Rmb1.1bn for a new plant with an annual capacity of 60k+ sets of planetary roller screws
Sorts	603501-CN	OmniVision	Chan, Charlie	14,568	82.2	(1%)	(1.9%)	(35%)	(40%)	Its existing sensor technology can be easily applied to humanoid's vision
Servo	688279-CN	Fortex	NC	3,180	149.3	(7%)	(1.3%)	(2%)	(18%)	Offers motor ASIC, driver IC, MCU, and established JV with Sanhua to develop dexterous hands
Sensor	603098-CN	Jiuyuan	Wang, Shelley	4,835	23.5	9%	7%	(25%)	(33%)	Develops 6-axes force sensors, tactile sensors, IMU, and has placed commercial orders for humanoid robots
Sensor	603662-CN	Kelk	NC	2,017	47.9	(4%)	(3.0%)	(33%)	(37%)	Develops 6-axes force sensor, and is applying humanoid robots in production line
Sensor	300007-CN	Hanwei	NC	1,488	30.1	(5%)	(2.4%)	(44%)	(53%)	Focus on soft, flexible sensor, cooperating with multiple leading integrators
Vision	688322-CN	Orbbec	NC	4,286	88.4	(7%)	(3.0%)	(5%)	(7%)	A key structured light camera supplier to leading domestic players
Vision	688400-CN	Lusee LightTech	NC	2,901	41.6	(12%)	(3.7%)	12%	(13%)	Providing monen capturing solution +F7 Mission for Unitree
Integrator	700-HK	Tencent	Yu, Gary	596,737	431.0	(2%)	0%	(28%)	(35%)	Tencent established a Robotics X lab in Shenzhen in 2018, unveiled XiaoYu
Integrator	BABA-US	Alibaba	Yu, Gary	269,362	107.7	(3%)	12%	(26%)	(40%)	Released Qwen Studio, a foundation model for physical intelligence. Ant Group's Robbyant unveiled LingBot-VA
Integrator	1810-HK	Xiaomi	Meng, Andy	668.9K	25.2	(4%)	12%	(30%)	(5.3%)	Unveiled Xiaomi-Robotics-0, an open-source VLA model
Integrator	1211-HK	BYD	Hsiao, Tim	78,227	75.6	(1%)	(3%)	(21%)	(31%)	Developing humanoid project. Yao Shun Yu, testing UBTECH humanoids. Invested in Pavers
Integrator	3806-HK	MideaRUKA	Lau, Lillian	93,550	97.8	(5%)	7%	8%	NA	The self-developed 8-arm wheel-based humanoid Robot Lillie has entered its washing machine factory
Integrator	XPEV-US	XPENG	Hsiao, Tim	7,503	9.5	(8%)	(2.8%)	(52%)	(50%)	Its humanoid robot - Iron, is expected to enter mass production stage by end-of-2026
Integrator	002747-CN	Edon	Zhang, Sheng	3,469	28.2	(4%)	(2.1%)	19%	10%	Cobot D2 was unveiled in June 2025 for flexible manufacturing
Integrator	9880-HK	UBTECH	NC	4,083	74.4	(5%)	(2.0%)	(41%)	(52%)	Walker S2 has begun mass production and delivery, targeting 1,000 annual industrial humanoids by 2026
Integrator	2432-HK	Dobot	NC	1,026	27.5	3%	(1.6%)	(43%)	NA	Dobot started mass production and delivery of the first batch of industrial humanoid ATOM robots in Feb-2026
ODM	002600-CN	Lingyi iTech	Shih, Sharon	13,441	11.9	(4%)	(2.1%)	(24%)	(27%)	ODM for multiple integrators, first humanoid robots rolled off Lingyi's Beijing Super Factory

Source: FactSet, Morgan Stanley Research Note: Data as of September 30, 2026 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 Mentions

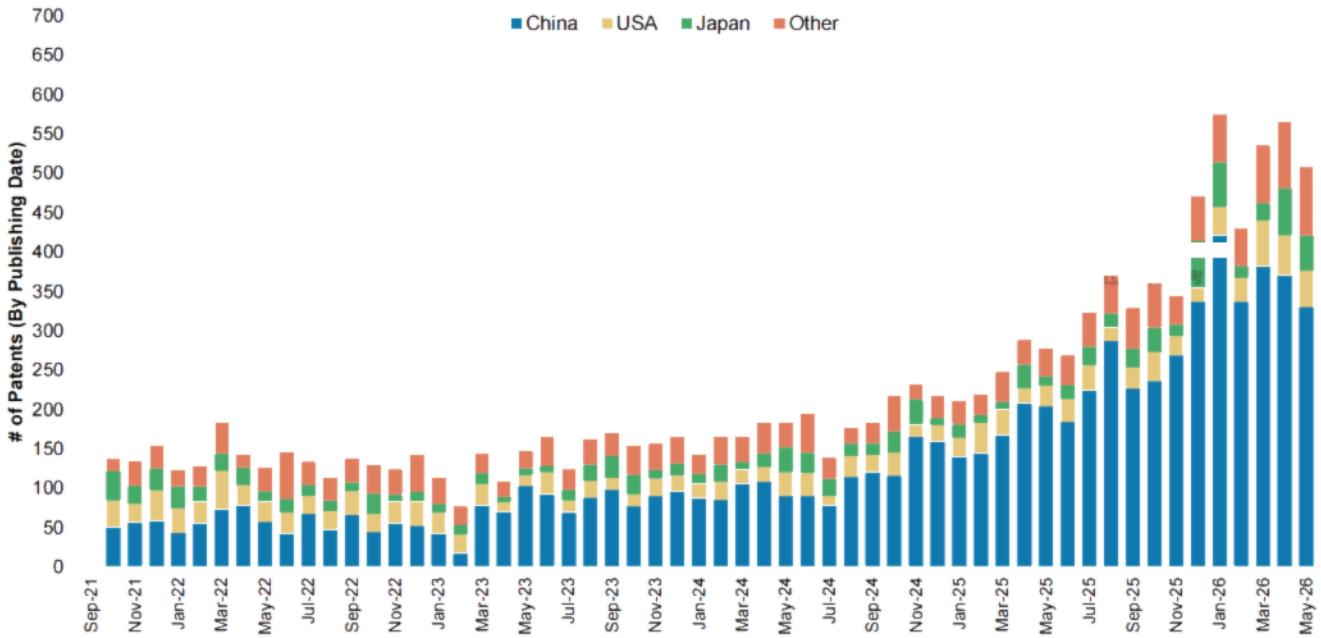
Exhibit 23: Public Companies Mentioning the Word "Humanoid" over Past 1 Year in Public Material by # of Mentions

Rank	Company	Ticker	Document Count	Region	Domicile Country
1	Faraday Future Intelligent Electric Inc	FFAI	259	Gardena-CA	United States
2	Realbotix Corp	XBOT.CA	173	Toronto	Canada
3	Humanoid Global Holdings Corp	ROBO.CA	94	Vancouver	Canada
4	Schaeffler AG	SHA0.DE	85	Herzogenaurach	Germany
5	XPeng Inc	09868.HK	61	Guangzhou	China
6	Mobileye Global Inc	MBLY	54	Jerusalem	Israel
7	NVIDIA Corp	NVDA	53	Santa Clara-CA	United States
8	Infineon Technologies AG	IFX.DE	42	Munich	Germany
9	SiTime Corp	SITM	41	Santa Clara-CA	United States
10	Vishay Precision Group Inc	VPG	37	Malvern-PA	United States
11	Virtuix Holdings Inc	VTIX	36	-	-
12	Minebea Mitsumi Inc	6479.JP	36	Tokyo	Japan
13	Shoucheng Holdings Ltd	00697.HK	36	Hong Kong	Hong Kong
14	STMicroelectronics NV	STMPA.FR	35	Geneva	Switzerland
15	Hesai Group	02525.HK	35	Shanghai	China
16	GXO Logistics Inc	GXO	34	Greenwich-CT	United States
17	Johnson Electric Holdings Ltd	00179.HK	32	Hong Kong	Hong Kong
18	Fortuna Metals Ltd	FUN.AU	30	Perth	Australia
19	Indie Semiconductor Inc	INDI	30	Aliso Viejo-CA	United States
20	Hexagon AB	HEXA.B.SE	29	Stockholm	Sweden
21	YASKAWA Electric Corp	6506.JP	29	Kitakyushu	Japan
22	Robosense Technology Co Ltd	02498.HK	29	Shenzhen	China
23	Zoomlion Heavy Industry Science and	000157.CN	28	Changsha	China
24	Hyundai Motor Co	005380.KR	27	Seoul	South Korea
25	Hastings Technology Metals Ltd	HAS.AU	27	Perth	Australia
26	Zhen Ding Technology Holding Ltd	4958.TW	27	Taoyuan	Taiwan
27	Neo Performance Materials Inc	NEO.CA	27	Toronto	Canada
28	Pony AI Inc	02026.HK	27	Guangzhou	China
29	Hon Hai Precision Industry Co Ltd	2317.TW	26	New Taipei	Taiwan
30	Kawasaki Heavy Industries Ltd	7012.JP	26	Kobe	Japan

Source: AlphaSense, Morgan Stanley Research

Global Patents

Exhibit 24: 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 25: 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	7,548
2	United States	1,492
3	Japan	1,176
4	World Intellectual Property Organization (WIPO)	800
5	South Korea	387
6	European Patent Office (EPO)	287
7	Taiwan	187
8	Germany	133
9	Great Britain	39
10	France	19
11	Brazil	19
12	Australia	18
13	Canada	17
14	Turkey	15
15	Poland	9
16	Sweden	8
17	Spain	6
18	Israel	6
19	Eurasian Patent Organisation (EAPO)	2
20	Switzerland	1

Note: Exhibit limited to top 20.

Source: Google Patents, Morgan Stanley Research

Exhibit 26: US Patent Applications Mentioning "Humanoid" by Assignee Over the Past 5 Years (according to Google Patents, may not capture all)

Top US "Humanoid" Patent Filers (Past 5 Years)

Rank	Patent Assignee	# Count
1	Boston Dynamics, Inc.	89
2	Roblox Corporation	87
3	Sanctuary Cognitive Systems Corporation	63
4	Figure Ai Inc.	40
5	Ubtech Robotics Corp Ltd	36
6	Nvidia Corporation	35
7	Honda Motor Co., Ltd.	34
8	Unity Technologies Sf	31
9	Google Llc	29
10	Samsung Electronics Co., Ltd.	23
11	Toyota Jidosha Kabushiki Kaisha	21
12	Sony Interactive Entertainment Inc.	20
13	Sony Group Corporation	20
14	Nuance Communications, Inc.	19
15	Tencent Technology (Shenzhen) Company Limite	18
16	Sarcos Corp.	17
17	Tesla, Inc.	17
18	Meta Platforms Technologies, Llc	17
19	Apple Inc.	13
20	Fanuc Corporation	

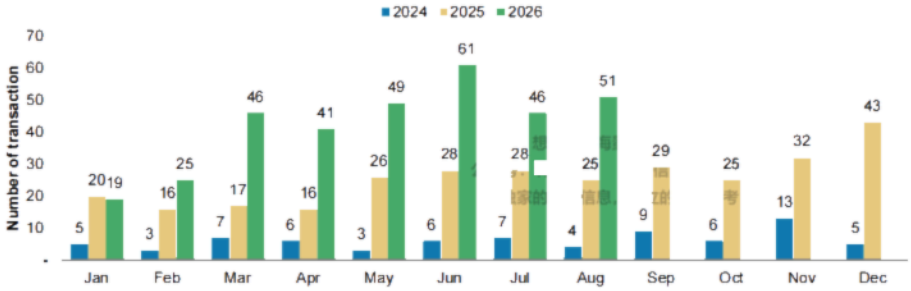
Note: Exhibit limited to top 20.

Source: Google Patents, Morgan Stanley Research

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China Financing Activity

Exhibit 27: 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, GSIII Morgan Stanley Research.

Tech Firms Supporting the Development of Humanoids

Exhibit 28: Humanoid or Robotics Involvement of Major Tech Firms in the US & China

Humanoid or Robotics Involvement of Big Tech Firms

Company	Involvement
Alibaba / 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

Global 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, ~28.1 million (~2.8% 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): ~16.7 million (~3.3% 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, ~138.5 million (~13.6% 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): ~81.4 million (~16.1% 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 (~42.2% 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.**

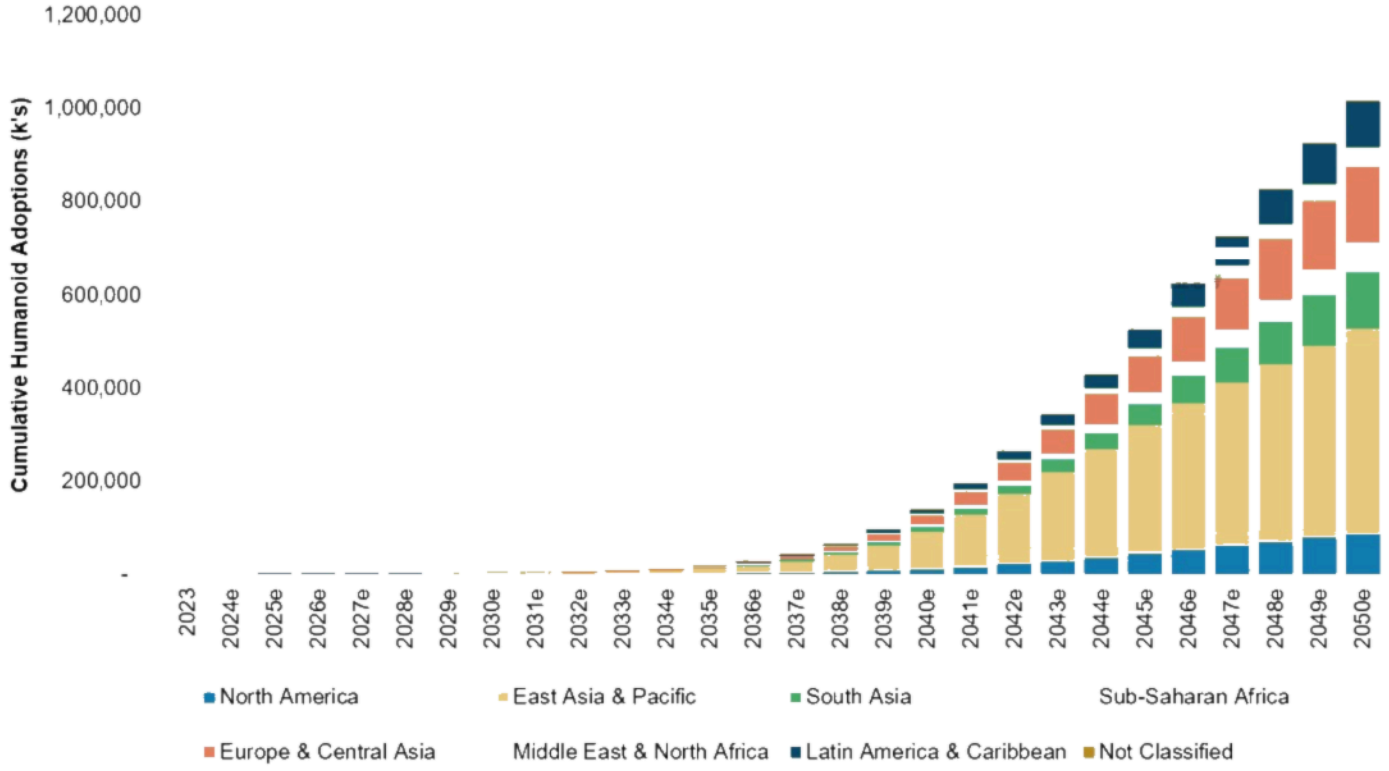
- Low Income Countries: ~14 million humanoids have been adopted.
- Lower Middle Income Countries: ~204 million humanoids have been adopted.
- Upper Middle Income Countries (Inc. China): ~504 million humanoids have been adopted.
- High Income Countries (Inc. US): ~296 million humanoids have been adopted.

Exhibit 29: 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	16,739	81,411	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	15,872	78,971	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	13,002	65,131	187,937	302,316
Other	13,157	63,051	210,492	639,219
Commercial	26,475	131,799	409,823	935,052
Household	1,618	6,673	20,623	84,185
Global	**28,093**	**138,471**	**430,447**	**1,019,238**

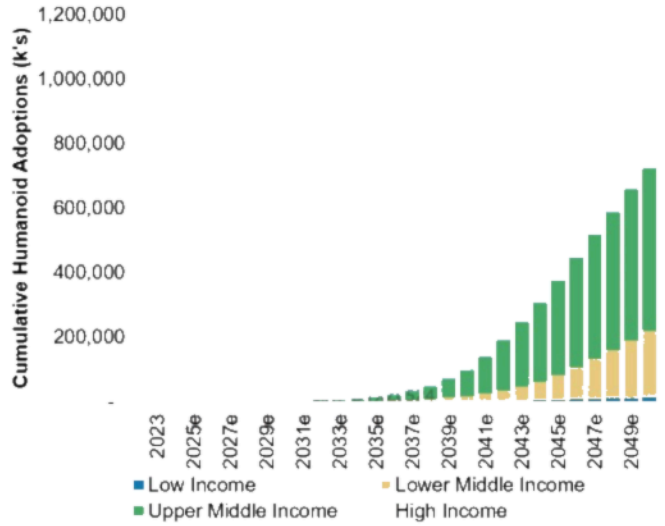
Source: Morgan Stanley Research estimates

Exhibit 30: Cumulative Humanoid Adoptions by Region



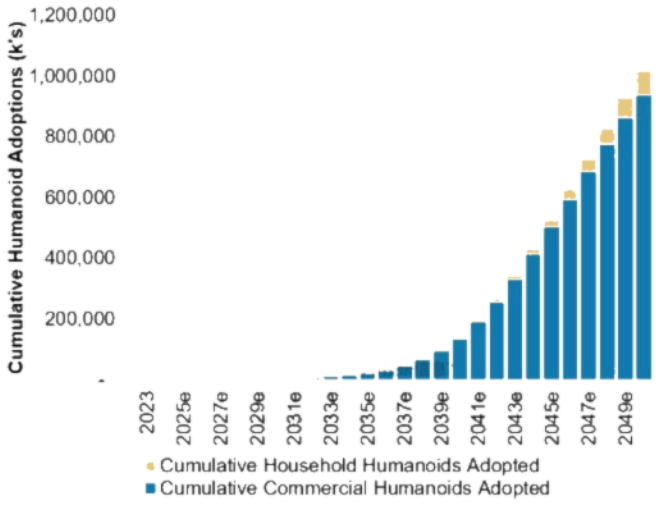
Source: Morgan Stanley Research estimates

Exhibit 31: Cumulative Humanoid Adoptions by Country Income Classification (United Nations)



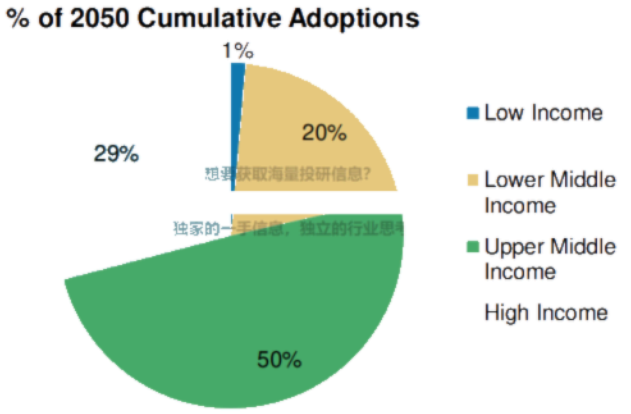
Source: Morgan Stanley Research estimates

Exhibit 32: Cumulative Humanoid Adoptions: Household vs. Commercial End-Markets



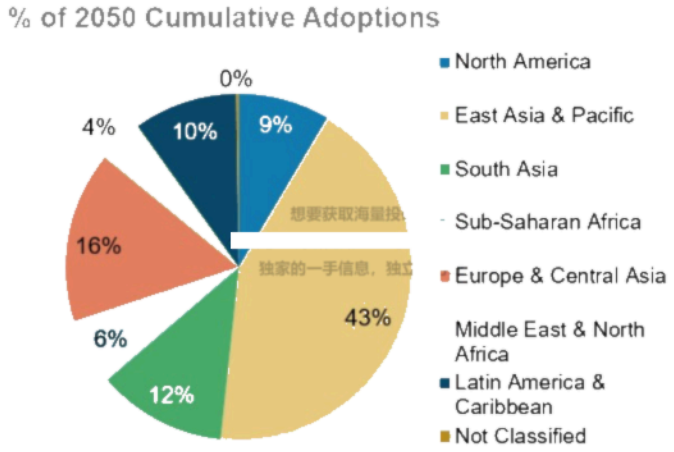
Source: Morgan Stanley Research estimates

Exhibit 33: 2050 Cumulative Adoptions by Income Classifications



Source: Morgan Stanley Research estimates

Exhibit 34: 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 ($336 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:

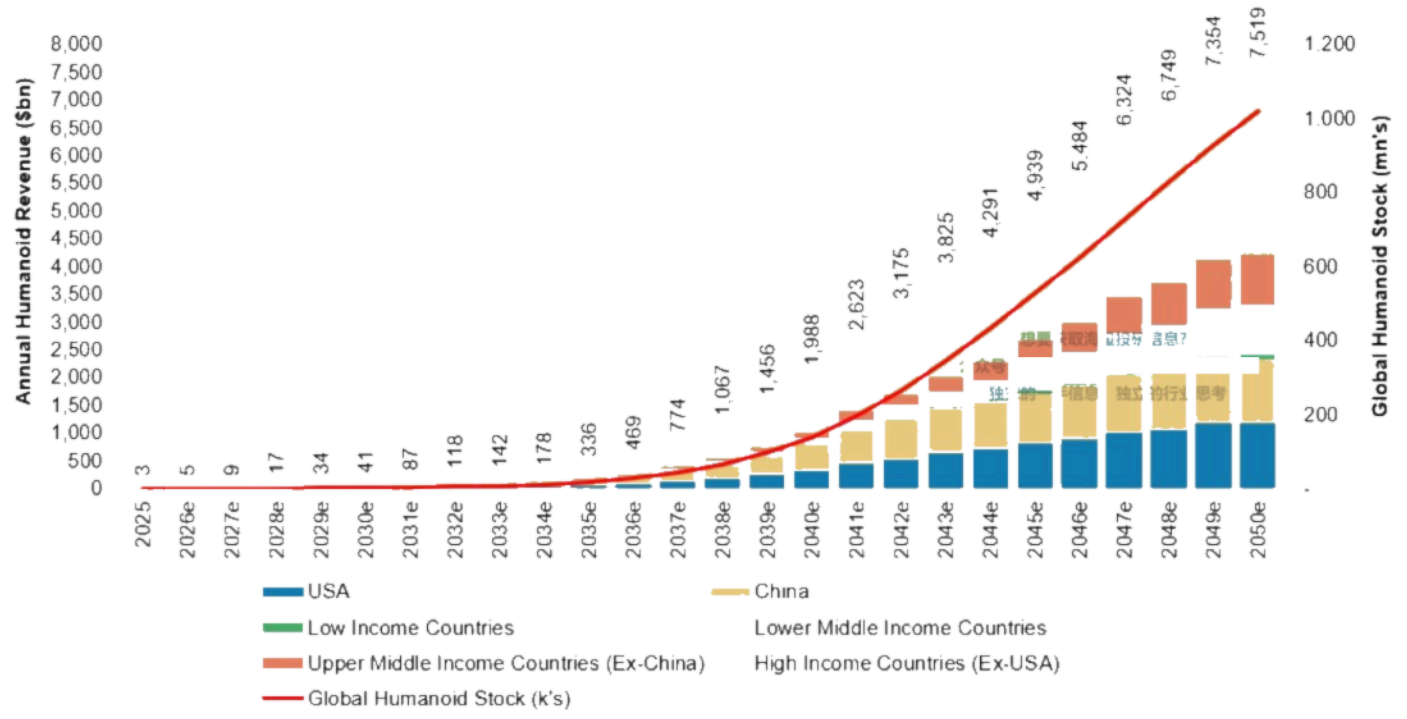
- High Income Countries: We assume that the initial ASP of humanoids was $200k in 2024 (largely research-oriented humanoids), with this declining to $150k each by 2028, and further declines to ~$93k by 2040 and ~$75k by 2050 driven by supply chain development and improvements in mass-production. Assume 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 35: 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)		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Replacement Units (mn)								0.0	0.0	0.1	0.2	0.2	0.7	1.8	3.5	5.8	8.3
Total Humanoid Units Sold (mn)	-	0.003	0.005	0.008	0.020	0.038	0.065	0.167	0.225	0.722	1.8	3.5	5.8	8.3	10.9	13.4	15.7
Average Selling Price Per Humanoid ($k)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
USA Revenue ($bn)	**-**	**0.6**	**0.9**	**1.3**	**2.9**	**5.3**	**8.5**	**20.4**	**25.9**	**78.2**	**182.1**	**334.7**	**520.5**	**702.7**	**888.5**	**1,051.1**	**1,178.9**
China	**2024**	**2025e**	**2026e**	**2027e**	**2028e**	**2029e**	**2030e**	**2032e**	**2034e**	**2036e**	**2038e**	**2040e**	**2042e**	**2044e**	**2046e**	**2048e**	**2050e**
New Humanoid Units Adopted (mn)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Replacement Units (mn)							0.0	0.0	0.2	0.4	1.0	2.0	4.9	11.2	22.3	36.3	43.1
Total Humanoid Units Sold (mn)	0.0	0.0	0.0	0.1	0.2	0.3	0.4	1.0	2.0	4.9	11.2	22.3	36.3	43.1	47.2	51.6	54.6
Average Selling Price Per Humanoid ($k)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
China Revenue ($bn)	**0.1**	**0.6**	**1.9**	**4.0**	**7.3**	**11.2**	**14.9**	**28.2**	**49.7**	**108.3**	**240.5**	**485.8**	**742.6**	**864.1**	**965.7**	**1,077.2**	**1,161.5**
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	1.7	1.6	1.8
Replacement Units (mn)										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 ($k)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
LI Country Revenue ($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	0.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Replacement Units (mn)									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 ($k)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
LMI Country Revenue ($bn)	**-**	**-**	**-**	**-**	**0.8**	**1.6**	**1.5**	**5.1**	**15.7**	**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)					[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Replacement Units (mn)									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 ($k)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
UMI Country Revenue ($bn)	**-**	**-**	**-**	**-**	**0.8**	**1.3**	**1.6**	**5.3**	**15.5**	**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)		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Replacement Units (mn)								0.015	0.038	0.110	0.478	0.609	1.984	5.110	10.096	16.394	23.615
Total Humanoid Units Sold (mn)	-	0.010	0.015	0.024	0.038	0.104	0.110	0.478	0.609	1.984	5.110	10.096	16.394	23.615	30.562	38.873	43.964
Average Selling Price Per Humanoid ($k)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
HI Country Revenue ($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	0.1	0.1	0.3	0.5	0.7	1.9	3.8	10.0	21.9	42.3	69.0	87.0	97.9	99.9	91.3
Replacement Units (mn)							0.0	0.1	0.3	0.7	2.0	4.1	10.7	23.9	46.4	79.7	110.9
Total Humanoid Units Sold (mn)	0.0	0.03	0.1	0.1	0.3	0.5	0.7	2.0	4.1	10.7	23.9	46.4	79.7	110.9	144.3	179.5	202.2
Average Selling Price Per Humanoid ($k)	49.0	119.2	77.0	70.5	64.1	65.3	57.0	59.3	43.4	43.9	44.6	42.8	39.9	38.7	38.0	37.6	37.2
Global Revenue ($bn)	***0.1***	***3.0***	***5.3***	***9.3***	***17.4***	***33.6***	***40.9***	***117.7***	***178.0***	***469.0***	***1,066.7***	***1,987.5***	***3,175.5***	***4,291.3***	***5,484.0***	***6,749.0***	***7,518.6***
Global Humanoid Stock (k's)	***0***	***0***	***0***	***0***	***1***	***1***	***2***	***5***	***11***	***28***	***65***	***138***	***264***	***430***	***624***	***827***	***1,019***

Source: Morgan Stanley Research estimates

Exhibit 36: Global Humanoid Revenue by Year (Hardware Sales Only)



Source: Morgan Stanley Research estimates

Notes

Public companies mentioned

Google (Brian Nowak)

NVIDIA, AMD (Joe Moore)

Tesla (Andrew Percoco)

Hyundai, Kia (Young Suk Shin)

Toyota Motor (Hiroto Segawa)

Xiaomi (Andy Meng)

XPeng (Tim Hsiao)

Hexagon (George Webb)

BMW (Javier Martinez de Olcoz Cerdan)

Yushu Technology (Sheng Zhong)

T-Robotics (not covered)

UBTech (not covered)