

2025 Oct. 16 (Thu) - AI & Robotics Strategic Innovation



Dr. **Kou-I Szu**

PM 03:50 - 04:20

台灣AI機器人產業發展方向

Directions for Taiwan's AI and Robotics Industry

Chairman of TAIROA & President of Hiwin Mikrosystem Corp.



社團法人台灣智慧自動化與機器人協會

Taiwan Automation Intelligence
and Robotics Association

台灣AI機器人產業發展方向

Taiwan's AI and Robotics Industry

絲國一 Dr. Ing. Kou-I Szu

TAIROA 理事長 / 大銀微系統股份有限公司 總經理
Chairman of TAIRQA & President of Hiwin Mikrosystem Corp.



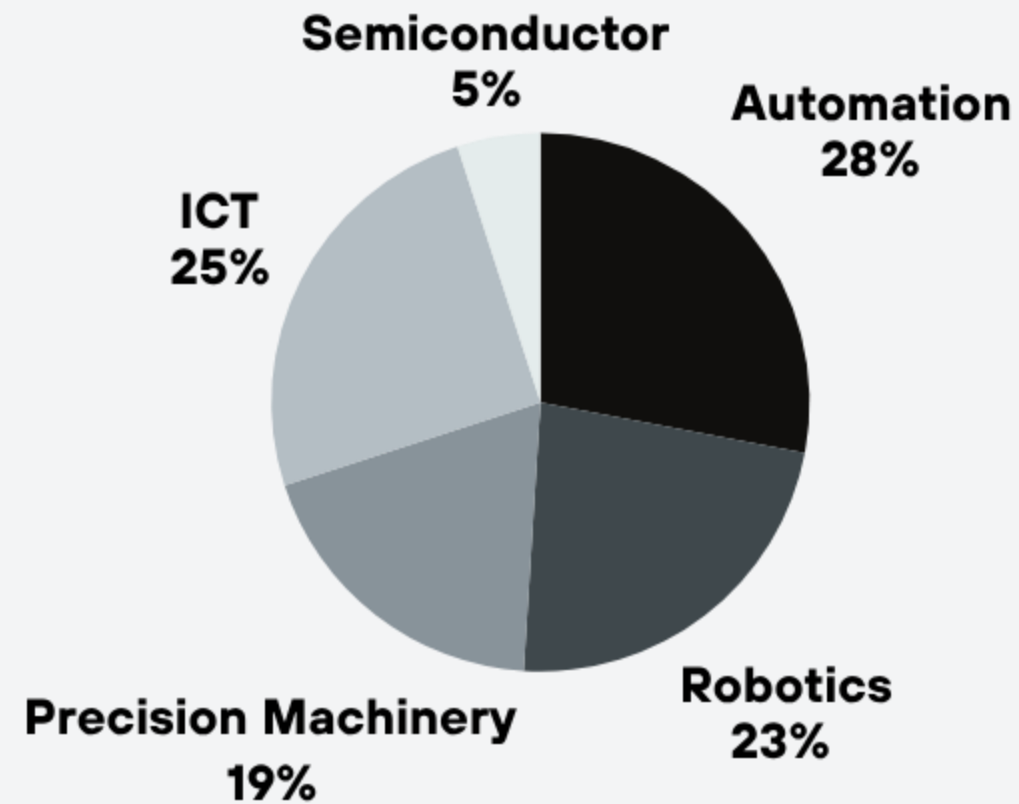
Outline

- 01** Global Robotics Development Trends
- 02** Robotics Development Opportunities in Taiwan
- 03** AI-driven Smart Manufacturing Applications

About TAIROA

Found in 1984

Our Members



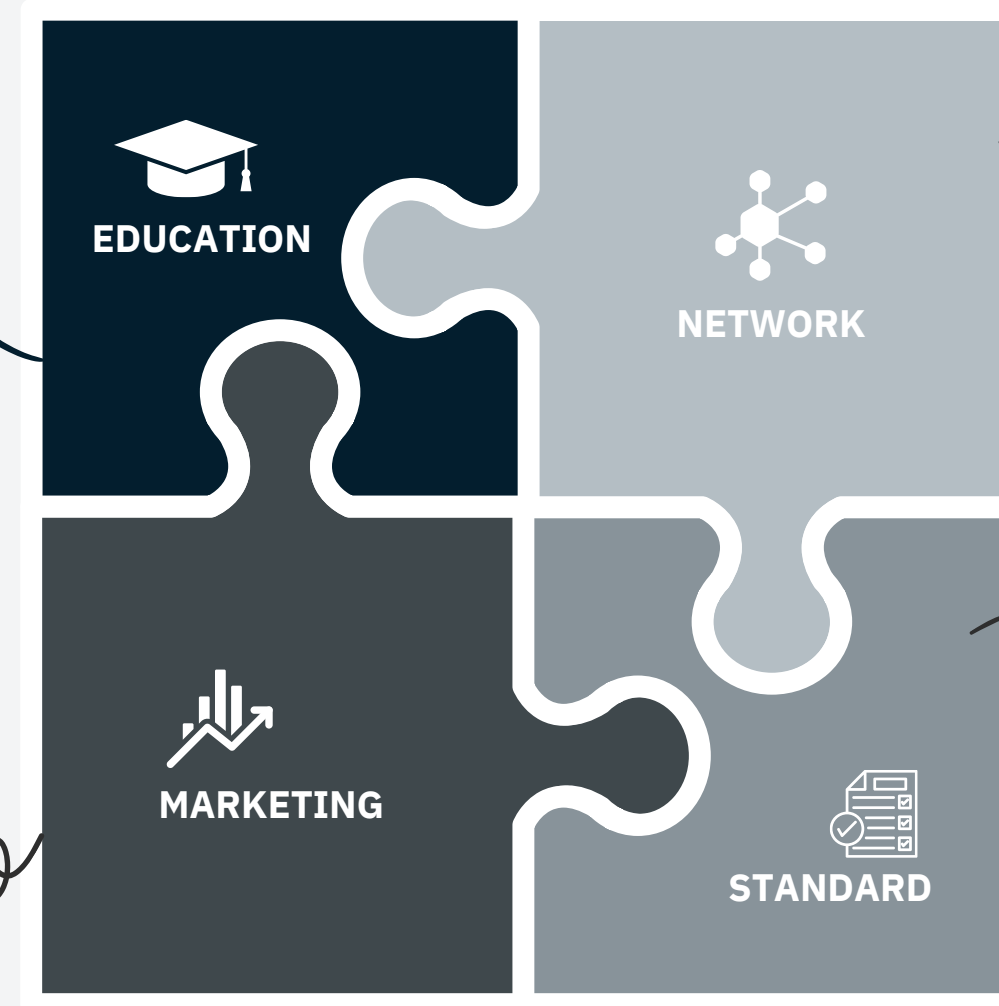
- 203 Companies
- 300 Members
- 525 Representatives



What we do

Training Courses
Robotics Competitions
Certification Robotics and Automation Engineering
Job Fairs and Internship
Academic Research Exhibition
Introduction

Journal of AIR
Industry White Paper
Award of Robotic System Integration
TAIROA B2B Trade Website
TAIROS & Automation Taipei Show



International Forum
Networking Dinner
Overseas Delegation
Business Matching

Robot Standard
Testing & Certification
TARS-Certify Robot Mark
Member of ANSI/SCC/UL
standard TC

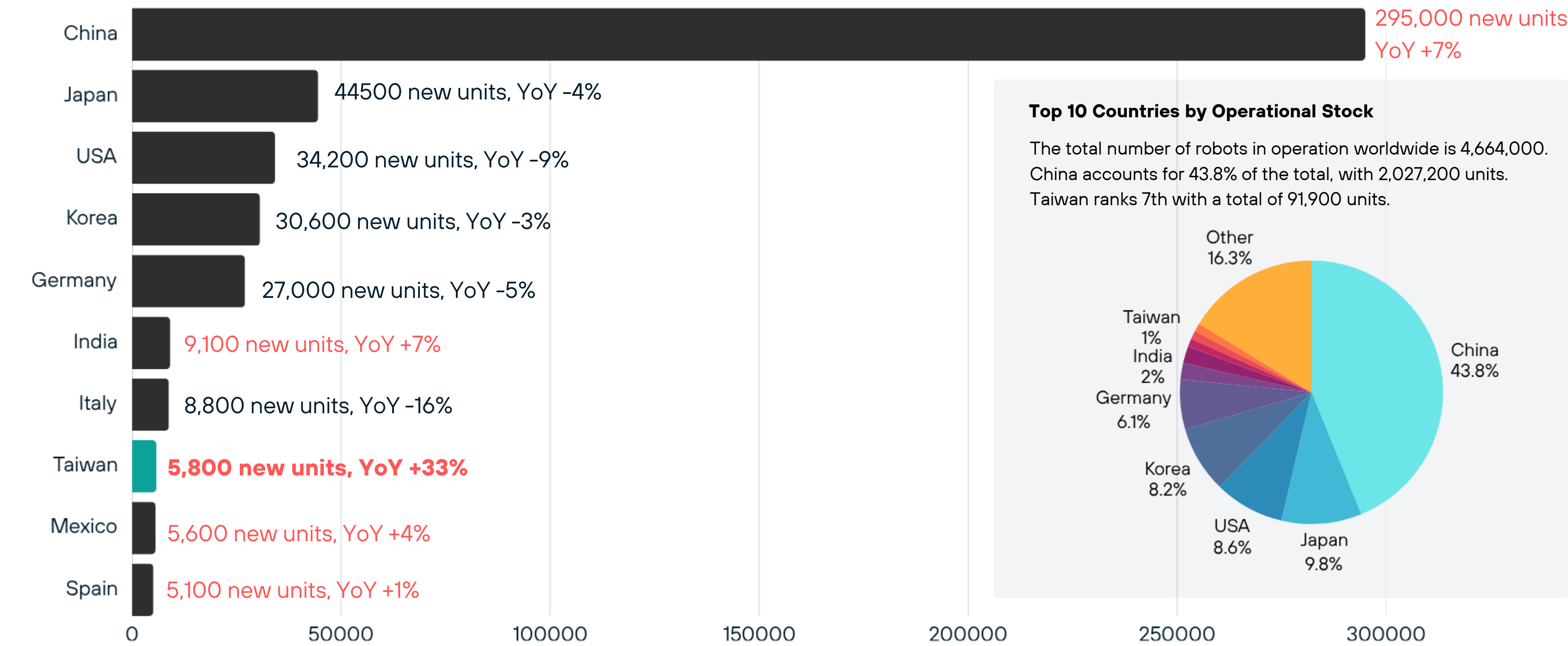
2025 High Light



Trends in the Global Industrial Robot Market

Taiwan ranks 8th among the top 10 global markets for new industrial robot installations in 2024.

With a 33% year-over-year growth rate in 2024, Taiwan's growth was the highest among the top 10 countries.



Source: IFR World Robotics 2025, compiled by TAIROA.

Global Robotics Development Trends

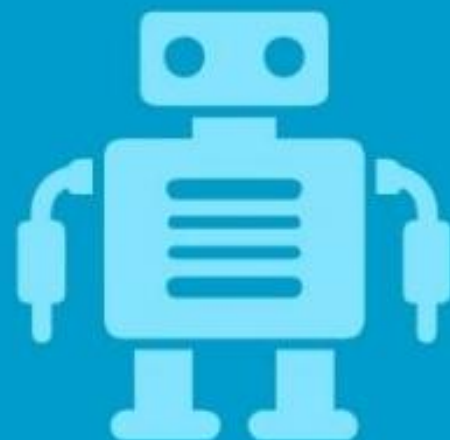
TOP 5 GLOBAL ROBOTICS TRENDS IN 2025



**1
PHYSICAL,
ANALYTIC &
GENERATIVE AI**



**2
SINGLE PURPOSE
HUMANOIDS**



**3
SUSTAINABILITY
AND ENERGY
CONSUMPTION**



**4
NEW FIELDS OF
BUSINESS AND
CUSTOMER
SEGMENTS**



**5
ROBOTS
ADDRESSING
LABOR SHORTAGE**



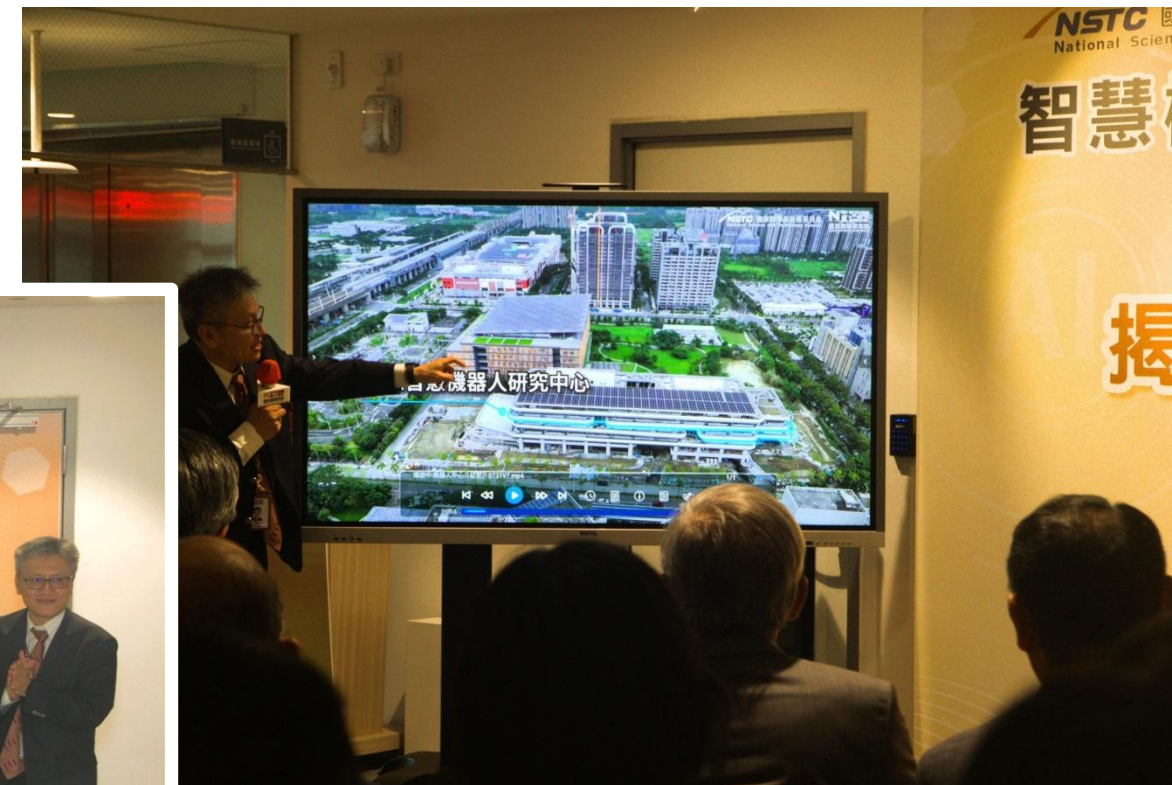
Find out more at:
<https://ifr.org/ifr-press-releases/top-5-global-robotics-trends-2025>

Source: International Federation of Robotics

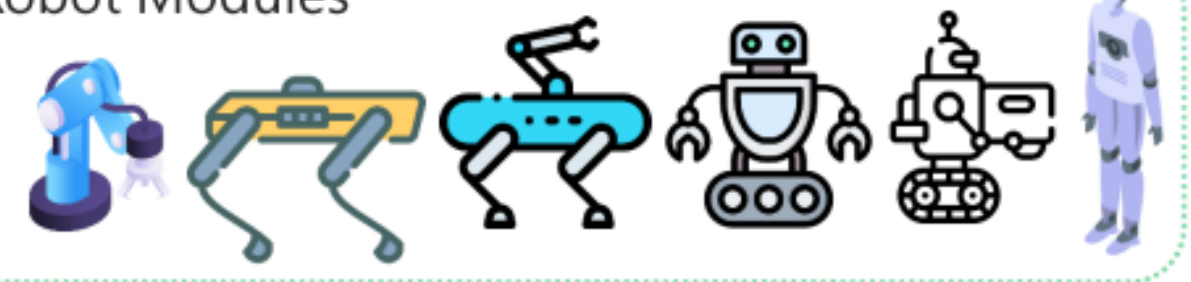
National Center for AI Robotics – NCAIR – in Tainan, Taiwan

Mission:

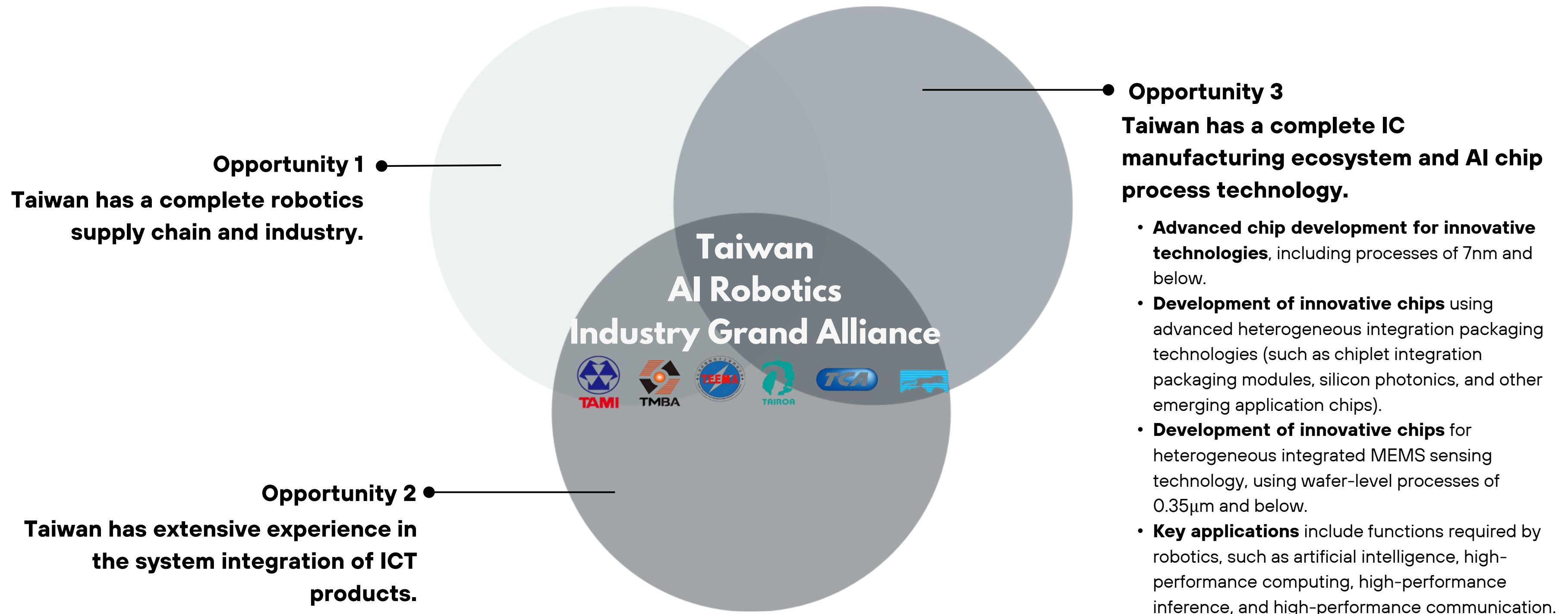
- Creating common AI robot platform for academics research
- Developing advanced core components and modules
- Training engineers to close the gap and foster entrepreneurship
- Networking and cooperating in international ecology



Robot Modules



Taiwan's Robotics Industry Development Opportunities



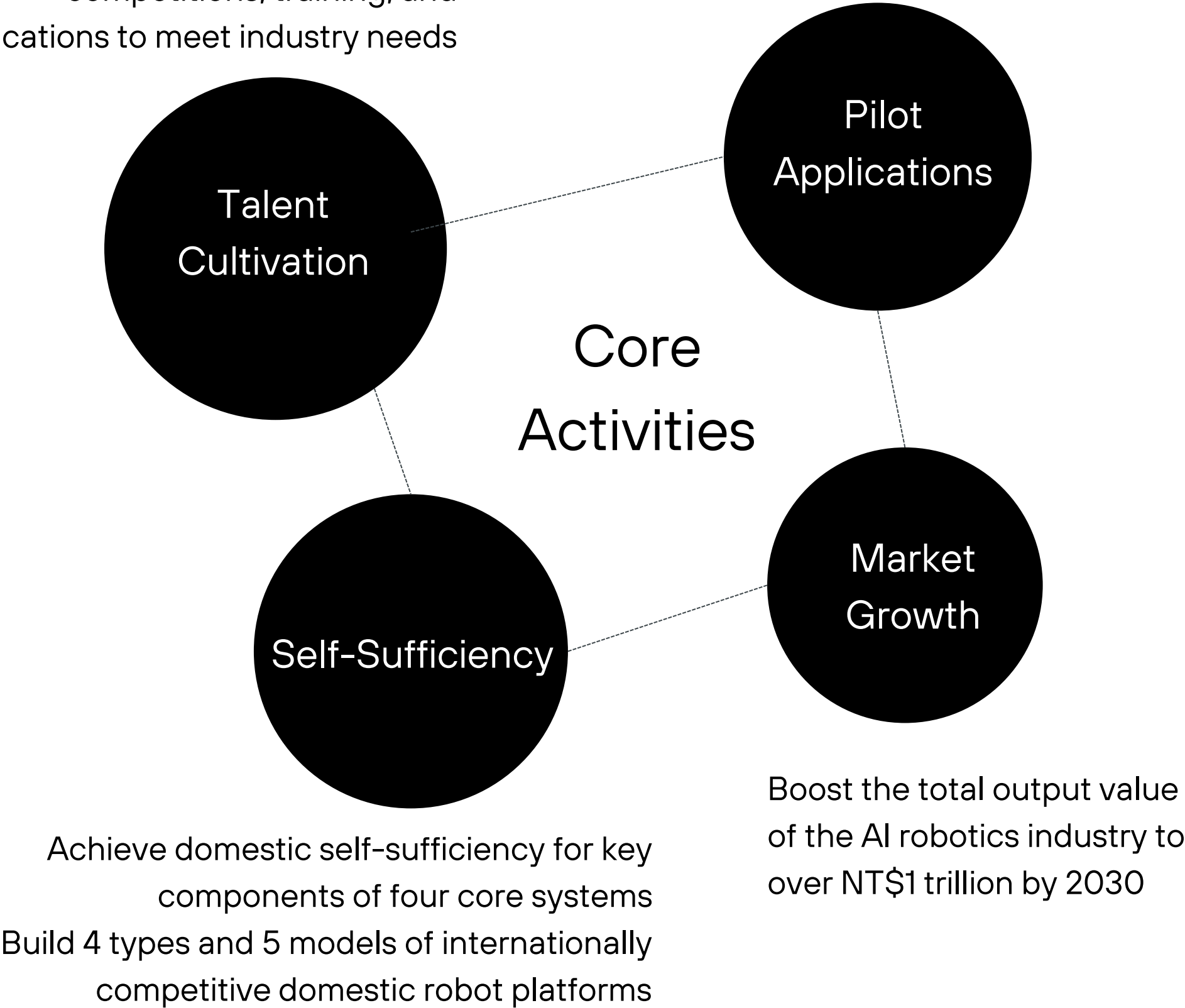
Taiwan AI Robotics Industry Grand Alliance

Vision Goals



various types of talent required for AI robotics will be cultivated through competitions, training, and certifications to meet industry needs

Implement robots in eight major application fields for real-world operation



R&D Progress of Domestic Quadruped Robots

The ITRI iDog Lab: A Key Proving Ground from Concept to Reality.



From the lab to the field:
Successfully completing autonomous patrol missions.



ITRI Quadruped Robot 2025 Milestones

- January: Completed in-place stepping test.
- March: Completed in-place posture actions (front-leg squat, rear-leg squat, four-leg squat).
- April: Completed walking (forward, backward, turning).
- May: Successfully withstands a strong side kick without falling.
- June: Completed targeted person following test.
- July: Completed autonomous outdoor patrol at the Ministry of Economic Affairs.

2025 Jan. - Jul.
Become a Good Dog
"Smarter with AI: The iDog walks faster, is more stable, and learns to act autonomously."

2024 Sep.-Dec.
From concept to prototype in four months, built entirely with domestic components.

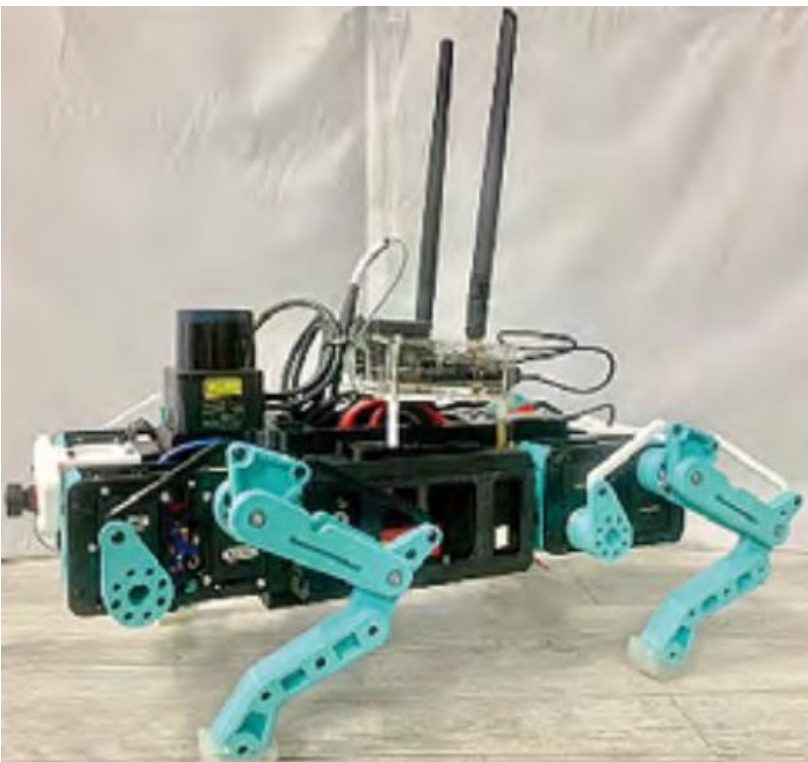
2024 Sep.
Form the team



Robotic Dog – Created in Taiwanese Universities

Key R&D Achievements

- Dynamic Balance: Stays stable within a 3-degree tilt on rough terrain.
- Autonomous Navigation: Features a complete system with real-time emergency stops.
- AI for Industry: Performs autonomous inspection by using AI to read gauges.
- Advanced Human Interaction: Enables complex communication via voice (ChatGPT) and gestures.



Small Robotic Dog

PLA 3D-Printed

- Multi-Linkage Leg Drive
- LiDAR for Mapping & Navigation



Oliver

Pet-Type Robot

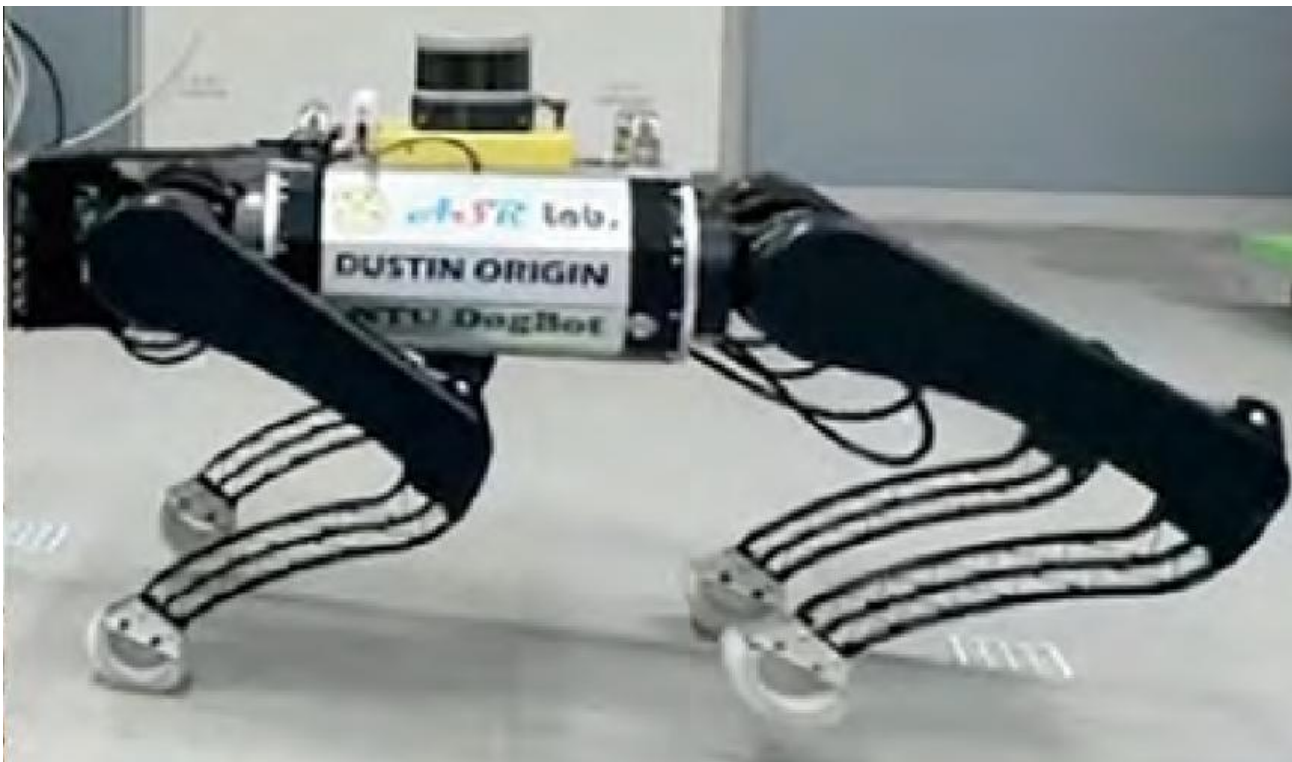
- 2D LiDAR
- ChatGPT for Voice Commands



Quasar

Pet-Type Robot

- Common Hardware Architecture
- Sim-to-Real Reinforcement Learning (RL)



Dustin

Industrial Inspection

- 3D LiDAR for Depth Perception
- ChatGPT for Task Commands

AI Humanoid Robot Development Trends



Europe

The technology is guided by a triple focus on social interaction, autonomous learning, and ethical compliance.

Robotics

iCub, Neura Robotics, 1X Technologies

Market

€2 billion by 2030

Challenges

- Slow Technology Transfer
- Scattered Investment
- Complexities of Cross-Border Standardization
- high sensitivity to ethical and privacy issues



United States

AI system integration and modular hardware platforms

Robotics

Tesla Optimus, Figure AI

Market

The compound annual growth rate is as high as 45.7%.

Challenges

- High institutional costs.
- High reliability requirements.
- Insufficient adaptability to complex environments.
- Regulatory and ethical issues.

China

The focus is on empowering robots with AI large models and enabling application-driven deployment in various scenarios.

Robotics

UBTECH, Xpeng, Unitree

Market

US\$4.5 billion by 2028

Challenges

Key Component Limitations, Reliability and Safety, Ethical Standards



South Korea



The focus is on the integration of education and training, urban services, and smart manufacturing.

Robotics

Rainbow Robotics

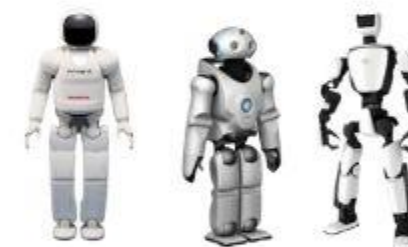
Market

US\$1.5 billion by 2030

Challenges

high-level sensing systems and stable bipedal gait algorithms still need breakthroughs.

Japan



The focus is on promoting human-robot symbiosis, particularly for smart care applications.

Robotics

Honda ASIMO, Sony Qrio, Toyota T-HR3.

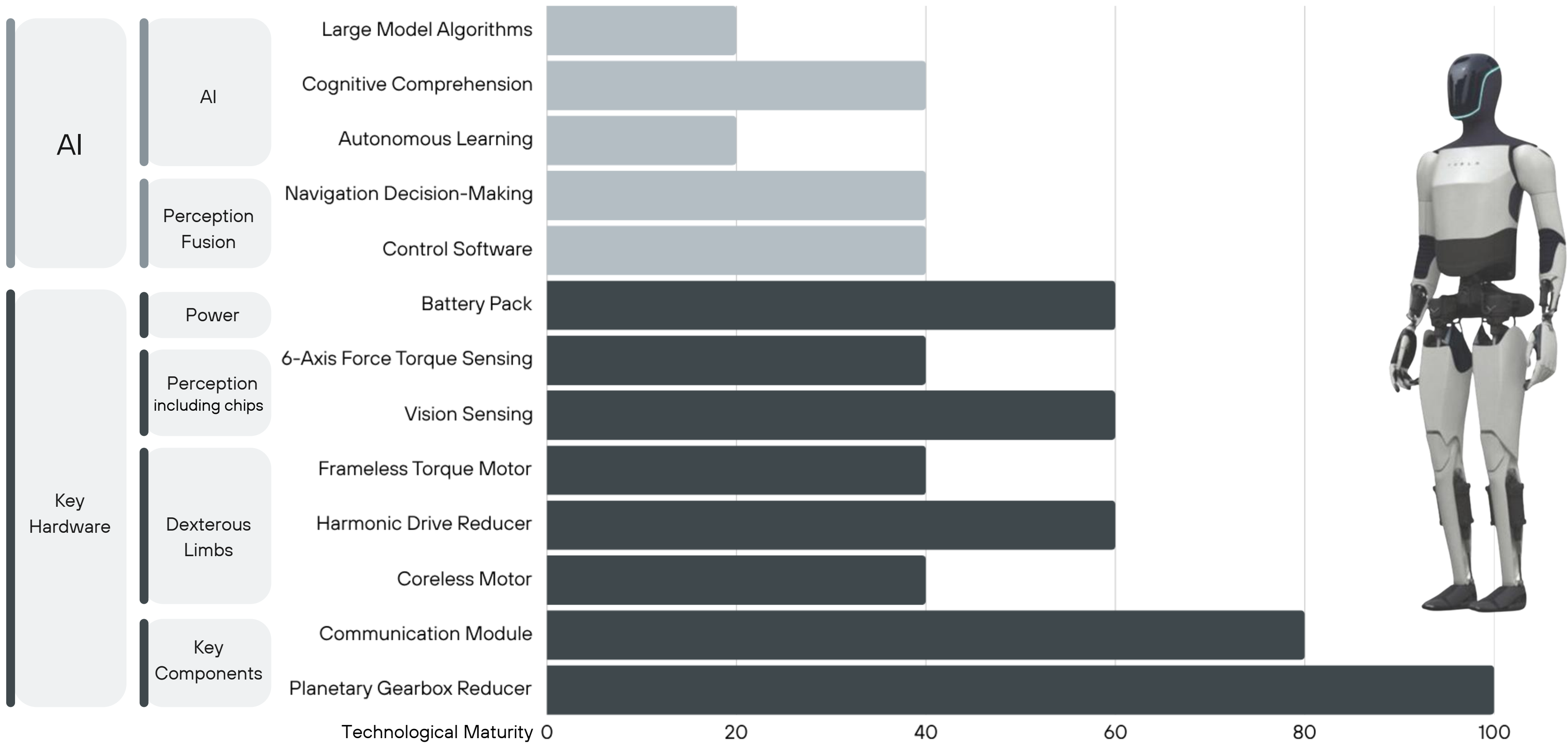
Market

US\$2.5 billion by 2030

Challenges

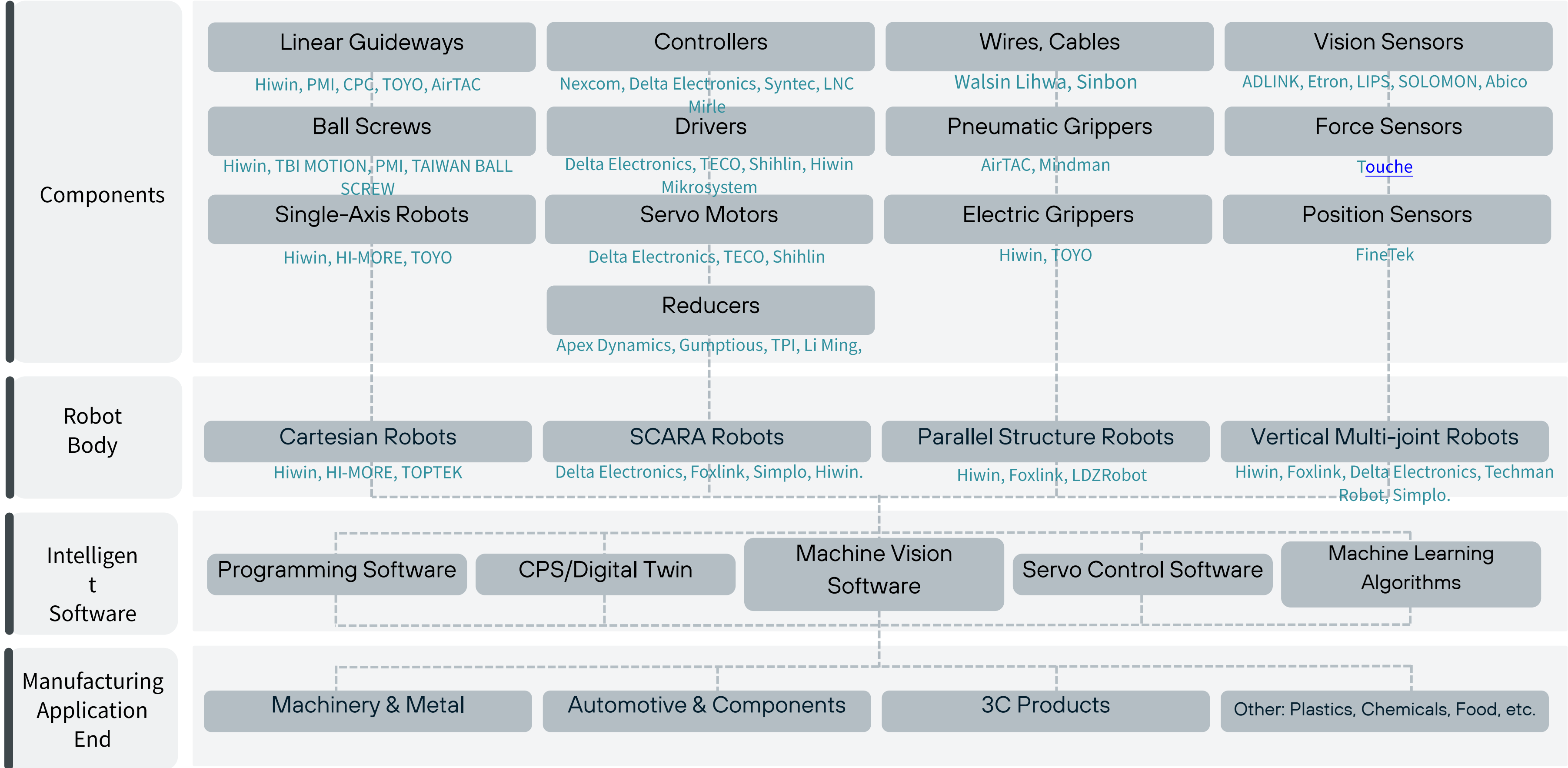
high-level sensing systems and stable bipedal gait algorithms still need breakthroughs.

Maturity of Taiwan's Technology for Humanoid Robot Development



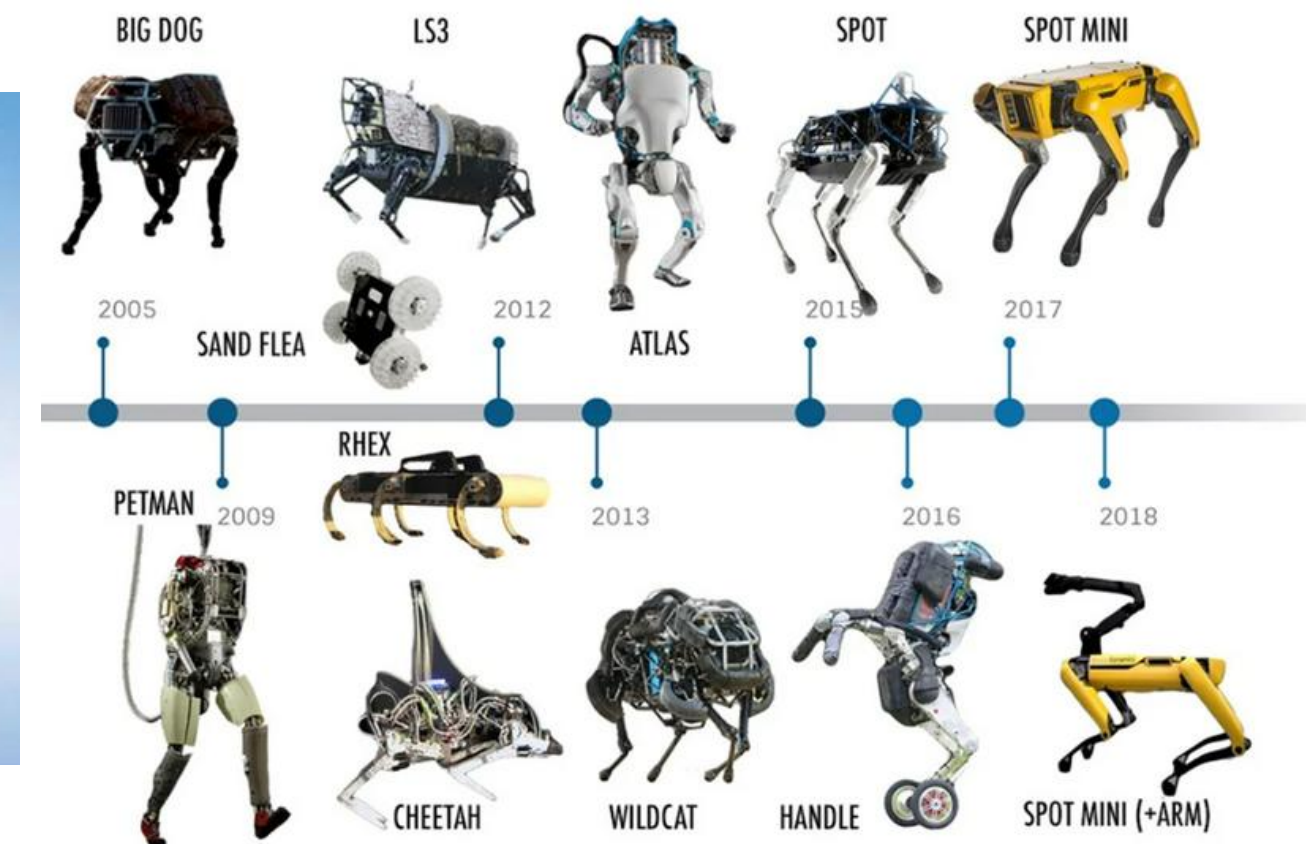
Source: Compiled by the Industrial Economics and Knowledge Center (IEK) of the Industrial Technology Research Institute (ITRI)

Taiwan has a complete robotics supply chain and industry.



Source: Industrial Technology Research Institute (ITRI), Industrial Economics and Knowledge Center (IEK)

Why couldn't Honda Asimo and Boston Dynamics become profitable?



Challenges and Roadmap

Accelerate innovation iterations

- Market size
- Industry cluster
- ...

Compete for talents

- Number of STEM graduated
- Leading semiconductor industry
- ...

Secure supply chain

- Rare earth
- ...

Against the giants

- Made in China
- Technology gap
- ...

Create AI robots for leading industry clusters

- Semi and advanced packaging industry
- ...

Use global RD resources

- RD centers in Taiwan
- Attract foreign RD talents
- ...

Reduce supply chain risks

- Innovative redesign
- ...

To be David against Goliath

- Invent values vs costs...
- ...

Persist – to forge a sword ...

Back to the Beginning ...

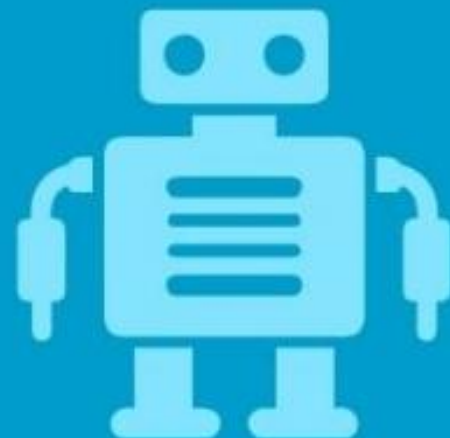
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Find out more at:
<https://ifr.org/ifr-press-releases/top-5-global-robotics-trends-2025>

Source: International Federation of Robotics

THANK YOU!

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