COBOTS

COLLABORATIVE ROBOTS

Enhancing Human-Robot Collaboration in the Workforce

INTRODUCTION TO COBOTS

WHAT ARE COBOTS?

Cobots are robots designed to work alongside humans in a shared workspace. Unlike traditional robots, they are equipped with safety features to ensure safe human-robot interaction.

Key Characteristics:

- Easily programmable.
- Flexible and adaptable to various tasks.
- Can work in close proximity to humans.

HOW COBOTS DIFFER FROM TRADITIONAL INDUSTRIAL ROBOTS

Aspect	Cobots	Traditional Robots
Collaboration	Can collaborate directly with human workers	Typically work in isolated environments
Safety	Designed with safety features to avoid harming humans. Cobots have sensors to stop if humans are near	Require safety barriers to ensure human safety. Traditional robots prioritize power
Flexibility	Cobots are easily reprogrammed	Traditional robots are task-specific
Cost/Size	Smaller, more cost-effective and easier to deploy in small or medium-scale operations	Generally large, more expensive and complex to deploy

HISTORY AND EVOLUTION OF COBOTS

Cobots began in the 1990s with Colgate and Peshkin’s work for GM. The first commercial cobot, Universal Robots’ UR5, launched in 2008. Advances in AI and sensors have since expanded their use, with companies like FANUC and ABB driving adoption in Industry 4.0.

COBOT MARKET OVERVIEW

CURRENT MARKET SIZE AND GROWTH PROJECTIONS

The global cobot market was valued at approximately **$1.9 billion** in 2024.

It’s projected to grow to **$11.8 billion** by 2030, with a compound annual growth rate (CAGR) of 35.2%.

*This rapid expansion is **fueled by increasing automation needs** across industries and advancements in cobot technology*

KEY MARKET DRIVERS AND TRENDS

Drivers

High ROI compared to traditional robots, rising demand in e-commerce and logistics, and adoption by SMEs for cost-effective automation.

Trends

Integration of AI and machine learning for smarter cobots, focus on safety and ergonomics, and growing use in non-manufacturing sectors like healthcare and agriculture.

THE COBOT MARKET, BASED ON CURRENT INDUSTRY INSIGHTS:

- Cobots offer a return on investment (ROI) within 2-3 years, down from 5 years previously, due to lower costs and faster deployment.
- The rise of e-commerce has boosted cobot use in logistics by 25-30% annually, especially for pick-and-place and packaging tasks.
- Small and medium enterprises (SMEs) account for over 40% of new cobot installations, driven by affordability and ease of use.
- Over 60% of new cobot models in 2025 feature AI or machine learning, enhancing adaptability and precision.
- Cobot use in healthcare and agriculture has grown by 15-20% yearly, with applications like surgical assistance and crop handling.

GLOBAL COBOT ADOPTION: REGION-WISE BREAKDOWN

Region	Market Share (2024)	Annual Growth Rate (CAGR, 2025-2030)	Key Stats	Notes
Asia-Pacific	~50-54%	~35-40%	~250,000 units installed (2024); China alone accounts for 40% of global sales	*Dominates due to manufacturing hubs like China (largest single market), Japan, and India. China's "Made in China 2025" initiative boosts adoption.*
Europe	~25-30%	~30-33%	~100,000 units installed (2024); Germany leads with 35% of regional share	*Strong in automotive and electronics, with Germany and France leading. Over 30% of new installations are in automotive.*
North America	~15-20%	~25-30%	~70,000 units installed (2024); U.S. drives 80% of regional growth	*U.S. and Canada see rapid growth, with labor shortages driving ~20% annual increase in cobot sales.*
Rest of World	~5-10%	~20-25%	~20,000 units installed (2024); Latin America and Middle East emerging	*Latin America and the Middle East are emerging, with adoption up by ~15-20% yearly in key sectors like logistics.*

KEY PLAYERS IN THE COBOT INDUSTRY

TOP 10 MARKET LEADERS IN COBOTS

UNIVERSAL ROBOTS

rethink robotics

TM ROBOT

KUKA

ABB

DOOSAN ROBOTICS

FANUC Robotics

omron | adept

Parker

AUBO

LEADING FOUR COBOT MANUFACTURERS AND MARKET SHARE

Pioneer in cobots, holds ~50% market share (2024 estimate). Known for UR series (e.g., UR5, UR30)

UNIVERSAL ROBOTS

ABB

~8-10% share, features YuMi and GoFa cobots, excels in electronics and assembly.

~10-12% share, offers CR and CRX series with payloads up to 50 kg, strong in automotive.

FANUC Robotics

KUKA

~5-7% share, known for LBR iiwa, targets precision manufacturing.

STARTUPS AND EMERGING PLAYERS

- **Techman Robot (Taiwan):**
  - *Gaining traction with vision-integrated cobots, popular in Asia-Pacific.*
- **Doosan Robotics (South Korea):**
  - *Rising with high-payload, user-friendly models for SMEs.*
- **AUBO Robotics (China):**
  - *Affordable cobots targeting small businesses, growing in Asia.*
- **Rethink Robotics (Germany):**
  - *Revived under United Robotics Group, focuses on adaptive cobots.*
- **JAKA Robotics (China):**
  - *Innovative, fast-growing player with compact, high-speed cobots.*

STRATEGIC PARTNERSHIPS AND INVESTMENTS IN COBOTS

- **Universal Robots + SICK AG (2023):**
  - Partnered for advanced safety solutions, enhancing human-robot collaboration.
- **FANUC + NVIDIA**:
  - Integrates AI for smarter cobots, improving precision and efficiency.
- **ABB + Sevensense (2024):**
  - Acquisition to boost AI and 3D vision, targeting autonomous cobots.
- **Collaborative Robotics:**
  - Raised $30M (2023) in Series A to develop next-gen cobots.
- **Techman Robot + Omron:**
  - Co-branded cobots to automate Asian manufacturing post-COVID.

INDUSTRY-SPECIFIC COBOT APPLICATIONS

AUTOMOTIVE INDUSTRY

Assembly, Welding, and Quality Inspection

Cobots assemble parts (e.g., dashboards), weld (20% faster than manual), and inspect (95% defect accuracy).

Units Sold (2024)

~15,000–17,000

(25–28% of total cobot sales)

Stats:

- **~40%** of small-part assembly automated.
- Welding scrap down **~15%**.
- Inspection time cut **~25%.**

ELECTRONICS INDUSTRY

Precision Assembly and Testing

Cobots assemble components (0.1 mm precision) and test devices (99% accuracy). Usage grew ~25% yearly, with electronics at ~24% of installs.

Units Sold (2024)

~12,000–14,000

(20-24% of total cobot sales)

Stats:

- **~50%** of precision assembly automated.
- Testing defects down **~30%**.
- Speed up **~20%** in cleanrooms.

METAL AND MACHINING INDUSTRY

Polishing, Grinding, and Machine Tending

Cobots polish (90% consistency), grind, and tend CNC machines (24/7 uptime). ~20% of metal shops use cobots (2024), ~12% of installs.

Units Sold (2024)

~6,000–7,000

(10- 12% of total cobot sales)

Stats:

- Polishing time down **~35%.**
- Grinding errors down **~25%.**
- Output up **~40%** in small batches.

FOOD & BEVERAGE INDUSTRY

Packaging and Sorting

Cobots pack (50 units/min) and sort (98% accuracy). They handle ~15-20% of packaging tasks in large plants (2025), ~3% of installs

Units Sold (2024)

~1,500–2,000

(2.5–3.5% of total cobot sales)

Stats:

- Packaging costs down **~20%.**
- Sorting speed up **~30%.**
- **~10%** of safety tasks automated.

HEALTHCARE INDUSTRY

Laboratory Automation and Rehabilitation

Cobots automate lab tasks (40% faster) and aid rehab (85% adherence). Used in ~10% of advanced clinics, lab automation up ~15-20% yearly.

Units Sold (2024)

~1,000–1,500

(1.5–2.5% of total cobot sales)

Stats:

- Lab errors down **~50%.**
- Rehab efficiency up **~25%.**
- **~30%** of high-throughput labs use cobots.

PLASTICS & RUBBER INDUSTRY

Injection Molding and Quality Inspection

Cobots manage molding (25% faster removal) and inspect (90% defect detection). ~5% of installs (2024), adoption up ~20%.

Stats:

- Downtime down **~30%.**
- Inspection accuracy up **~35%**.
- Waste down **~15%.**

Units Sold (2024)

~2,500–3,000

(4–5% of total cobot sales)

TO SUMMARIZE ALL THE KEY FINDINGS

- Total cobot units sold in 2024 (~50,000–60,000) are distributed across industries, with automotive and electronics leading due to high automation demand.
- Smaller sectors like food & beverage and healthcare have lower unit counts but are growing rapidly.
- Estimates align with reports indicating ~35,000 units shipped in 2023, with a ~22% increase in 2024.

FINANCIAL AND BUSINESS VIABILITY OF COBOTS

COST VS. ROI

WHY COMPANIES ARE INVESTING IN COBOTS

COST

- *$20,000–$60,000 per cobot*
- *(e.g., $60,000 for machine tending).*
- *~50% cheaper to install than traditional robots.*

ROI

- *Achieved in 1–2 years (vs. 5+ for traditional robots).*
- *~75% of firms report positive ROI within 18 months.*

BENEFIT

- ***Labor savings: ~$80,000/year for two shifts.***
- ***Output boost: Up to 40% with 24/7 operation.***
- ***Cost reduction: ~20–30% in assembly, ~20% in e-commerce packaging.***

AFFORDABLE, FAST PAYBACK, AND FLEXIBLE AUTOMATION

CHALLENGES IN COBOT ADOPTION

01

Safety:

- Sensors improve safety, but ~10% of adopters note risks in heavy tasks

02

Workforce Training:

- Upskilling needed; only 22% of firms enhance training.
- Adds 10–20% to costs; 2–4 weeks delays ROI by ~1–2 months.

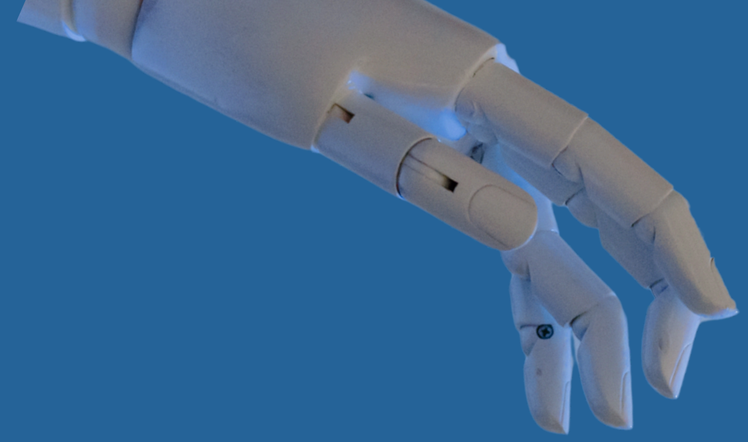
03

Technical Limitations:

- Payload: <20 kg limits heavy industry use (~15% cite as barrier).
- Precision: ~5–10% below humans in complex tasks (e.g., bin picking).
- Downtime: ~20% linked to battery/tech issues in mobile units.

FUTURE TRENDS AND OPPORTUNITIES IN THE COBOT MARKET

AI-POWERED COBOTS AND INTELLIGENT AUTOMATION



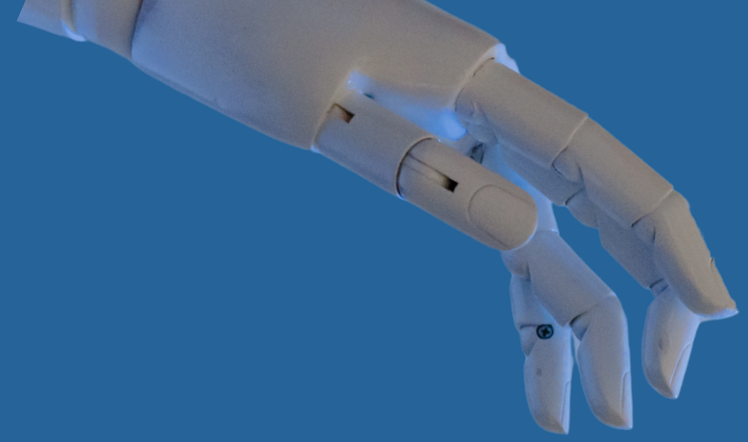
AI in **~60%**
of 2025 cobots

+20% *precision*
-30% *downtime*

$5B
market by 2030

Smarter cobots boost efficiency

THE ROLE OF COBOTS IN INDUSTRY 4.0 AND IOT



+15% yearly
installs in smart factories

25% *use IoT for monitoring*

$2B
potential by 2030

Cobots power connected manufacturing

REGULATORY AND ETHICAL CONSIDERATIONS IN COBOT DEPLOYMENT

10% face
safety compliance gaps

20% *adoption with ethical trust*

5%
Job shift by 2030

Safety and ethics shape growth

JOB TRANSFORMATION AND WORKFORCE ADAPTATION WITH COBOTS

40%
repetitive tasks automated

25% *rise in new roles*

75%
worker satisfaction boost

Cobots transform, don’t replace

ISAAC SIM FOR COBOTS

INTRODUCTION TO NVIDIA ISAAC SIM FOR COBOTS

What is Isaac Sim?

- AI-driven robotics simulation platform on NVIDIA Omniverse.

Why Critical for Cobots?

- Cuts prototyping costs by ~50%, speeds AI training, and enhances safety for human collaboration.

Key Features:

- Physics-accurate simulation, synthetic data generation, AI training tools.

~30% of cobot developers use simulation platforms like Isaac Sim (2024 estimate).

KEY BENEFITS OF ISAAC SIM IN COBOT DEVELOPMENT

~60% of 2025 cobots leverage AI trained via simulation.

- **Faster Development:**
  - Reduces programming time by up to 70% (NVIDIA claim).
- **AI-Powered Training:**
  - Synthetic data refines AI models; e.g., pick-and-place accuracy up ~25%.
- **Lower Costs:**
  - Cuts real-world testing costs by ~40% vs. physical prototypes.
- **Pre-Integrated Brands:**
  - FANUC, KUKA, Universal Robots, Techman supported.

ISAAC SIM STREAMLINES COBOT CREATION

CASE STUDY: TECHMAN ROBOT

20% ***faster cycle time via Isaac Sim optimization***
(Techman report)

INDUSTRY USE CASES:

- *Manufacturing: Assembly automation (e.g., ~15,000 units in automotive, 2024).*
- *Logistics: Smart sorting (e.g., 30% speed boost in warehouses).*
- *Healthcare: AI-trained surgical cobots (e.g., 10% adoption in clinics).*

FUTURE TRENDS

Digital twins, real-time monitoring, reinforcement learning

INDUSTRY ADOPTION AND MARKET IMPACT

Simulation-driven cobot market CAGR ~20% by 2030 (projected).

MARKET GROWTH

Widespread Adoption

Used by FANUC, Universal Robots, and more; ~35% of top cobot firms (2024 estimate).

50,000–60,000

cobots sold globally in 2024, many sim-tested

Industry Applications

- **Manufacturing:** ~40% of assembly tasks automated.
- **Logistics:** ~20% of supply chain cobots simulation-trained.
- **Healthcare**: ~1,000–1,500 units sold, aided by Isaac Sim.

FUTURE TRENDS AND BUSINESS OPPORTUNITIES

Isaac Sim unlocks cobot potential

AI-POWERED COBOTS

$5B
Market Share *by 2030*

DIGITAL TWINS

Real-time cobot monitoring

30%
Downtime *cut*

WORKFORCE TRAINING

25%
Reduced *deployment errors*

INVESTMENT POTENTIAL

Startups tap Isaac Sim for next-gen cobots

(e.g., Collaborative Robotics, $30M in 2023)

CONCLUSION

CONCLUSION

Summary:

- Cobots revolutionize industries by enabling seamless human-robot collaboration, prioritizing safety with advanced sensors, boosting productivity by 20–40%, and enhancing efficiency with flexible, cost-effective automation ($20K–$60K per unit).

The Future:

- As AI (in 60% of 2025 models) and IoT (25% of units) evolve, cobots will expand their role, driving deeper synergy and unlocking $11.8B market potential by 2030 while amplifying human skills in smart, adaptive workplaces.

THANK YOU