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ROBOGLOBAL



BRINGING THE UNIVERSE OF ROBOTICS, AUTOMATION & AI TO INVESTORS

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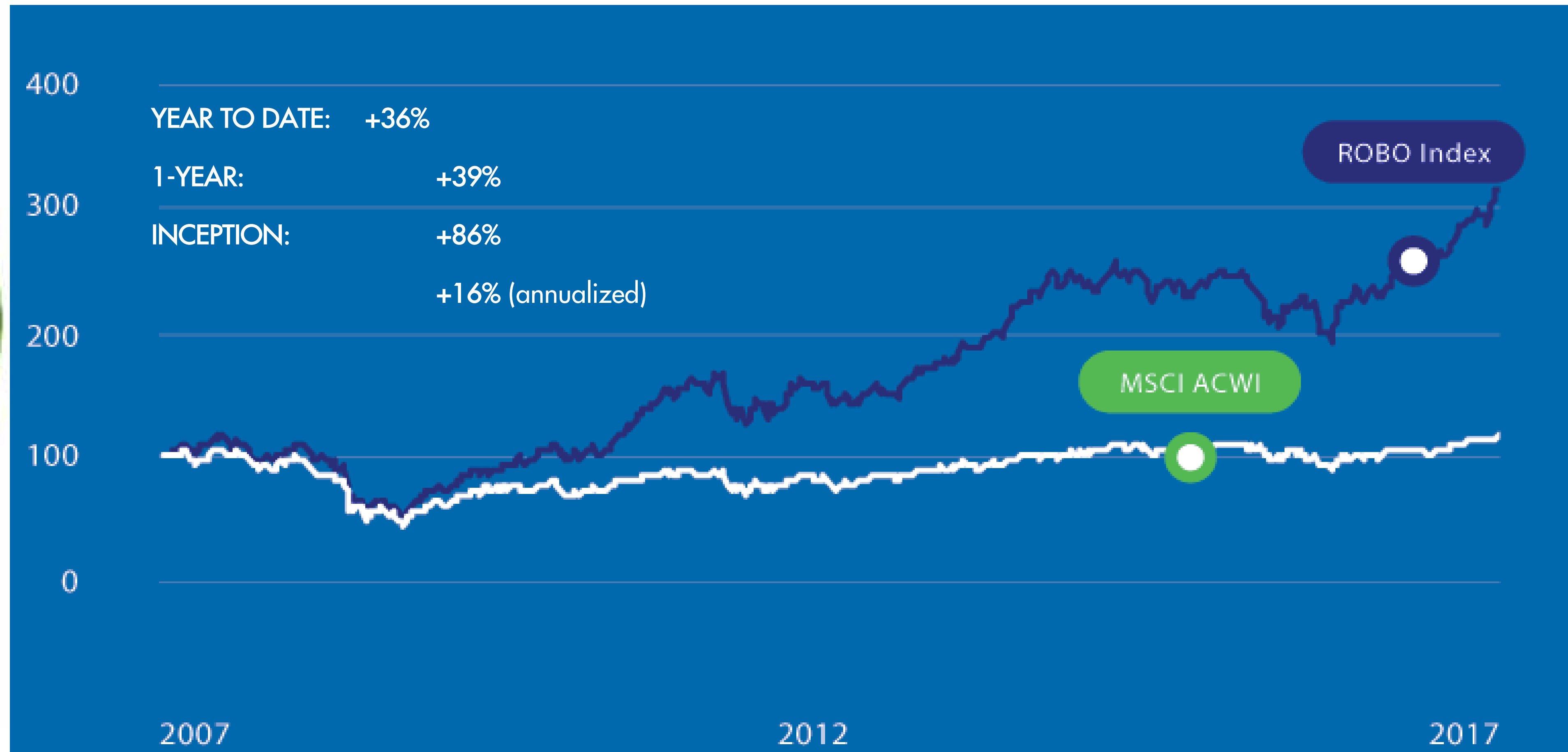
Professor, Electrical Engineering & Computer
Science Department

Case Western Reserve University

PERFORMANCE



ROBO GLOBAL® ROBOTICS AND AUTOMATION INDEX



*The ROBO Global Robotics & Automation Index launched on August 2, 2013. Performance prior to that date is simulated returns.
Data: Bloomberg, Sept 30, 2017

AGENDA

ROBOTICS, AUTOMATION & ARTIFICIAL INTELLIGENCE (AI)

- 1) EXPECT EXPONENTIAL GROWTH
- 2) TRANSFORMING ALL INDUSTRIES
- 3) HAPPENING NOW
- 4) ROBO GLOBAL[®] ROBOTICS AND AUTOMATION INDEX ETF
- 5) INVESTMENT OPPORTUNITY



THE ROBOTICS GROWTH CURVE

THE PAST, PRESENT, AND FUTURE OF THE ROBOTICS ECONOMY



1960's

— SPECIALIZED —

Expensive industrial robots are introduced exclusively to auto manufactures.

Industrial



1970's

1980's

1990's

2000's

Today: \$64 Billion

— ADVANTAGEOUS —

Decreasing automation costs and technology advancements expand applications and improve productivity.

Industrial, service & consumer applications



2025: \$1.2 Trillion

— NECESSITY —

The cycle quickly accelerates, resulting in a shift from a corporate competitive advantage to automate or fail.



STRATEGIC ADVISORY BOARD



HENRIK CHRISTENSEN, PhD

Director of UC San Diego, Contextual Robotics Institute



WYATT NEWMAN, PhD

Prof. of Humanoid, Robotics & AI, 10+ Patents, 130 Publications



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Prof. of Dynamics Systems & Control; Co-Founder of Kiva



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Gavekal Founder; CEO Money Management & Global Research



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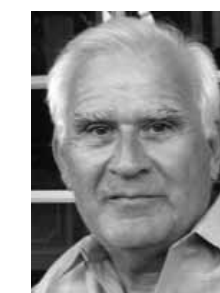
MORTEN PAULSEN

CLSA, Head of Research for Robotics and Machinery Industry



MANISH KOTHARI, PhD

President of SRI Ventures, VP of SRI International



FRANK TOBE

Publisher and Editor of The Robot Report

ROBO CLASSIFICATION SYSTEM

THE INDEX HAS 84 MEMBERS

TECHNOLOGIES: 42 Holdings

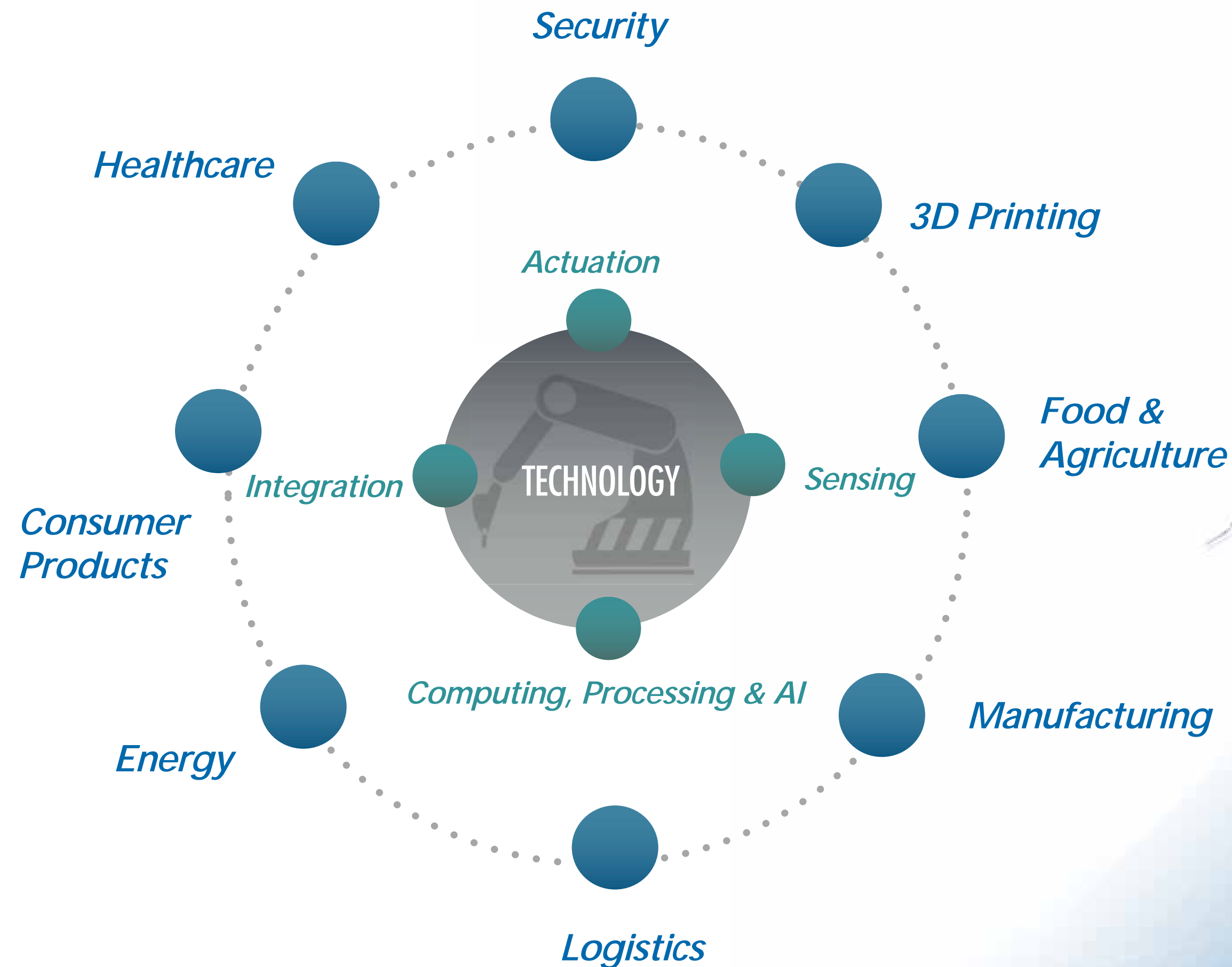
TECHNOLOGY

Companies with products and services that enable robots to “think, sense and act”.

APPLICATIONS: 42 Holdings

APPLICATIONS

Companies that deploy robotic and automation technology into a product, service or manufacturing process to increase efficiency and productivity.



APPLICATIONS

INDUSTRIES WHERE ROBOTIC TECHNOLOGY IS BEING DEPLOYED

Industrial Manufacturing

- Factory robots
- Co-bots



Logistics Automation

- Materials Handling
- Warehouse robots



3D Printing

- Additive manufacturing
- Prototyping



Consumer Products

- Drones
- Home automation



Security

- UAVs
- Rescue robots



Food & Agriculture

- Farming robots
- Self-driving tractors



Healthcare

- Surgical robots
- Exoskeletons

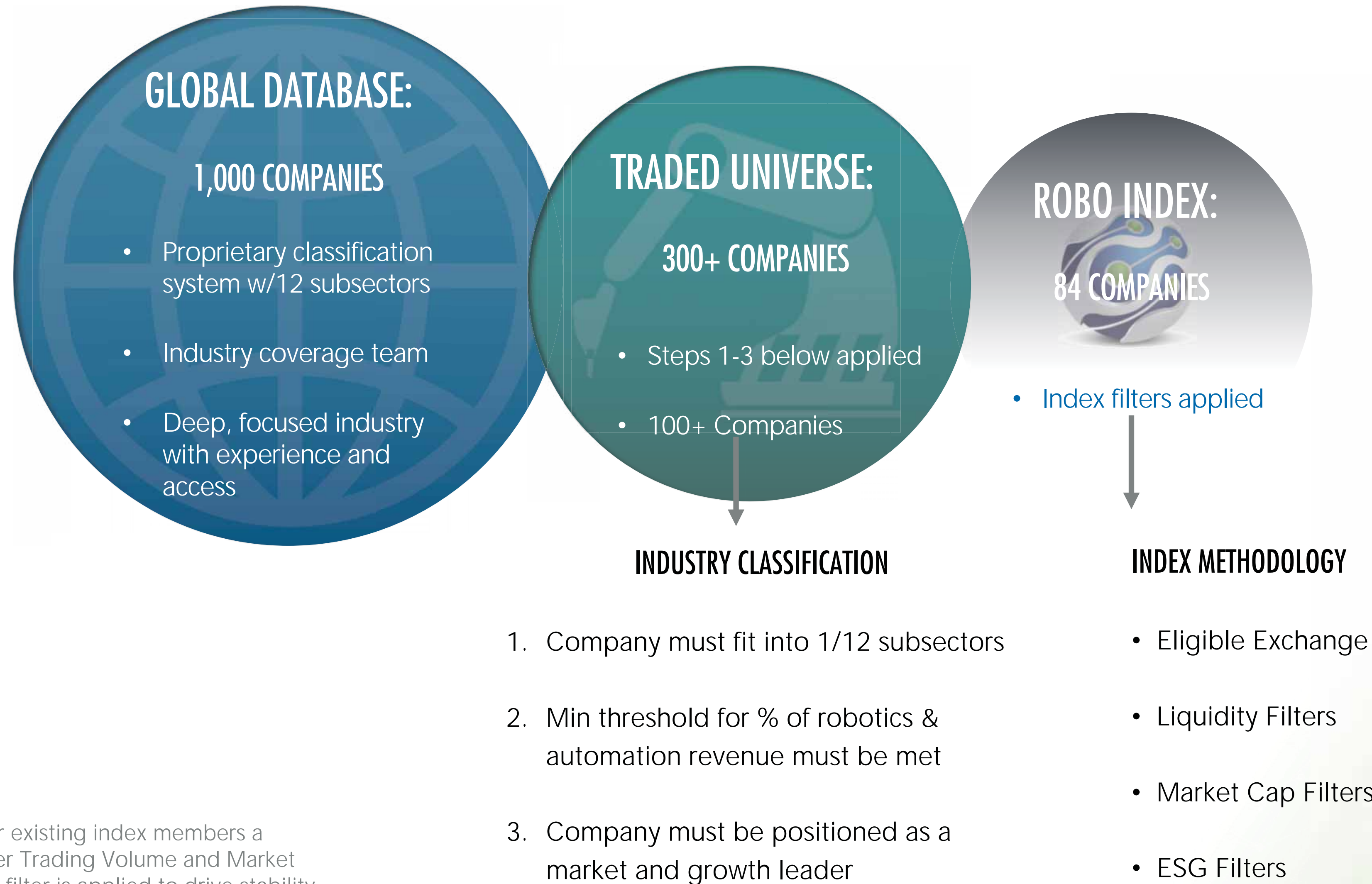


Energy

- Remotely Operated Vehicles



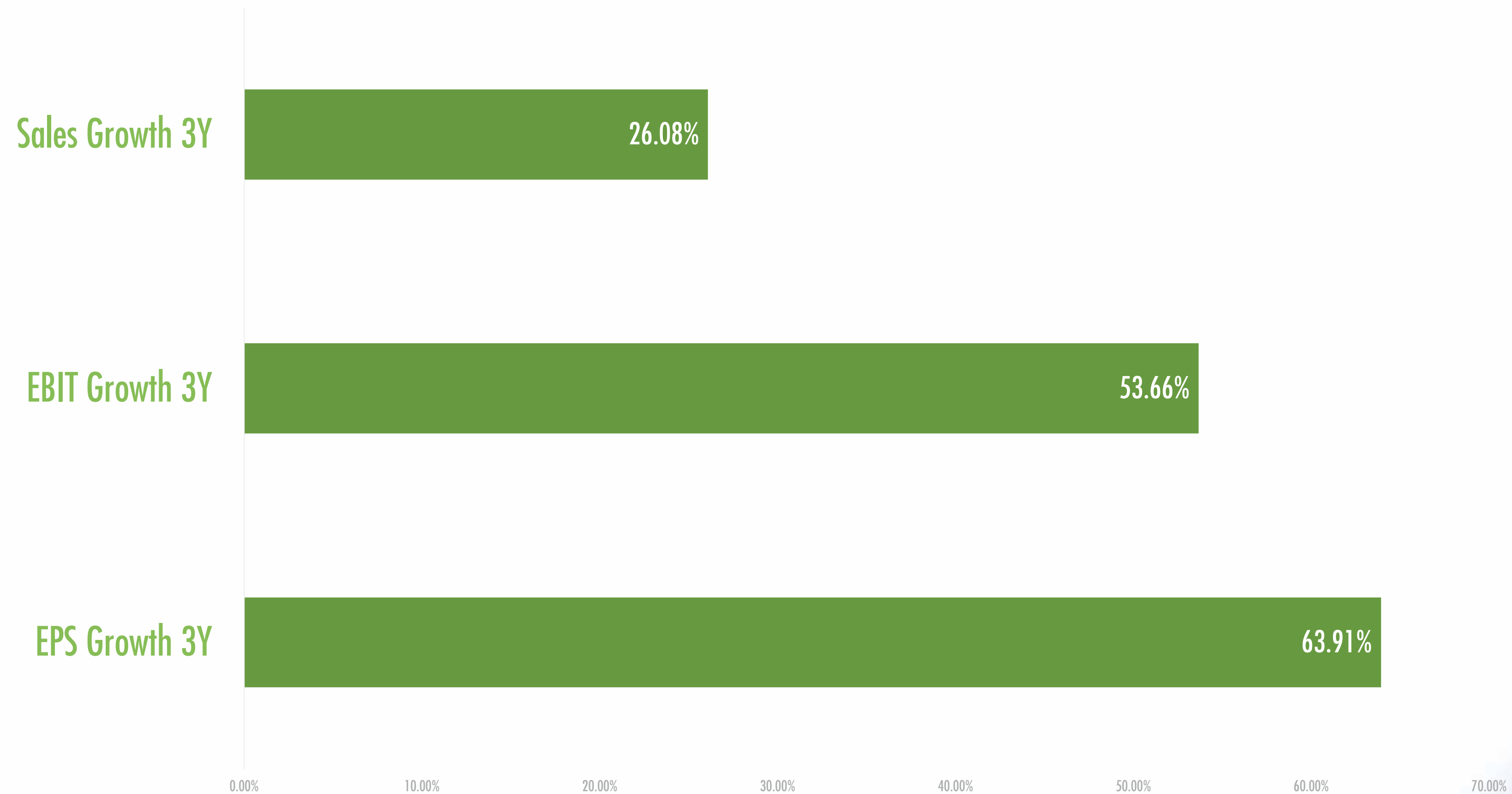
INDEX METHODOLOGY



* For existing index members a lower Trading Volume and Market Cap filter is applied to drive stability

SIGNIFICANT GROWTH OPPORTUNITY

ROBO Global® Robotics & Automation Index



■ ROBO Global Robotics & Automation Index

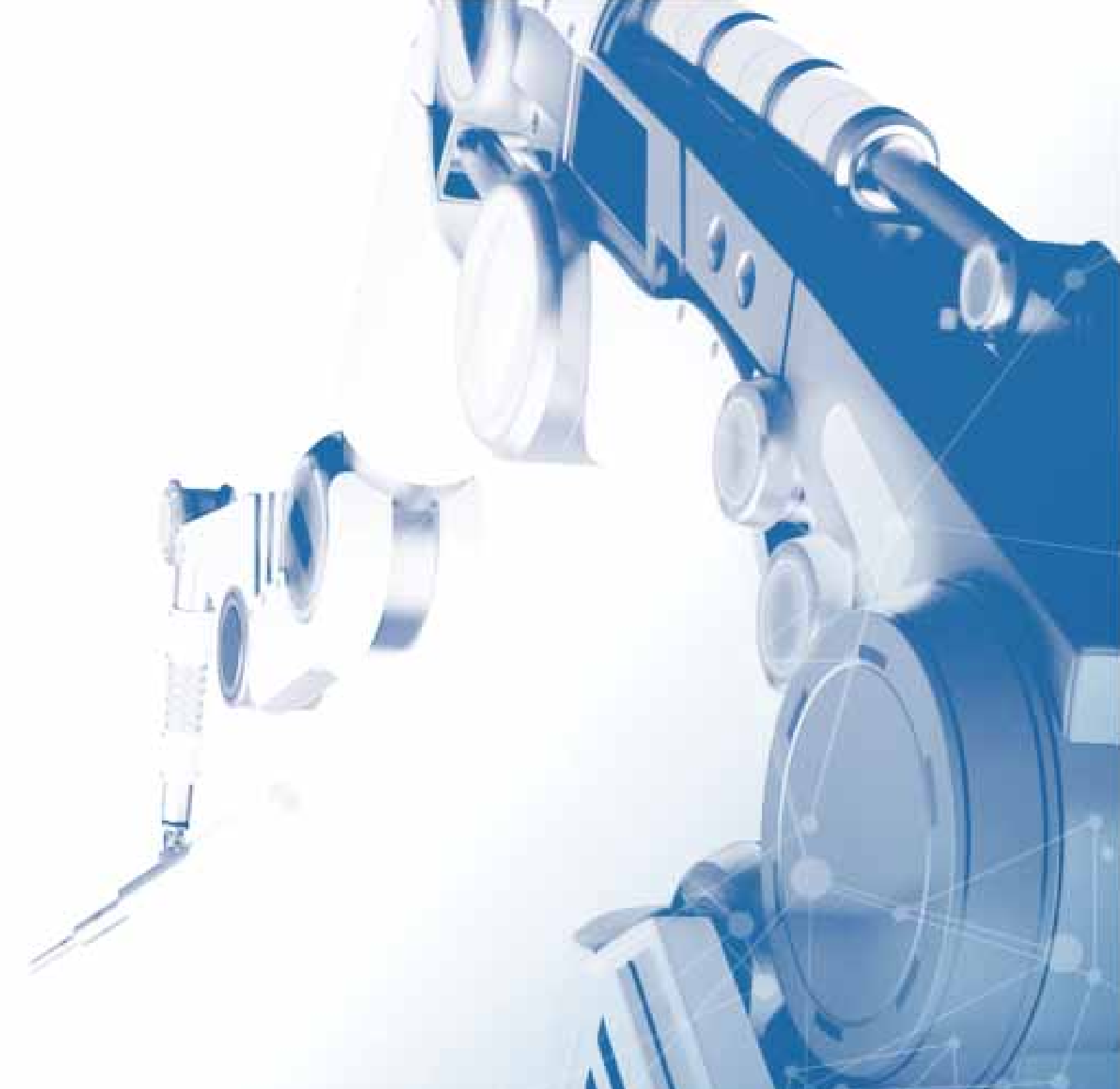
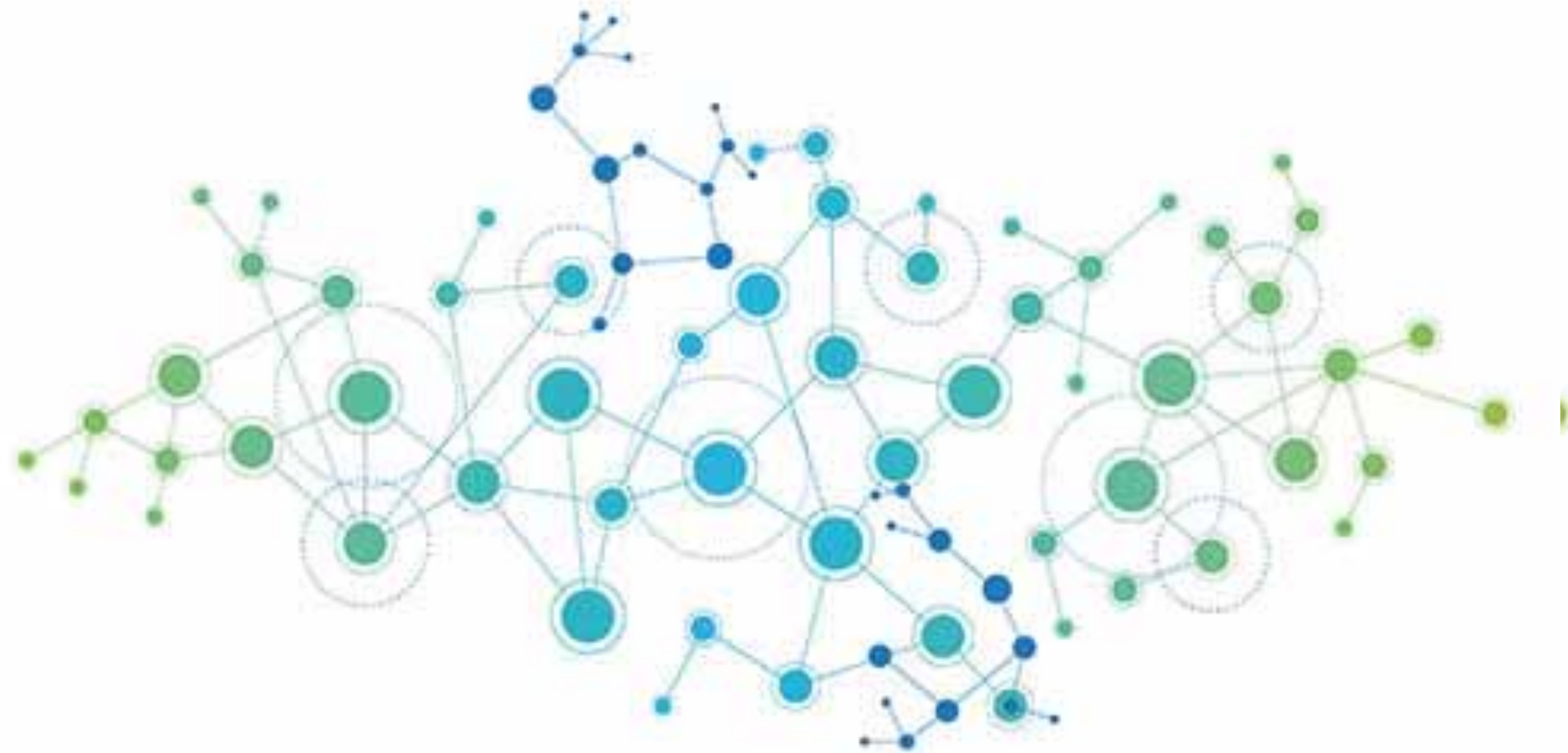
EPS Growth 3Y
63.91%

EBIT Growth 3Y
53.66%

Sales Growth 3Y
26.08%

ARTIFICIAL INTELLIGENCE

TECHNOLOGY WORKING AS AN EXTENSION OF OURSELVES - TRANSFORMING ALL INDUSTRIES



THEN AND NOW – INDUSTRIAL REVOLUTION

Easter morning 1900: 5th Ave, New York City. Spot the automobile.



Source: US National Archives.

Easter morning 1913: 5th Ave, New York City. Spot the horse.



Source: George Grantham Bain Collection.

1900

Automobile Introduced
in Developed Countries

13 YEARS FOR TOTAL
TRANSFORMATION

1913

Mass Adoption of the
Automobile

THEN AND NOW – DIGITAL REVOLUTION



Source: BI Intelligence

2015

Over 253 Million Cars on U.S. Roads; 95% of Households Own a Car

FIVE YEAR CAGR:
134%

2020

10 Million Self-driving Car Projected to be on the Roads

ROBOTIC AND AI REVOLUTION

- automate complex tasks
- multiple industries or roles
- self-learn for repeatability at scale
- complement and enhance human ability
- improve capital efficiency
- boost productivity



ROBOT OPERATING SYSTEM (ROS)

the emerging de-facto standard for reusable robot software

3D SENSORS

recent and emerging means to obtain topographical data of environments, key to both navigation and manipulation

ROBOTICS & AI REVOLUTION

INDUSTRY 4.0 – THE MARRIAGE OF MECHANICAL, DIGITAL & PHYSICAL

MECHANICAL PRODUCTION

water and steam

1800

1900

ROBOTICS

automate production

1960s

TODAY

PRODUCTION LINE

electricity and division of labor

ROBOTICS & AI

"cyber-physical systems"



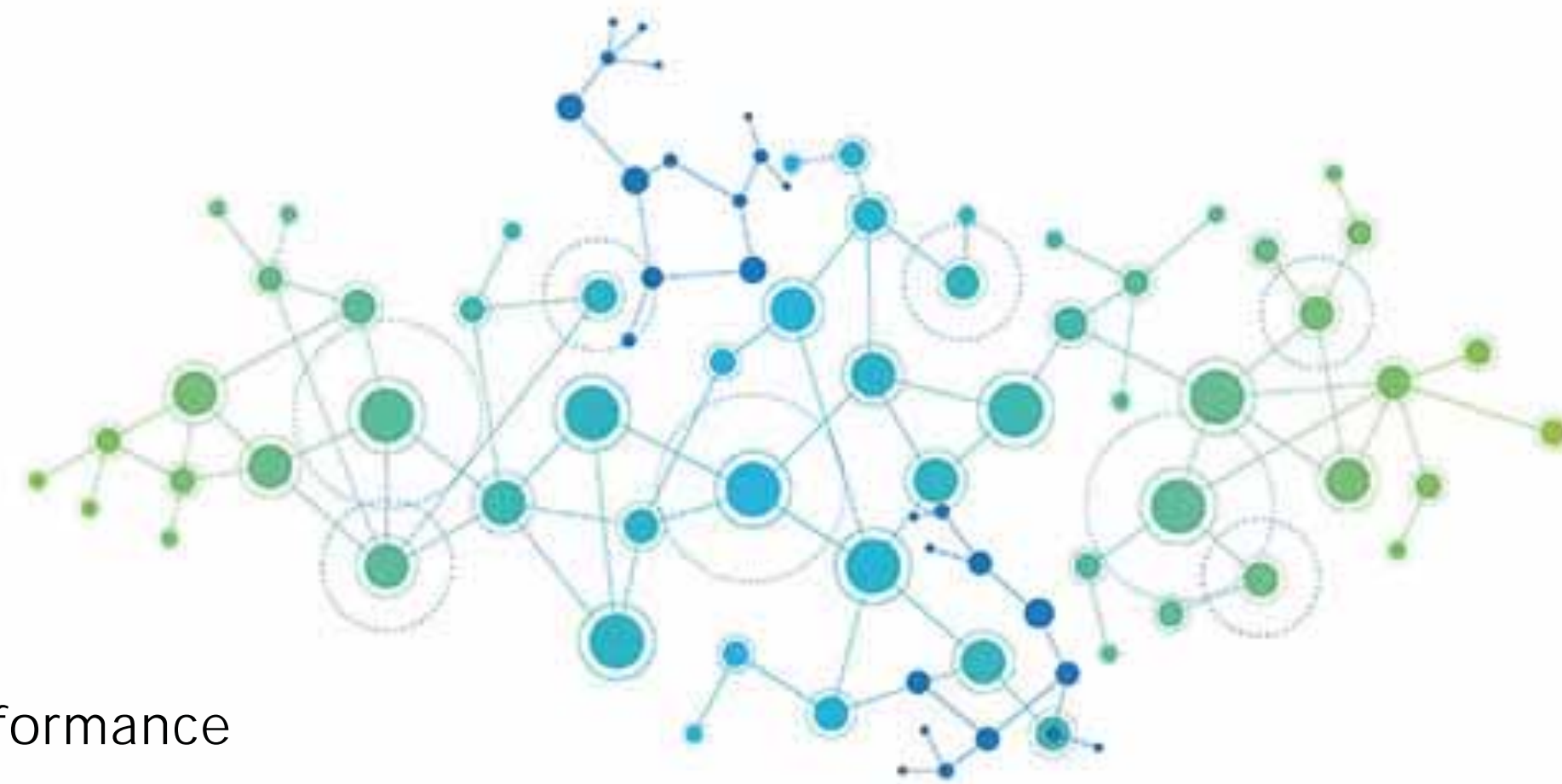
NEURAL NETWORKS

Cost curve of high-performance computing is dropping

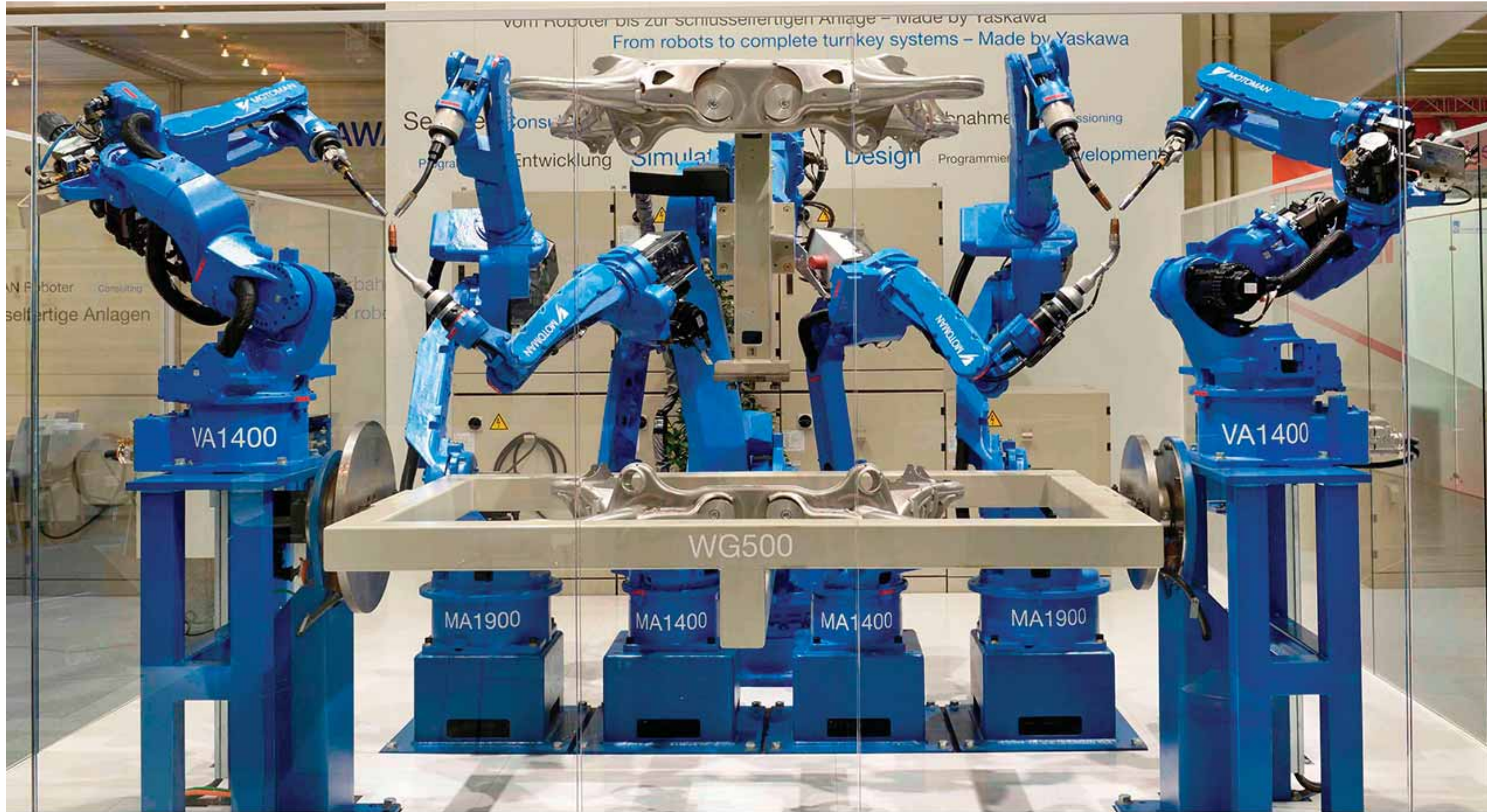
GPU's (Graphics Processing Units)

Recent breakthroughs

- ImageNet classification performance
- MNIST character recognition
- Google search engine replacement
- Speech recognition
- Text understanding



DEEP LEARNING IN ROBOTS



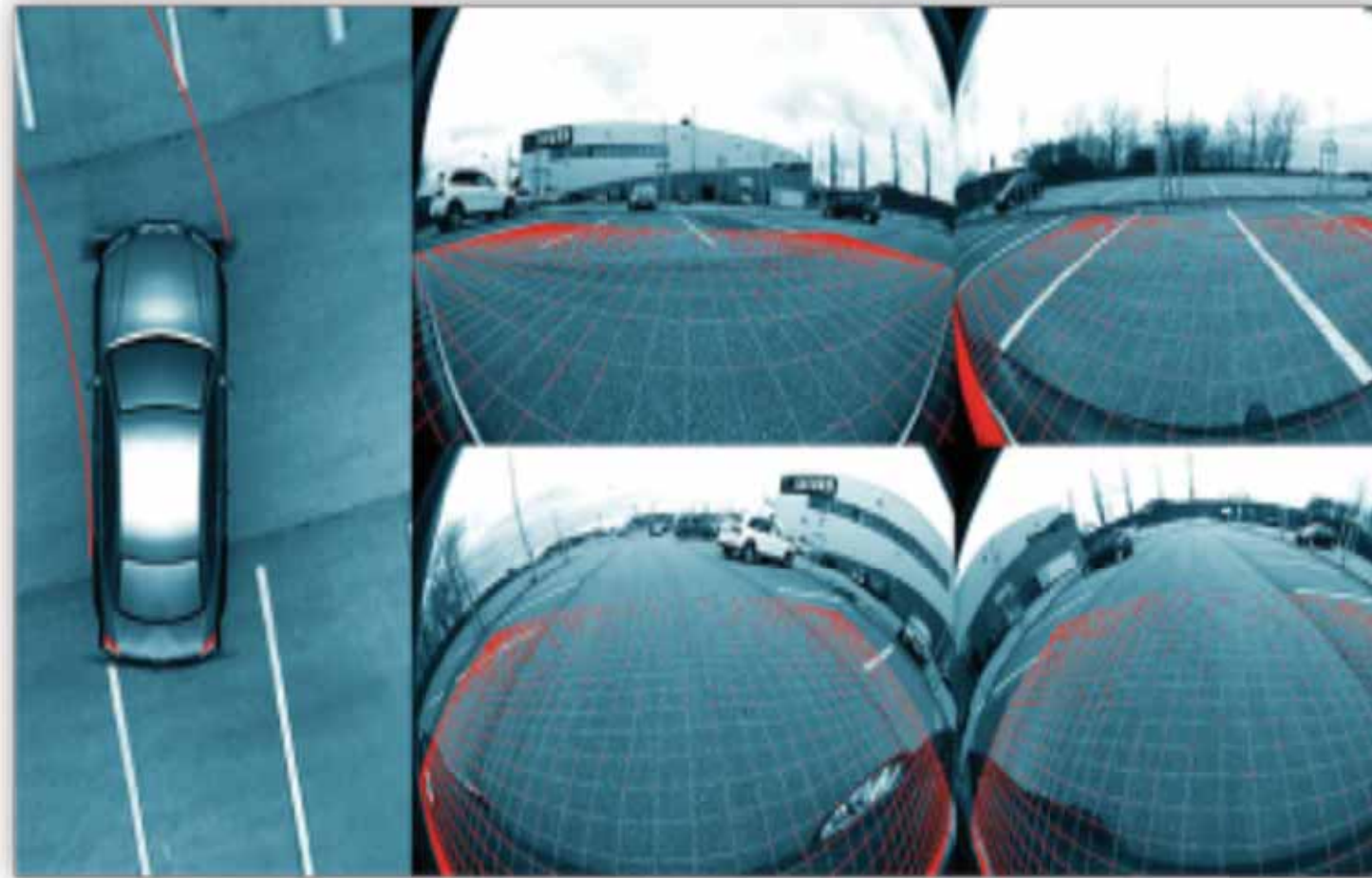
FANUC

YASKAWA

NACHI

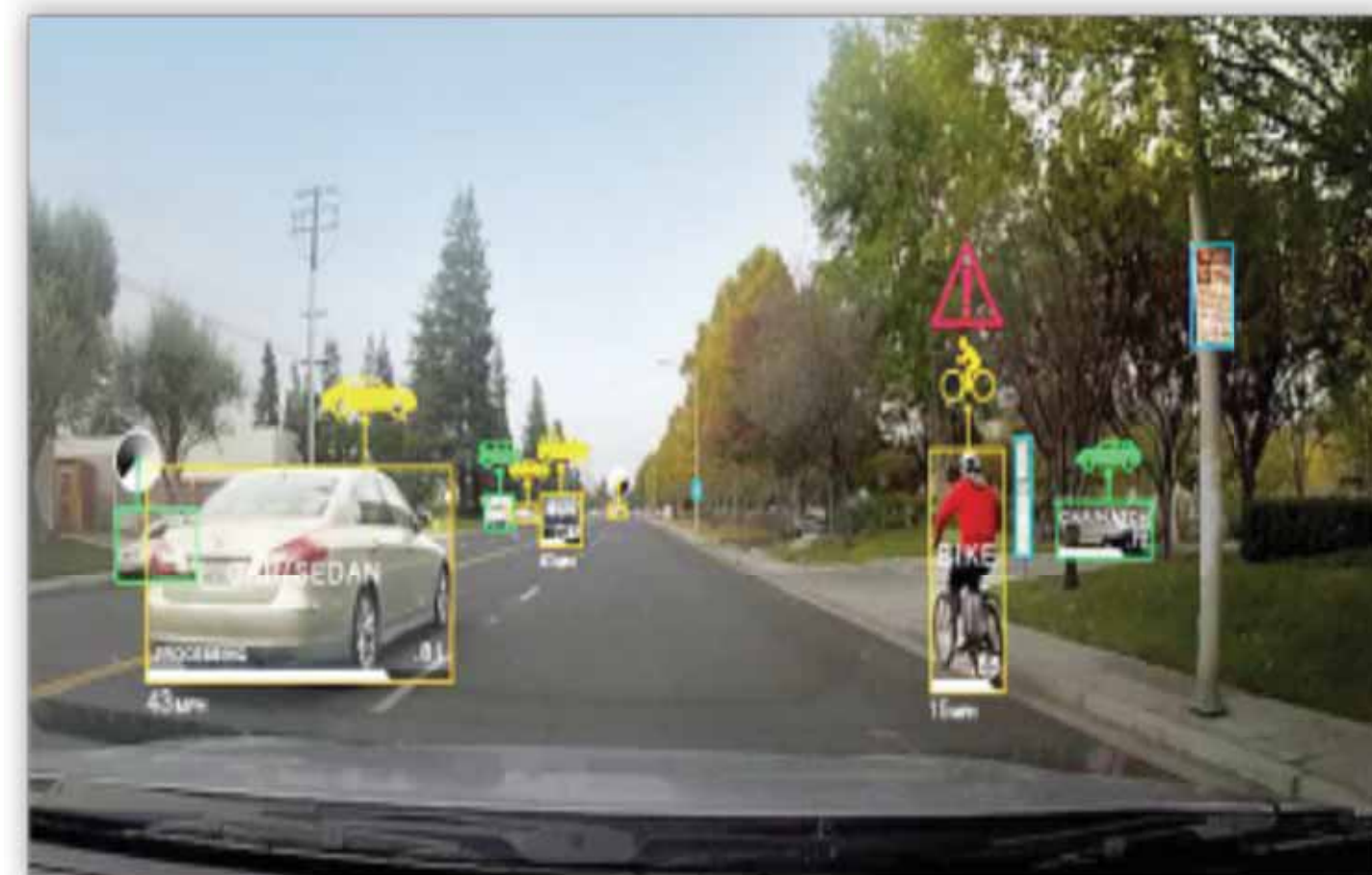
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DEEP LEARNING IN VEHICLES



Applicability to 3D Image Recognition/Scene Detection

- Point clouds with RGB and depth data with xyz coordinates
- Useful for scene decomposition and recognition
- More detailed than typical 2D approaches



<http://www.nvidia.com/object/drive-px.html>



- *DRIVE PX with Sensor Fusion*
- *ROBO Global Index Company*



AUTONOMOUS TRUCKS



50,000 BEERS

First autonomous truck delivery on Oct 25, 2016

400,000 CRASHES

Annually in relationship to truck driving,
killing about 4,000 people

- In almost every case, human error is to blame.
- Synergy with autonomous vehicles, mobile manipulators, automated warehouses, smart wheelchairs

RECENT AI INVESTMENTS

"In the long run, I think we will evolve in computing from a mobile-first to an AI-first world,"

-Google CEO Sundar Pichai



\$15.2 BILLION

Raised since 2012 for a total of 2,320 AI fundings.

700

Total AI fundings in 2016 alone

\$2.1 BILLION

Raised in 1Q17 alone for 280 AI fundings.

Source: CB Insights



MACHINE VISION



A man holding a tennis racquet on a tennis court.



Two pizzas sitting on top of a stove top oven



A group of young people playing a game of Frisbee



A man flying through the air while riding a snowboard





10% ROBO PORTFOLIO ALLOCATION

Portfolio Diversification Benefits

- ▶ adding unique source of alpha from RAAI
- ▶ 8% increase to Mid-Small Companies
- ▶ 6% increase in growth companies
- ▶ 1.4% increase in international companies

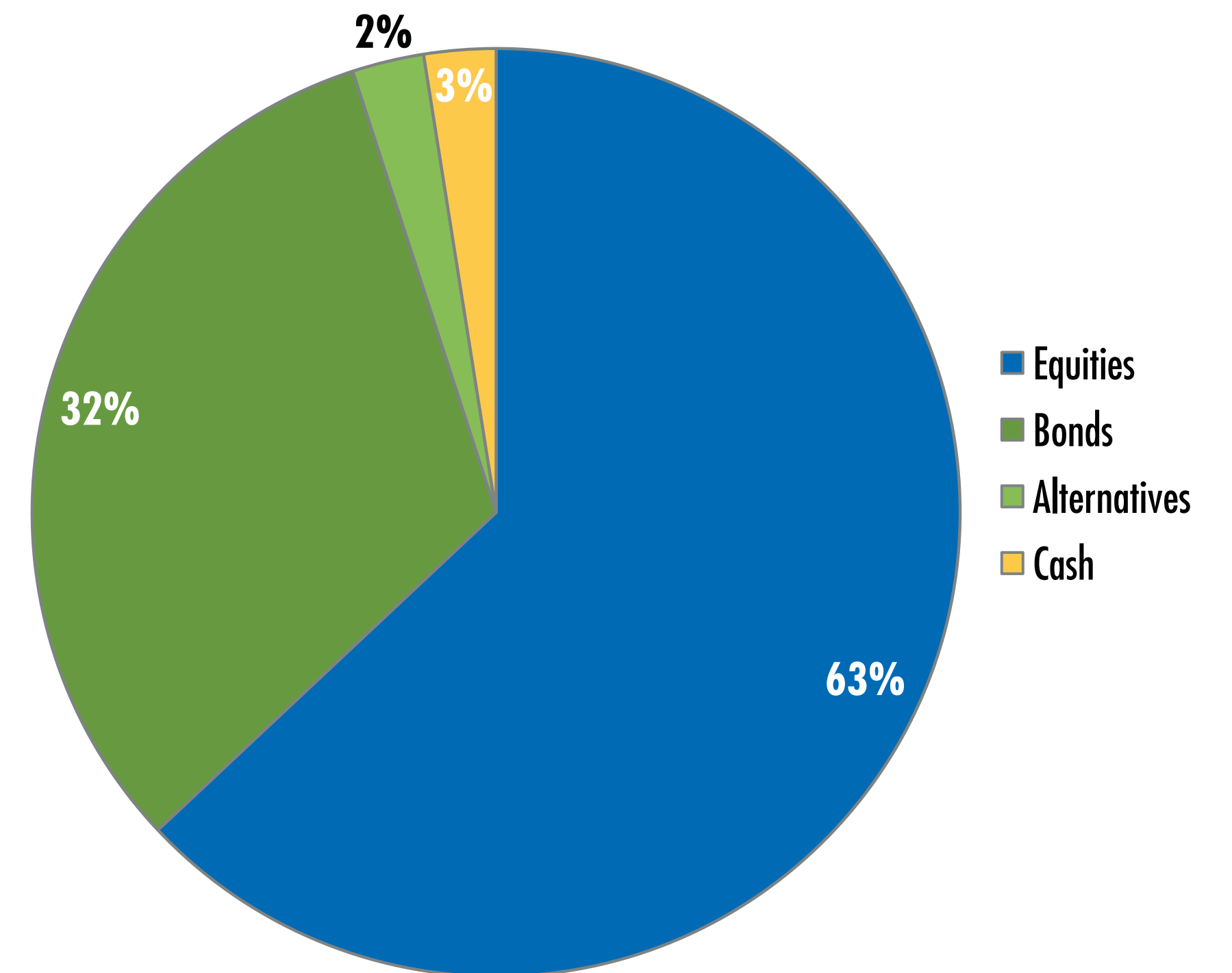
3 yr. returns ending 7/31/2017

- ▶ increased portfolio returns
- ▶ improved portfolio risk-adjusted returns
- ▶ increased diversification with less than 3% overlap with broad market indices

Where to use ROBO

- ▶ FAANG replacement / rebalance on valuations
- ▶ US technology fund
- ▶ US growth fund

Moderate Conservative Portfolio



CONCLUSION

The Robotics & Automation landscape is enabling a technological revolution that will fundamentally change how we work and live. Robotics has transitioned from an industrial application to multiple applications across the entire economy. The ROBO Index provides diversified exposure to the “value chain” of Robotics & Automation.

ROBOTICS, AUTOMATION & AI

- Is positioned to outperform the global market.
- Is becoming increasingly visible in every aspect of our daily and business life.
- Is a solution for emerging trends across the world from decreasing productivity growth to demographic shifts.

ROBO GLOBAL

- Leading team of industry and financial analysts.
- Developed the industry classification system to capture entire market.
- Created the first index in August 2013.



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