

***FOCUS Expert Workshop  
16th FEBRUARY 2016***

**World Robotics Survey**

**Arturo Baroncelli**

**President 2013 - 2015 IFR - International Federation Of Robotics**

**Member of the IFR Board**

**Engelberger Prize Award 2005**

**IFR**   
*statistical*  
**department**

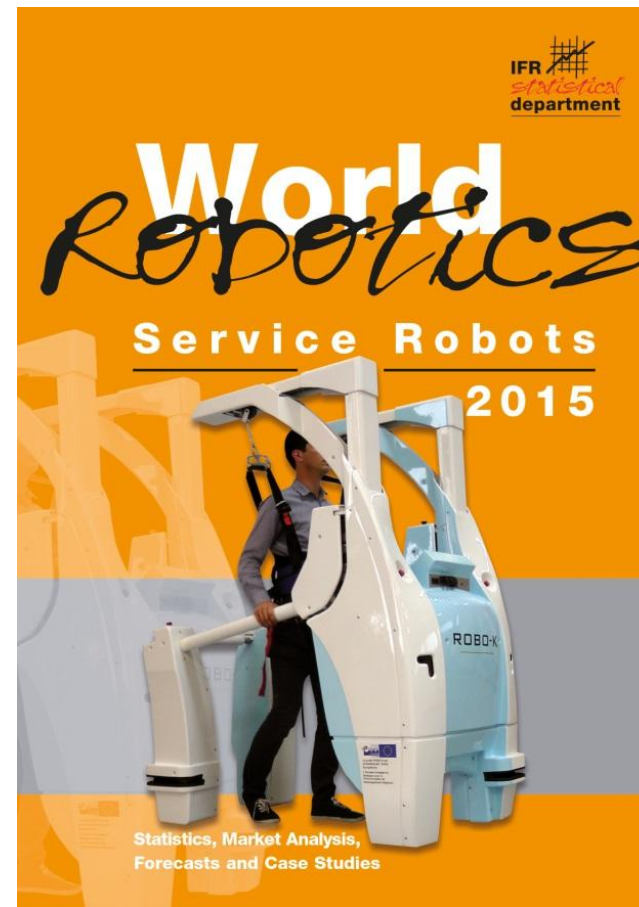
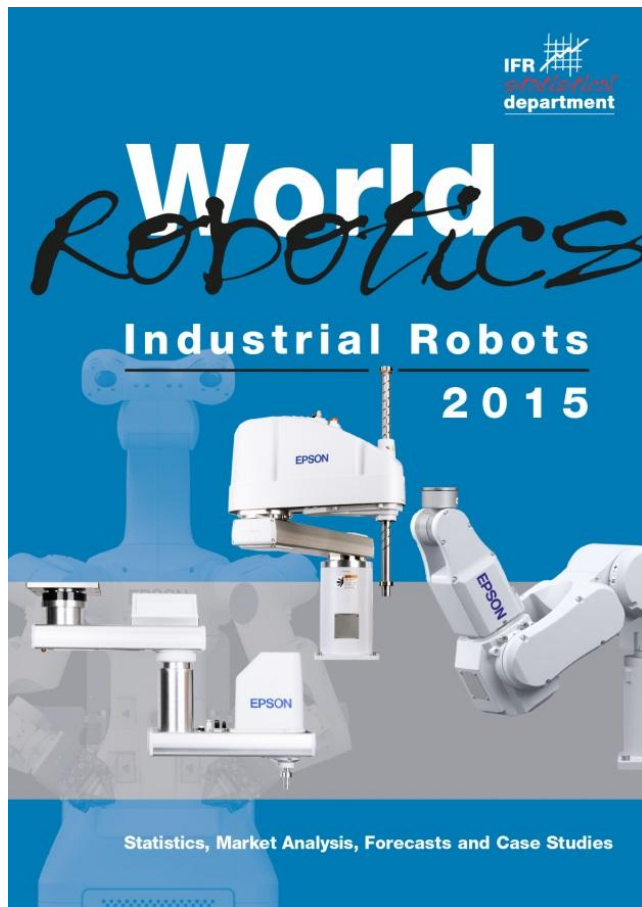
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*statistical*

# World Robotics 2015



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# International Federation of Robotics

Represents the global robotics industry

Robotics turnover 2014: \$32 billion

>50 members:

- National robot associations

- R&D institutes

- Robot suppliers

- Integrators

Sponsor of the International Symposium on Robotics (ISR)

Co-Sponsor of the IERA Award

Primary source for world-wide data on use of robotics – IFR Statistical Department



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# Industrial Robots

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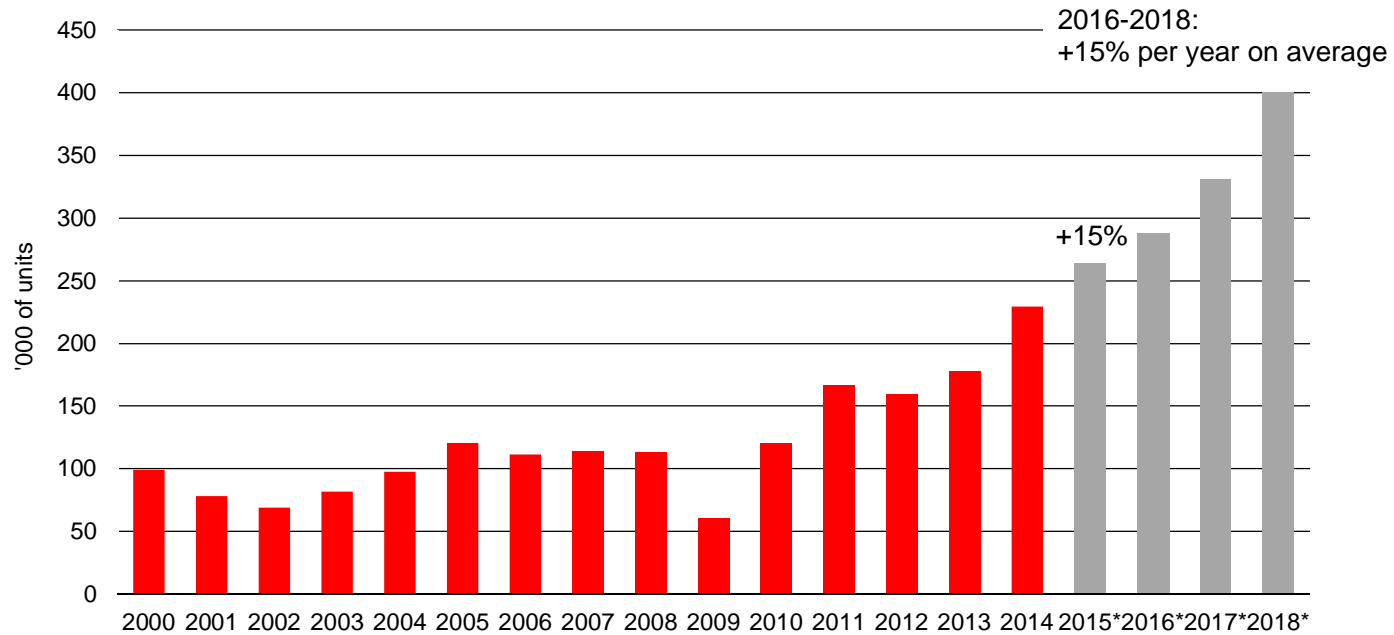


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# Continued double digit growth

Worldwide annual supply of industrial robots  
2000 - 2018\*

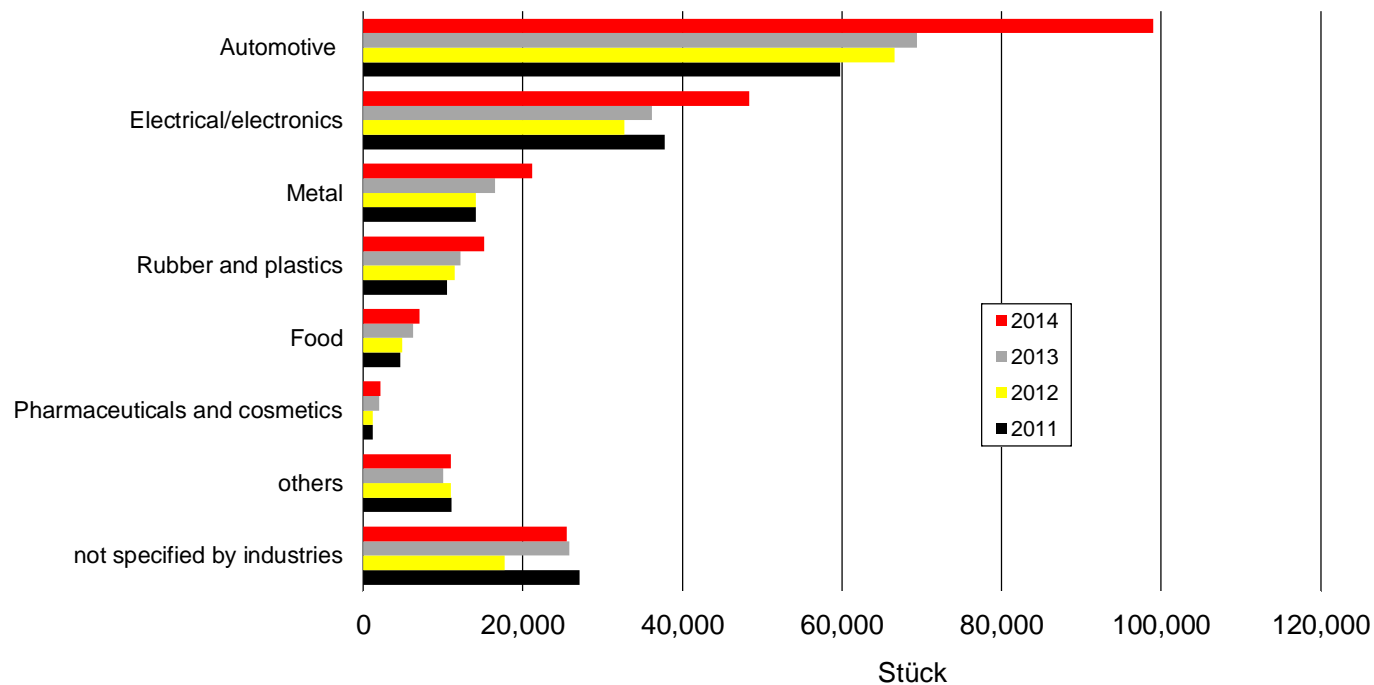


\*forecast

Source: IFR World Robotics 2015

# Main drivers: automotive and electronics

Estimated worldwide annual supply of industrial robots at year-end by main industries 2011 - 2014

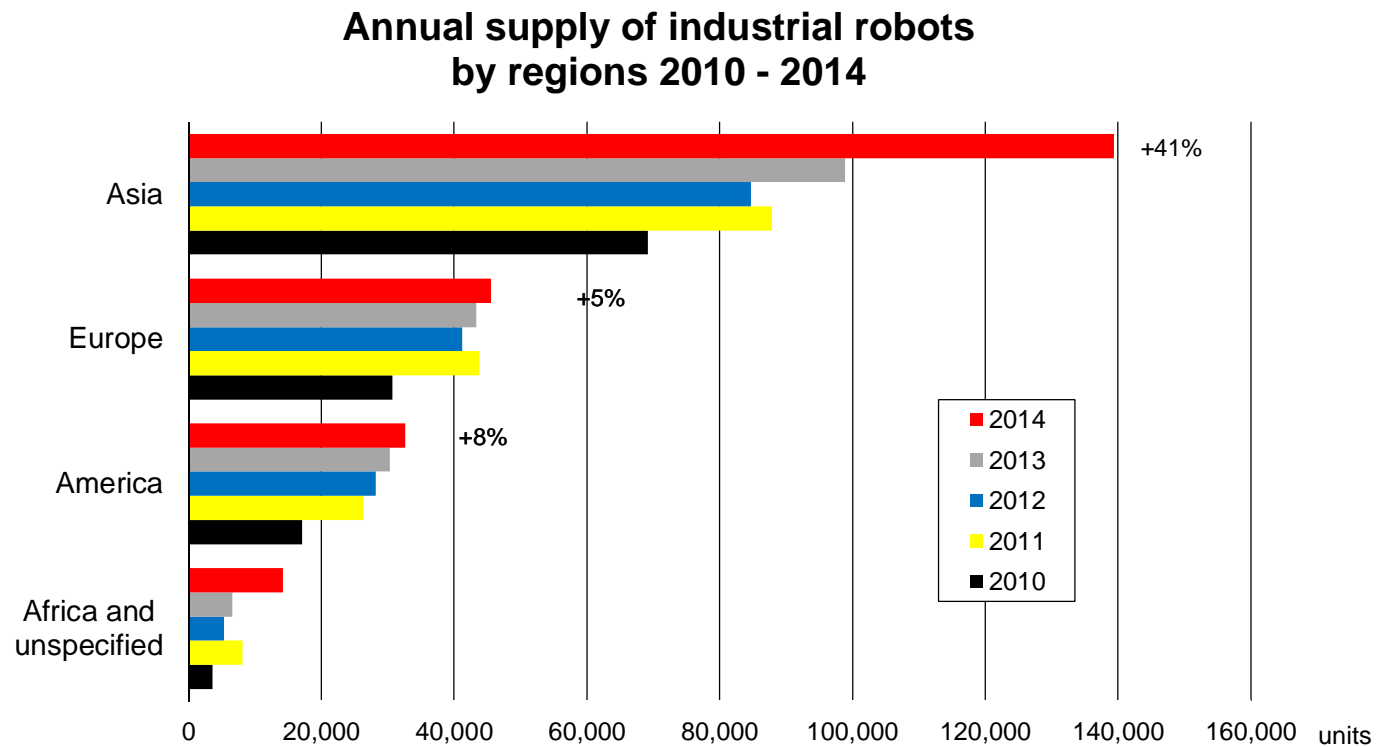


Source: IFR World Robotics 2015

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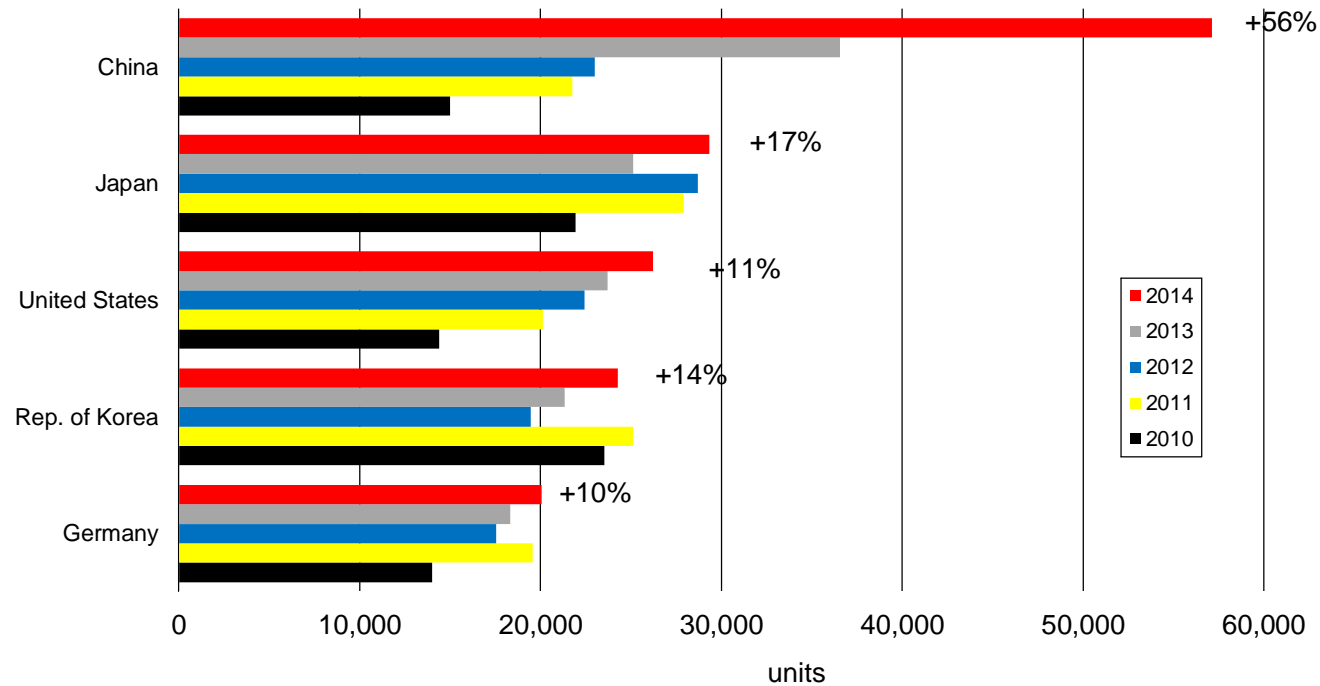
# 2014: Asia is the driver of the growth



Source: IFR World Robotics 2015

# 2014: about 70% of global supply in 5 markets

Annual supply of industrial robots  
largest markets 2010 - 2014



Source: IFR World Robotics 2015

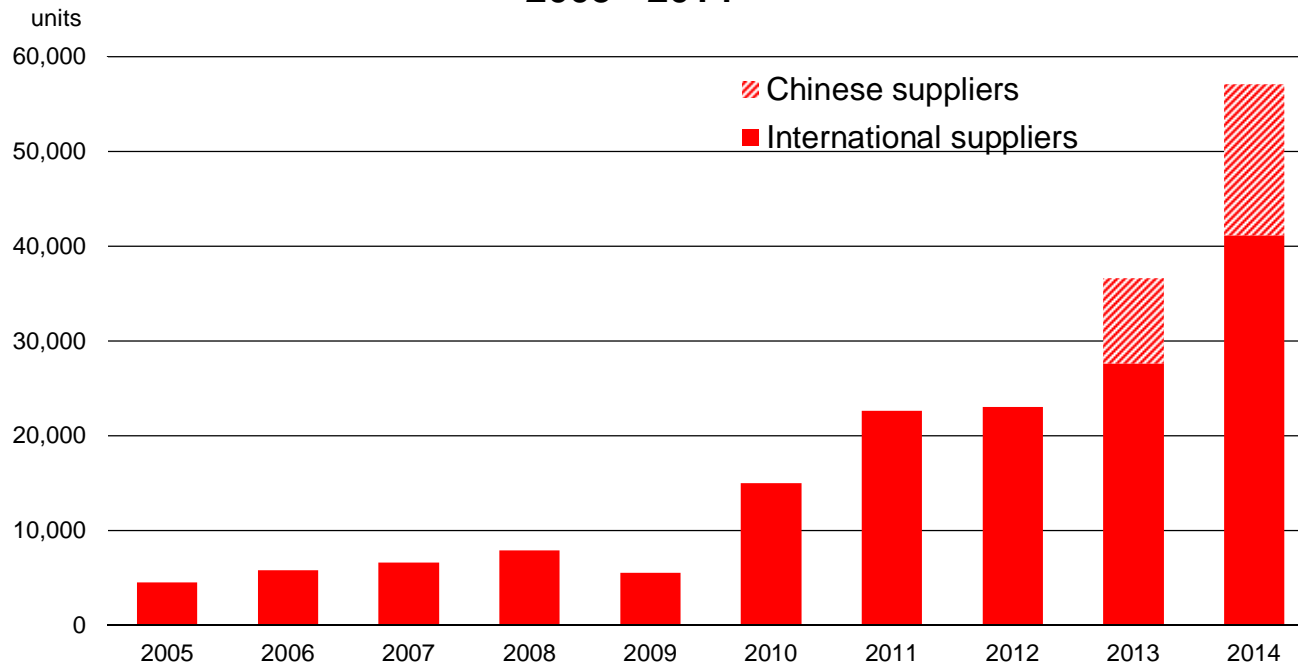
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# China: Rapid increase of robot installations

Annual supply of industrial robots to China  
2005 - 2014



Source: IFR World Robotics 2015

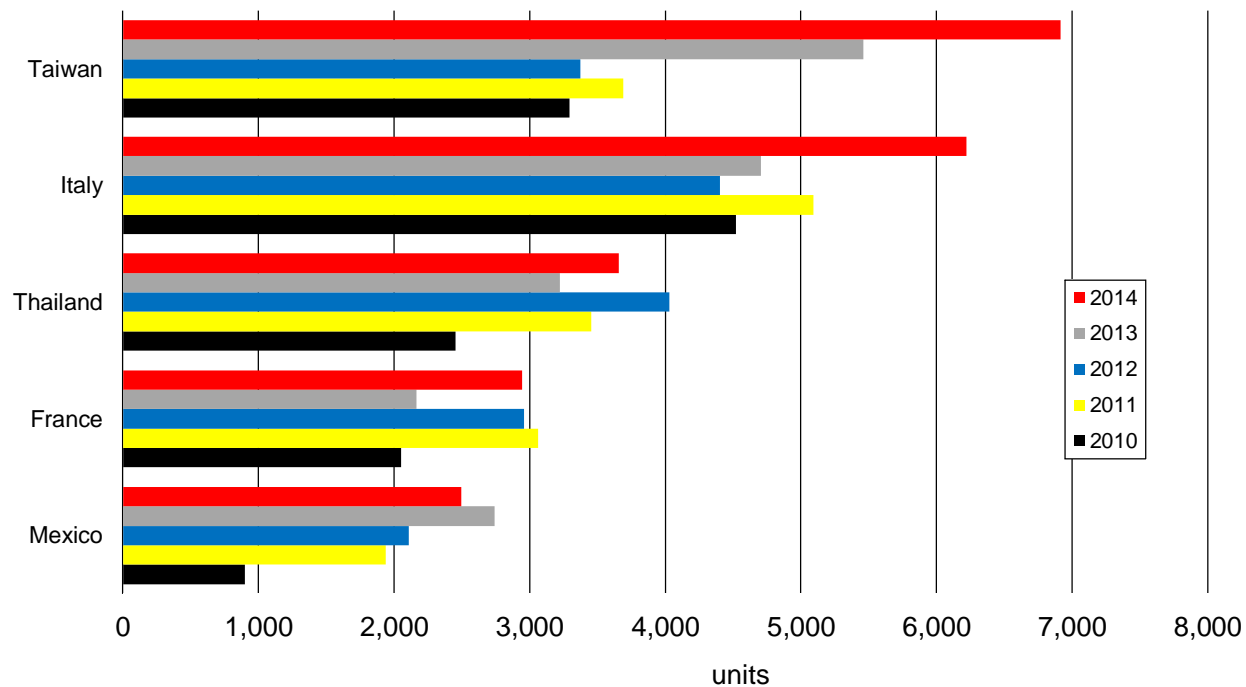
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# Increasing importance of Taiwan

## Strong recovery in Italy

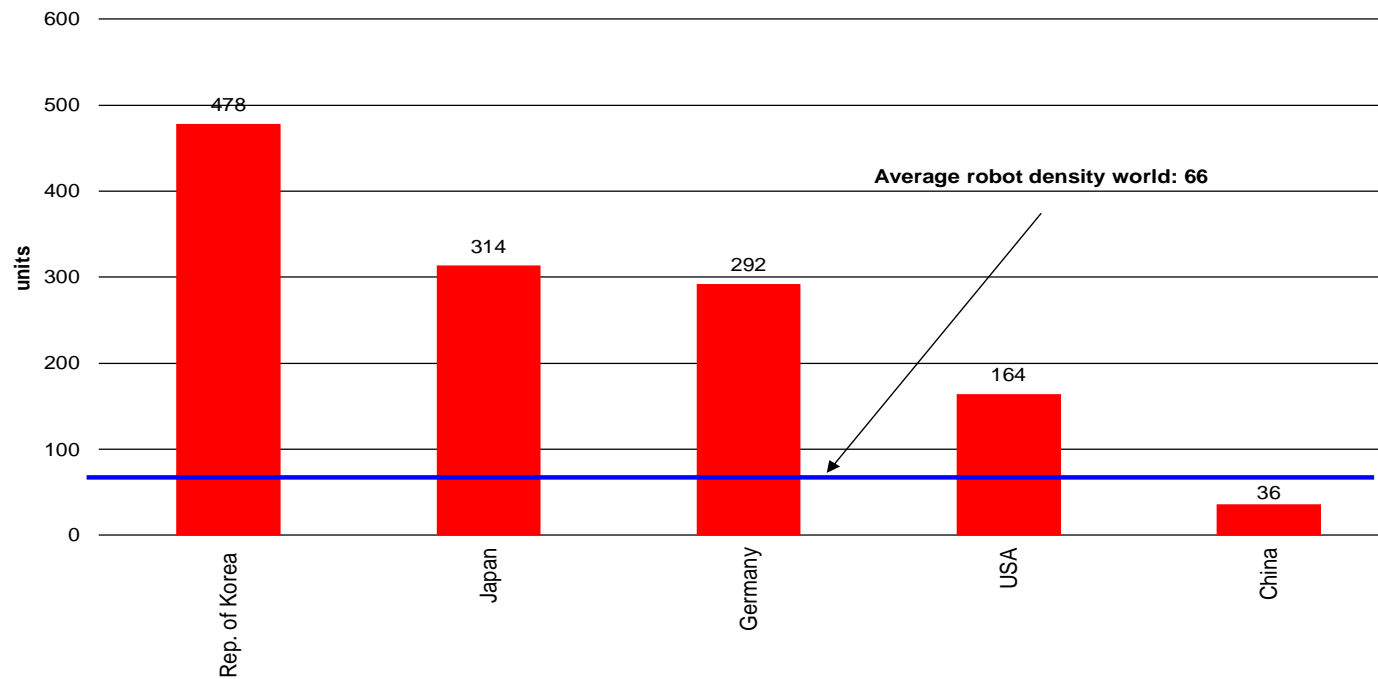
Annual supply of industrial robots  
largest markets - continued 2010 - 2014



Source: IFR World Robotics 2015

# Still very low robot density in China

Robot density\* in the five biggest destinations of robot supplies in 2014



\*Number of multipurpose industrial robots (all types) per 10,000 employees in the manufacturing industry (ISIC rev.4: C) 2014

Source: IFR World Robotics 2015

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*statistical*

## Main trends 2015-2018: Industry 4.0

- Robots will play an important role in the new era of manufacturing: Industry 4.0
- Manufacturing will be transformed
  - Communication is all around
  - Integration of machinery, warehousing systems and production facilities as Cyber-Physical Systems
  - Vast increase of flexibility, cost effectiveness and productivity in smart factories
  - Jobs in factories will change
    - workers will be freed from repetitive routine tasks, and
    - will focus on jobs that require judgment, common sense, creativity, problem-solving skills and dexterity.

## Main trends 2015 and 2018

- **Breakthrough of human-robot collaboration**
  - industrial robots assist workers in a variety of tasks
  - improve manufacturing quality and processes
  - increase productivity
  - assist an aging workforce, e.g. in physically demanding tasks



Source: KUKA

Source: IFR World Robotics 2015

# Main trends 2015 and 2018

- **Simplification of the use of robots**
  - essential for all industries to be able to sustain efficient and flexible manufacturing
  - High potential in small and medium sized companies
- **Mobile Robots**
  - support human-robot collaboration, and
  - flexible manufacturing
  - important tool for Industry 4.0



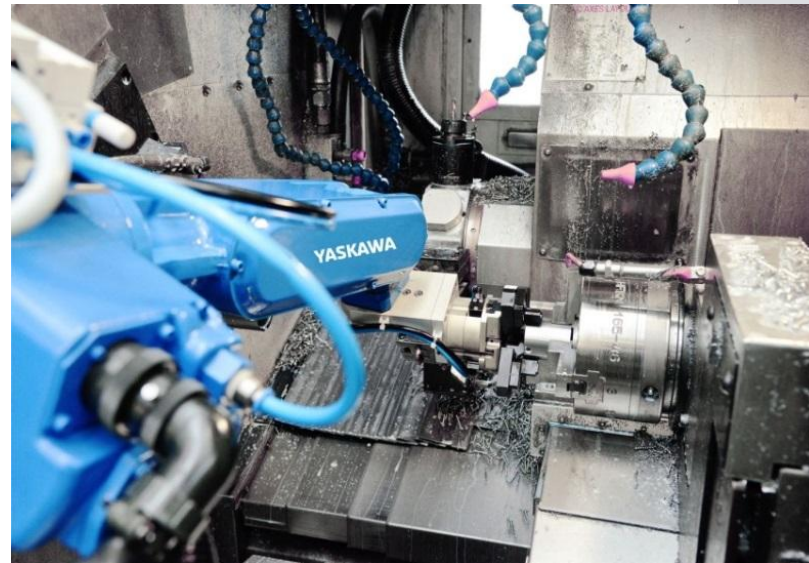
Source: Universal Robots



Source: KUKA

## Bright prospects for robots between 2015 and 2018

- Most important driver of the growth: China
- And other Southeast Asian countries
- Continued increase of demand from North America
- Increasing sales in Western European countries
- Sales to Eastern European countries will gain momentum



Source: Yaskawa

## Bright prospects for robots between 2015 and 2018

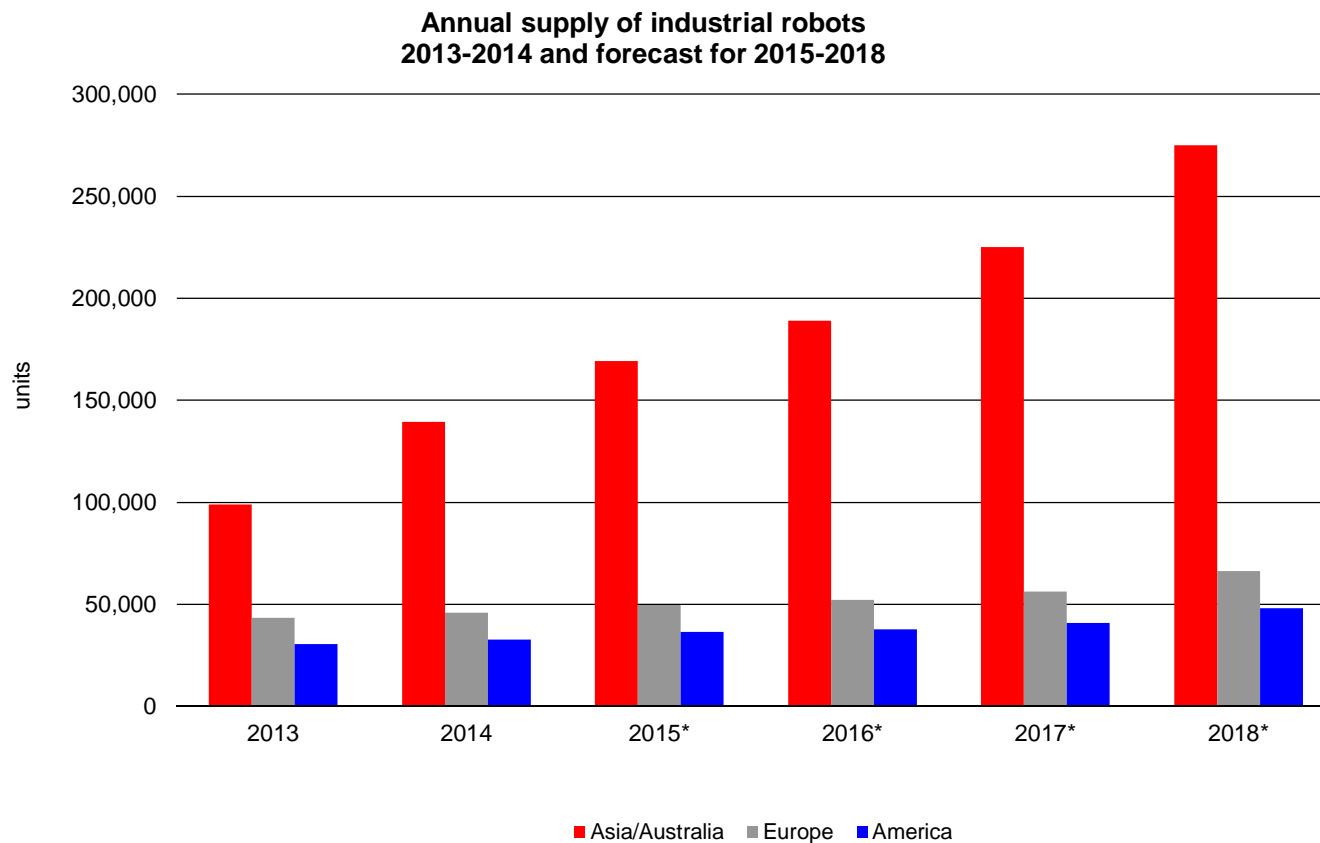
- Automotive still strong
- High volume electronics manufacturing
- General Industry will grow faster
- Energy-efficiency and using new materials require continued retooling
- Decline in products' life cycle and increase in the variety of products require flexible automation



Source: ABB



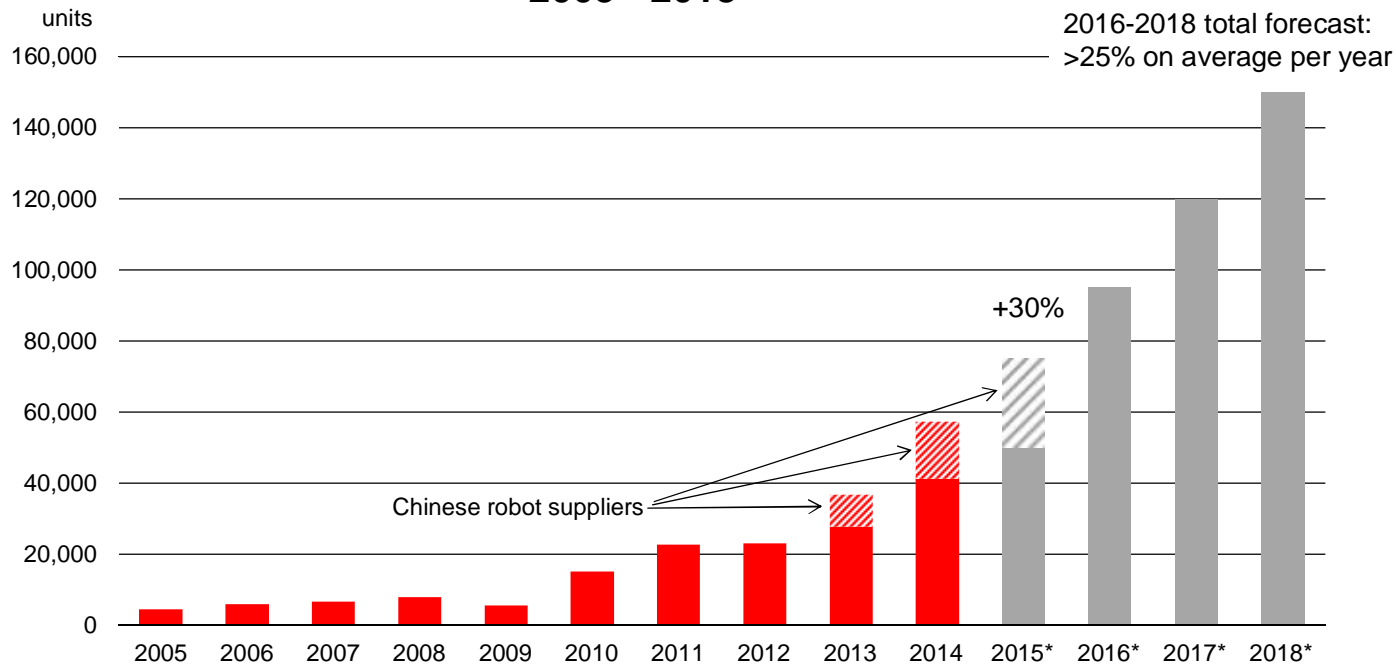
# 2015-2018: above average increase in Asia



Source: IFR World Robotics 2015

# China: Continued substantial increase

Annual supply of industrial robots to China  
 2005 - 2018\*



\* forecast

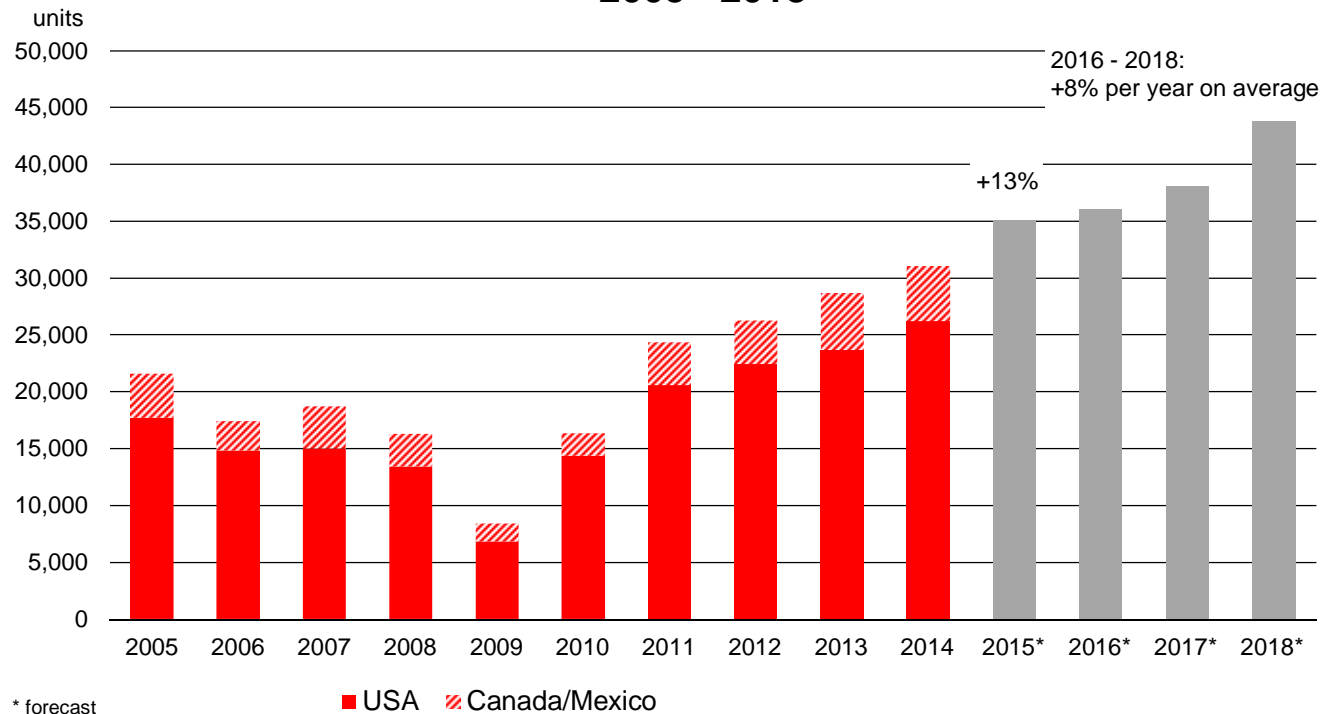
Source: IFR World Robotics 2015

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# North America: continued growth

**Annual supply of industrial robots to North America  
2005 - 2018\***



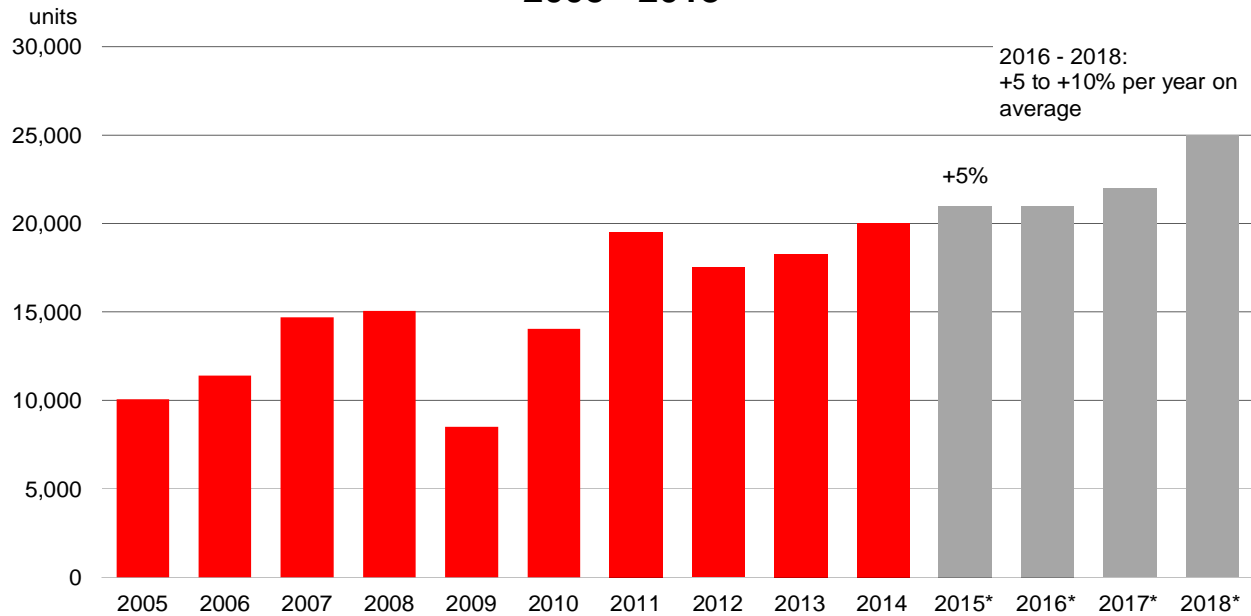
Source: IFR World Robotics 2015

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# Germany: general industry will gain in importance

**Annual supply of industrial robots to Germany  
2005 - 2018\***



\* forecast

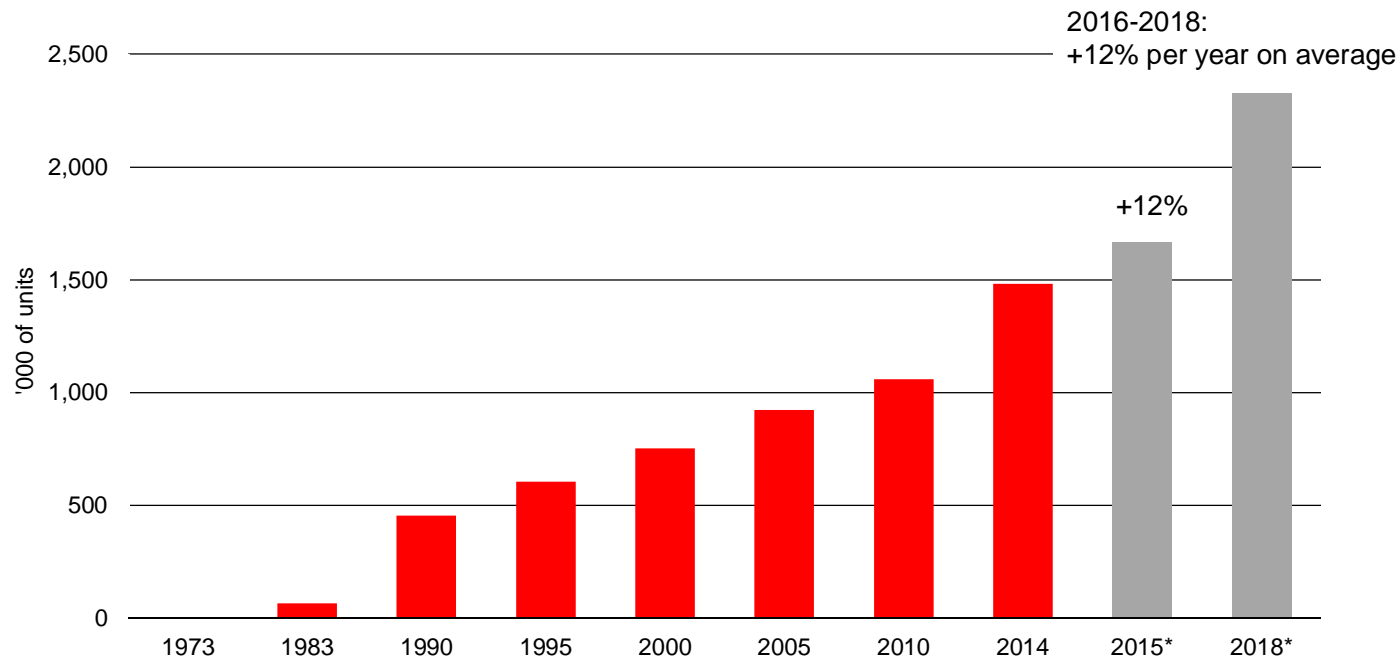
Source: IFR World Robotics 2015

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# 2018: 2.3 million robots in operation

Worldwide estimated operational stock of industrial robots



\* forecast

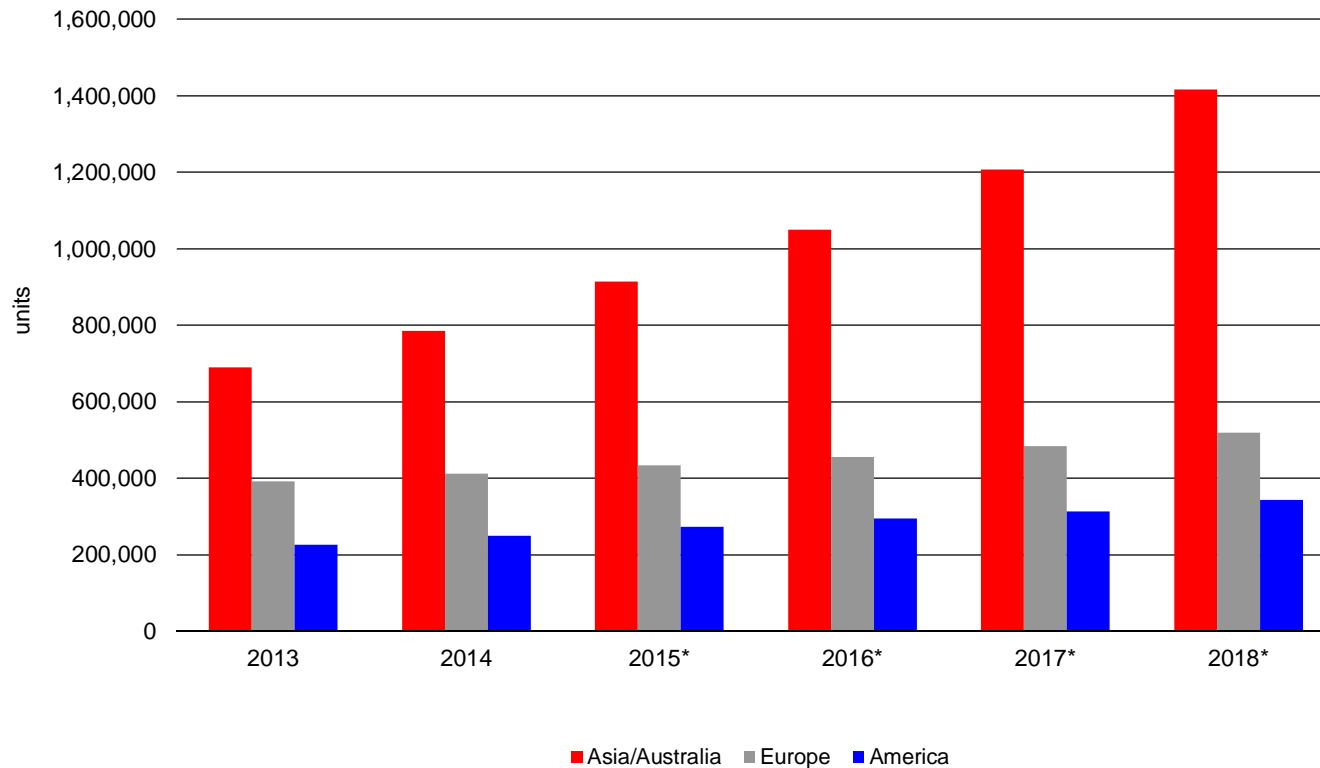
Source: IFR World Robotics 2015

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# 2018: 1.4 million robots in operation in Asia

Estimated operational stock of industrial robots  
2013-2014 and forecast for 2015-2018



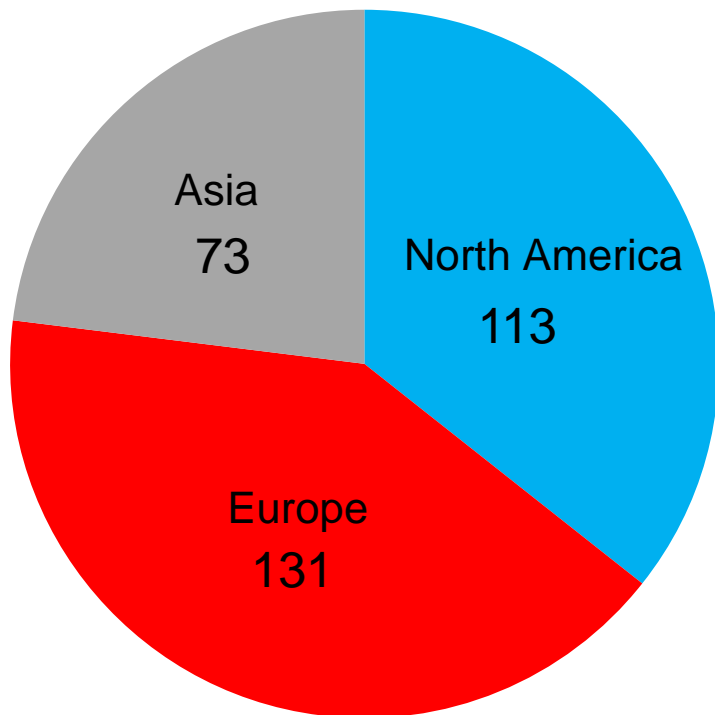
Source: IFR World Robotics 2015

# Service robots

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## Number of service robot manufacturers of all types by region of origin



- World Robotics Database: over 300 companies world-wide
- 15% of service robot suppliers are start-ups (criteria: technology-driven, company age under five years)
- „Start-up“-share growing quickly



**By 2018: Sales of service robots for personal and domestic use will increase to 35 million units**

■ **Main categories:**

- Vacuum and floor cleaning
- Lawn-mowing robots
- Entertainment and leisure robots
- Robots for elderly and handicap assistance



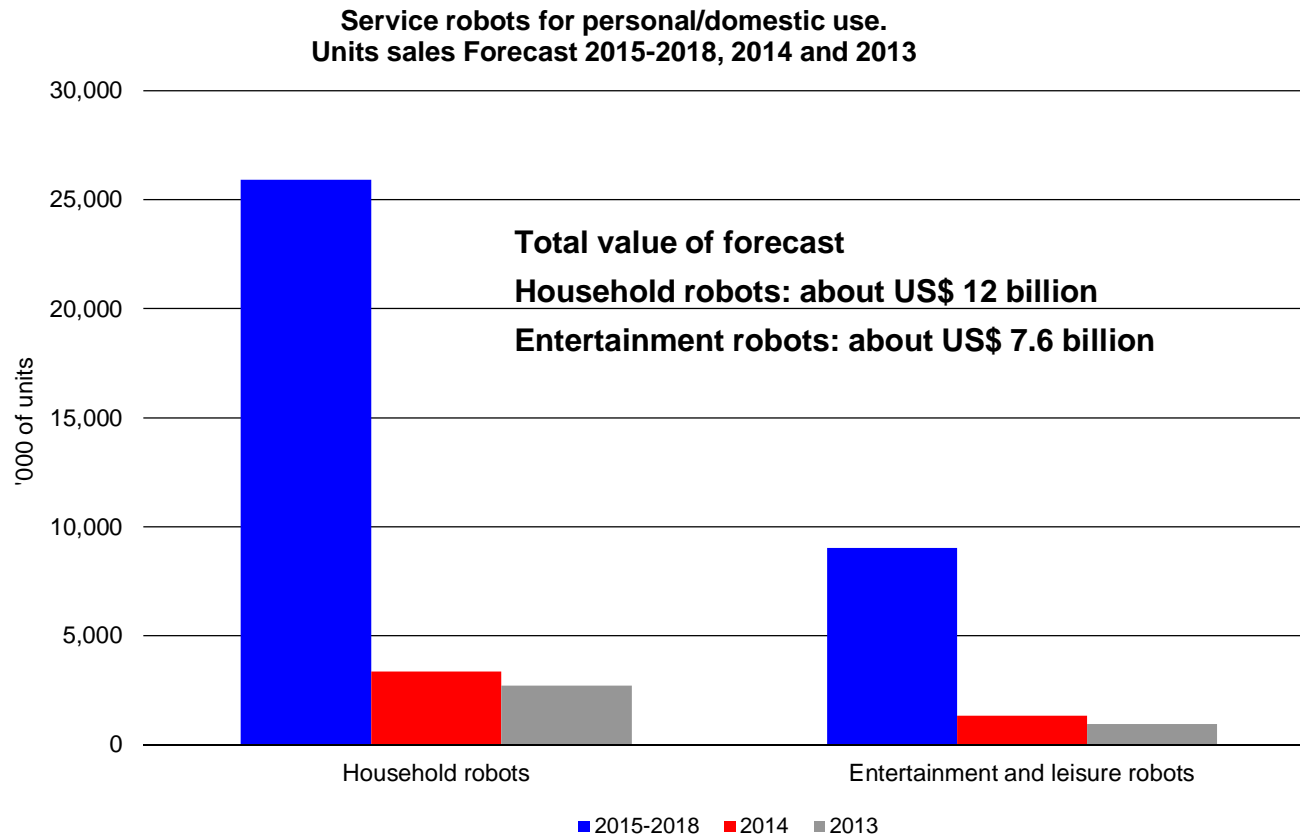
Source: Vorwerk (Vacuum cleaning)



thymio

Source: Manon Briod and Maria Beltran

# By 2018: about 25 million household robots



Source: IFR World Robotics 2015

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## Future market for private handicap assistance

- Handicap assistance robots have taken off to the anticipated degree in the past few years.
- Strong increase in 2014
- Rapid longer-term growth expected
- Need for care will increase
  - Increasing number of disabled persons
  - Demographic shift

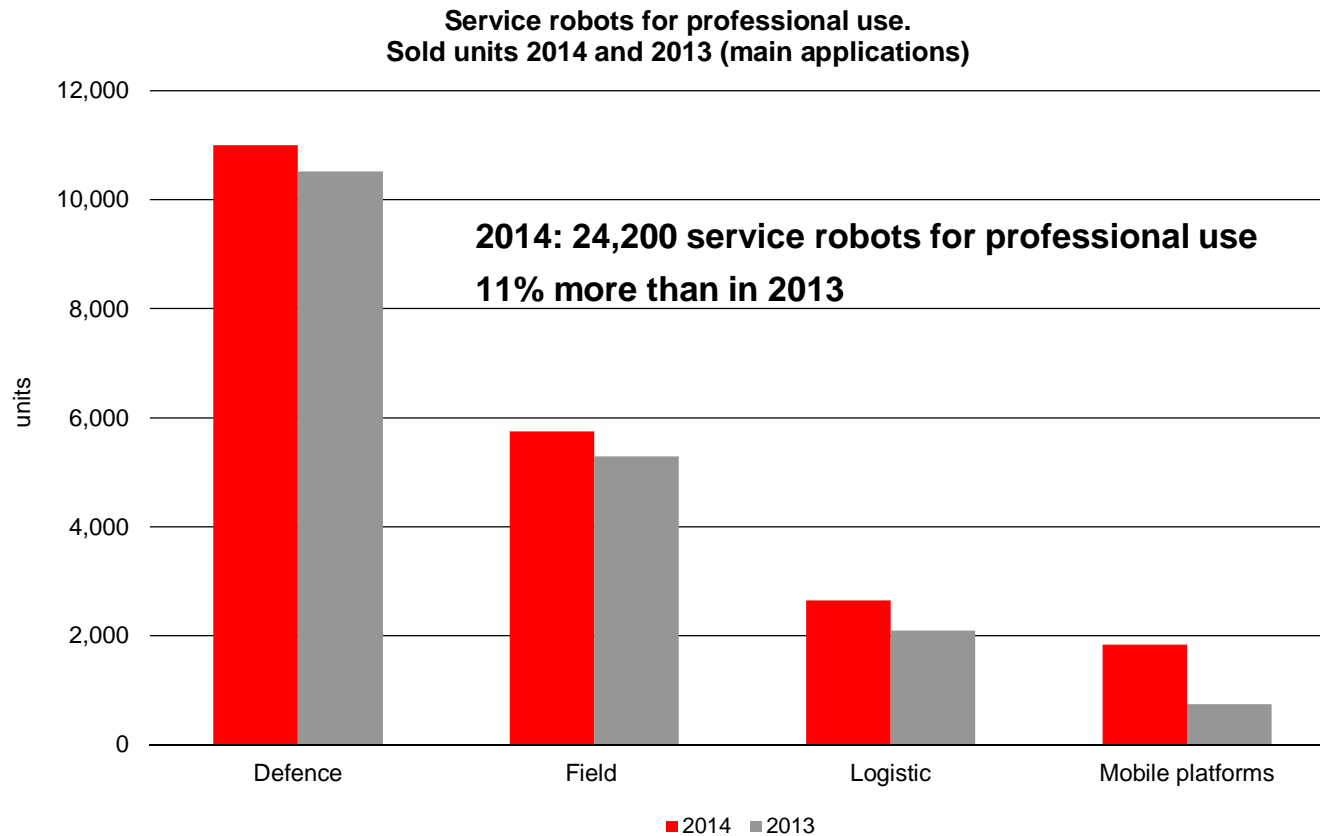


Source: Yujin Robot



Source: Focal Meditech BV, Netherlands

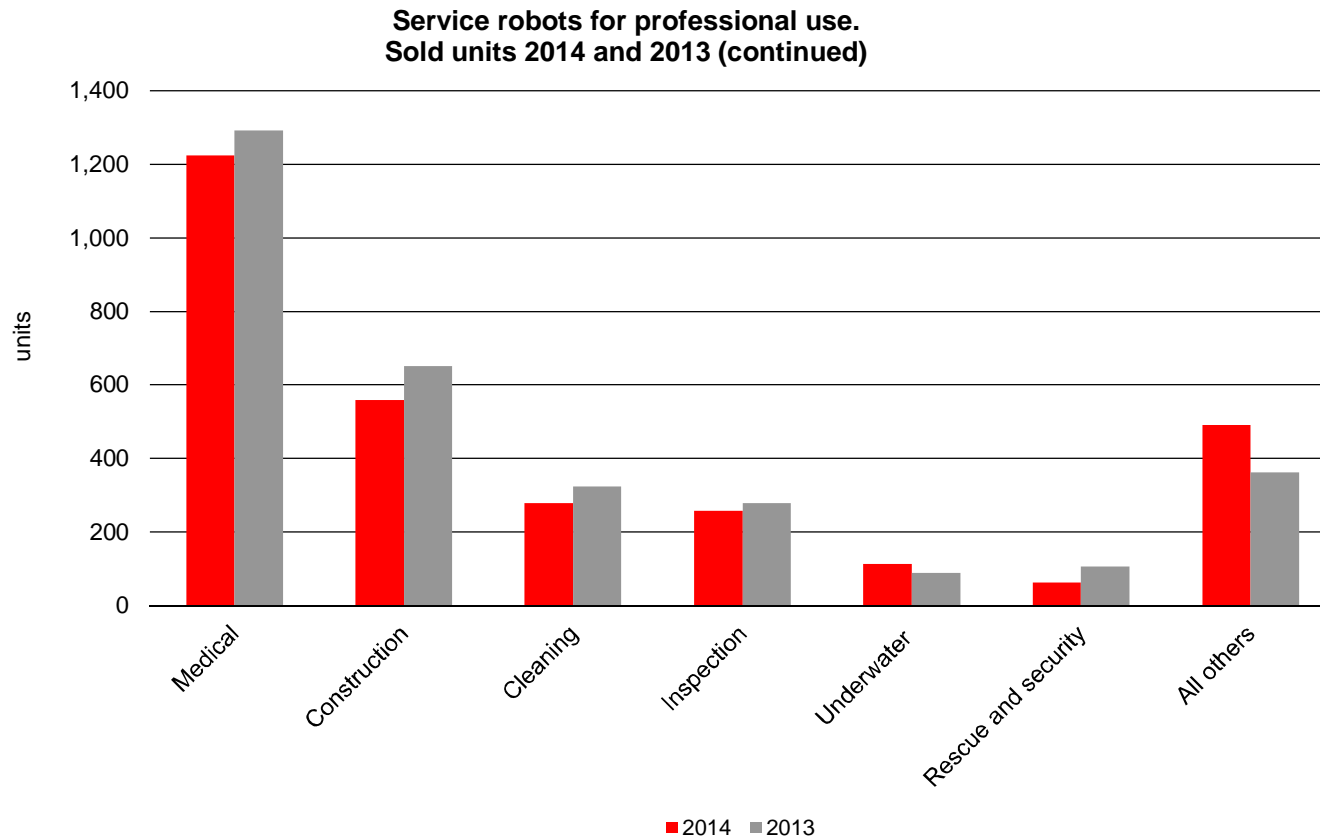
# 2014: Increase in all important applications



Source: IFR World Robotics 2015

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# 2014: Unit sales in low volume applications decreased



Source: IFR World Robotics 2015

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# Trends in the service robot market

- Exoskeletons on the rise
  - Rehabilitation
  - Ergonomic support for reducing loads



Source: AlterG, USA



Source: Cyberdyne, Japan

# Trends in the service robot market

- Logistic systems on the rise:
  - 2,700 units (mainly AGVs) installed in 2014, +27%
  - At least 14,500 units will be sold 2015-2018
- High growth potential for logistic systems
  - Human-Robot-Collaboration
  - Industrial and non-industrial sectors



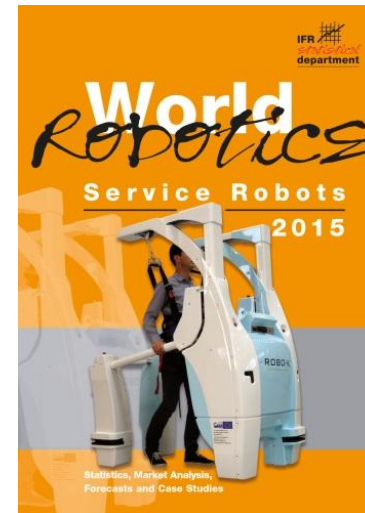
Source: Panasonic



Source: Bluebotics

## Other important service robot applications with considerable growth potential

- Medical systems
  - Diagnostic systems
  - Robot assisted surgery or therapy
  - Rehabilitation systems
  
- Field robots, especially
  - Milking robots
  - Farming and livestock breeding systems
  
- Mobile platforms in general use



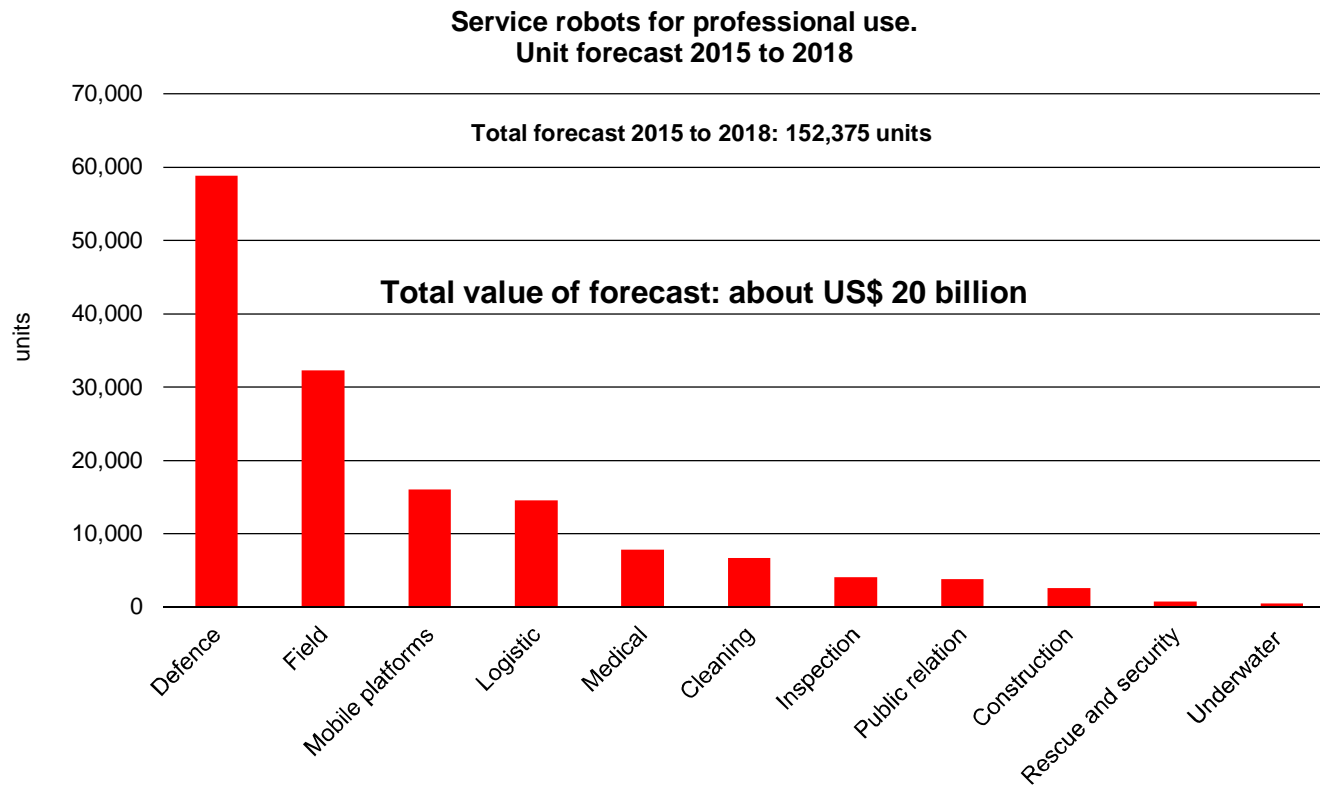
Source: BA Systemes



Source: Lely



# 2015-2018: about 152,400 new service robots for professional use



Source: IFR World Robotics 2015

**THANKS !**

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