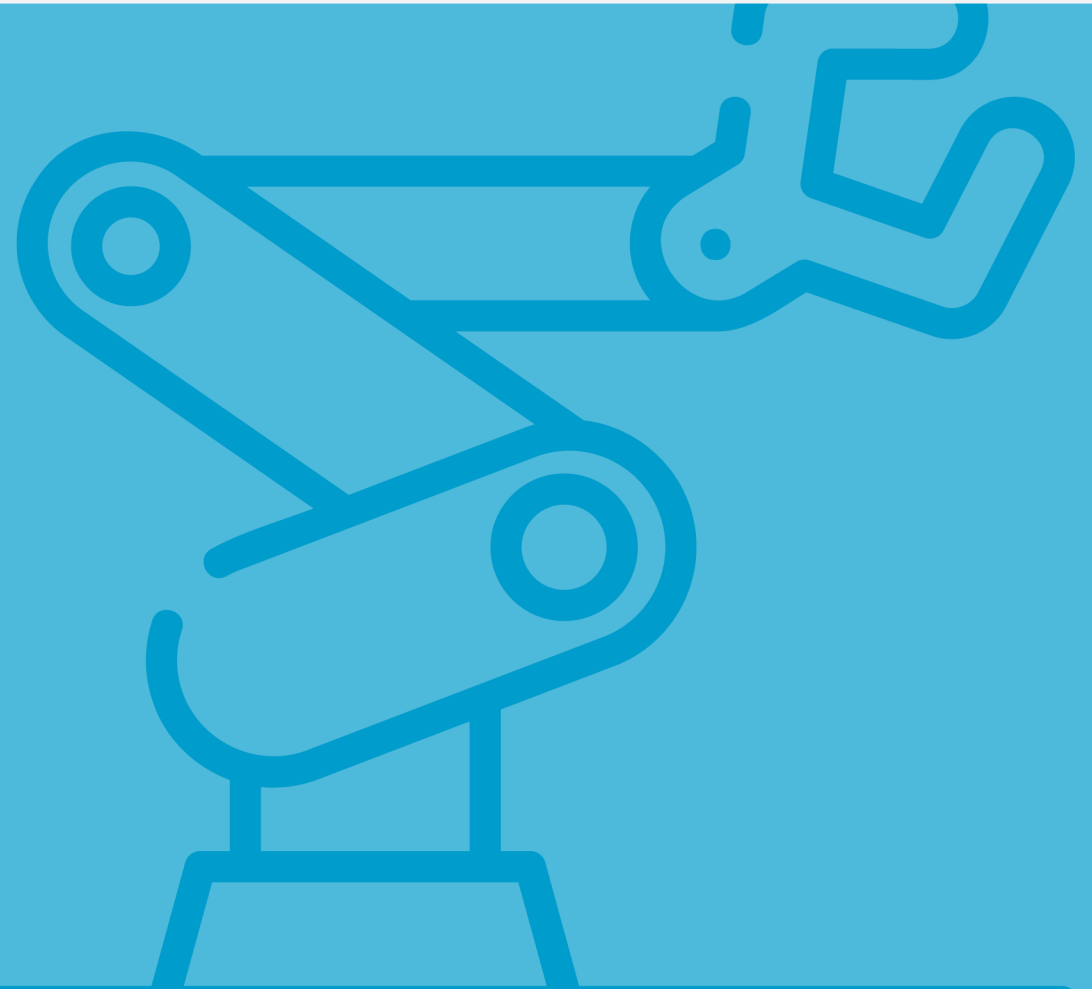


Welcome to the presentation of

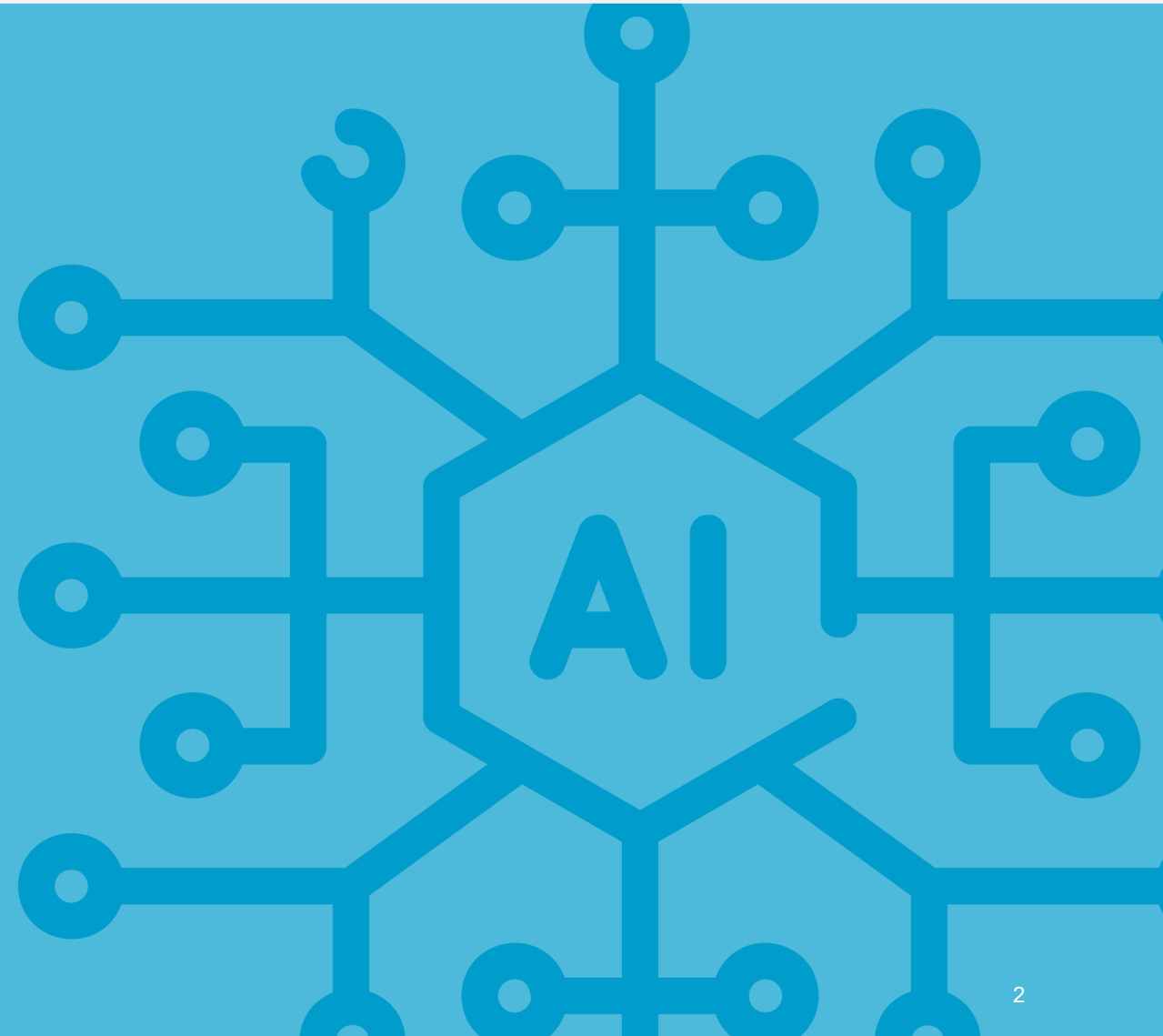
World Robotics 2021

28 October 2021, live stream



 #WorldRobotics

1 Welcome



For you on the panel



Milton Guerry
IFR President

President Schunk USA



Dr. Christopher Müller
Director Statistical Dpt.

International Federation
of Robotics



Dr. Werner Kraus
Vice Chair IFR Service
Robot Group

Head of Dpt. Robot and
Assistive Systems,
Fraunhofer IPA

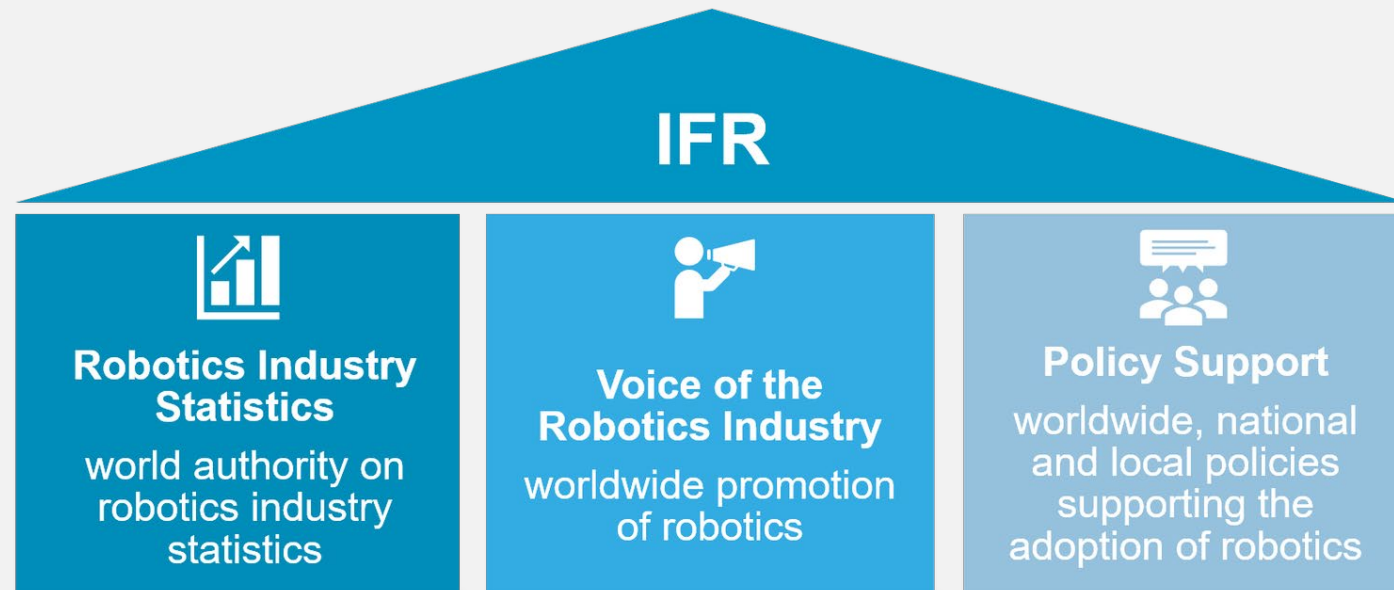


Dr. Susanne Bieller
General Secretary

International Federation
of Robotics

International Federation of Robotics

- **Non-profit organization** since 1987
- IFR represent **more than 2,000 organizations** from **25 countries**
- Robot manufacturers, national robotics associations, universities, start-ups worldwide
- Annual global **robotics turnover \$50 billion** (robot systems including software & peripherals)



What is a robot – and what is not?



Image: Photoneo

- **“Robot”** defined by **International Standards Organization ISO**

- **No robots:**
 - ⊗ software (“bots”, AI, Robotic Process Automation-RPA)
 - ⊗ remote-controlled drones, UAV, UGV, UUV
 - ⊗ voice assistants
 - ⊗ autonomous cars
 - ⊗ ATMs, smart washing machines, etc.

Two types of robots

Industrial robots



Service robots



3 Presentation of World Robotics 2021



Industrial robots - top findings



2020: Robot Sales Climb Again

Inspiring finish of a challenging year

New robots

- 383,500 units (+0.5%)
- Third highest number in history
- CAGR 2015-2020: +9%

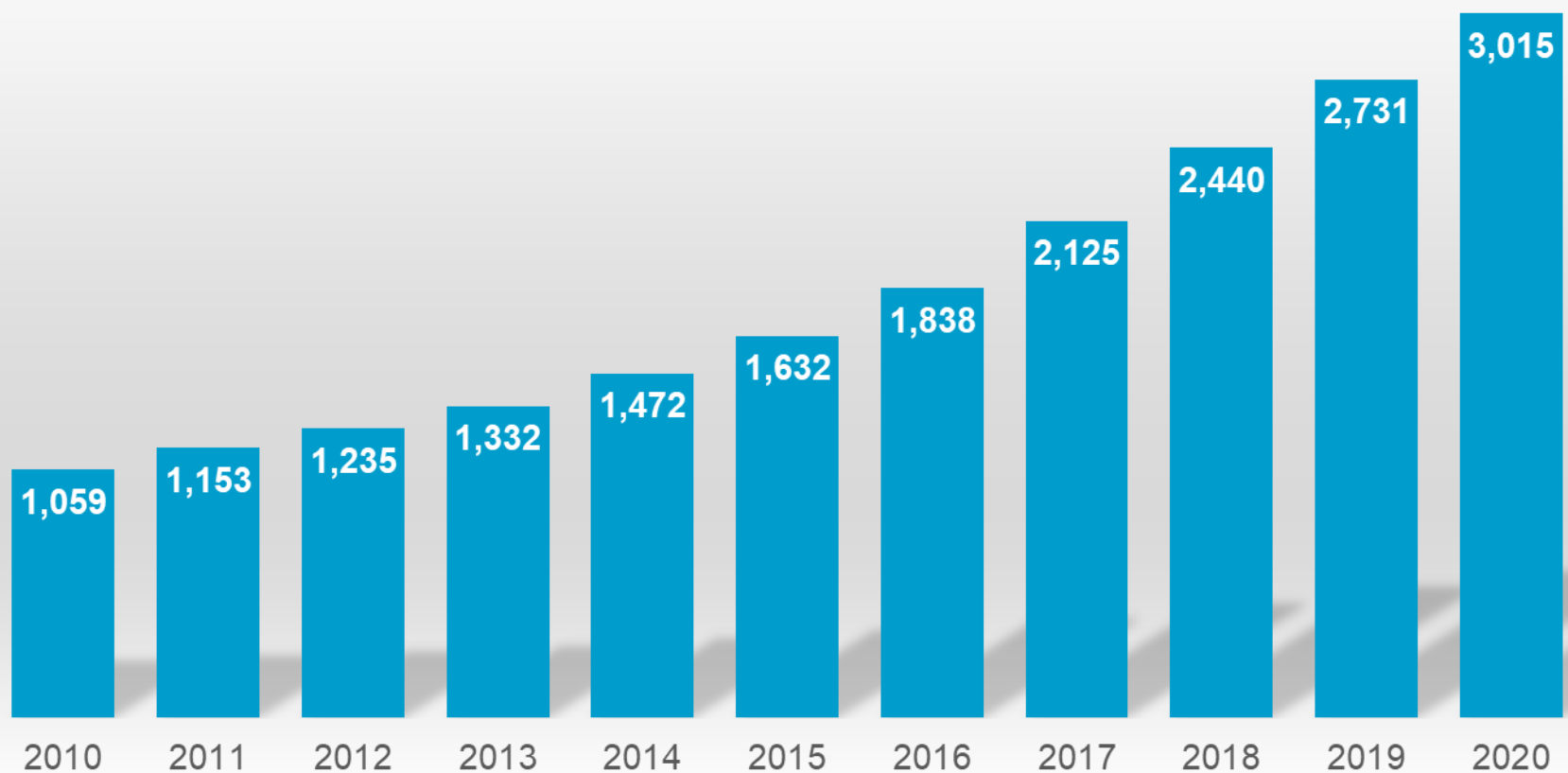
Robot stock

- 3.0 million units (+10%)
- CAGR 2015-2020: +13%

3 million industrial robots operating in factories around the world

Operational stock of industrial robots - World

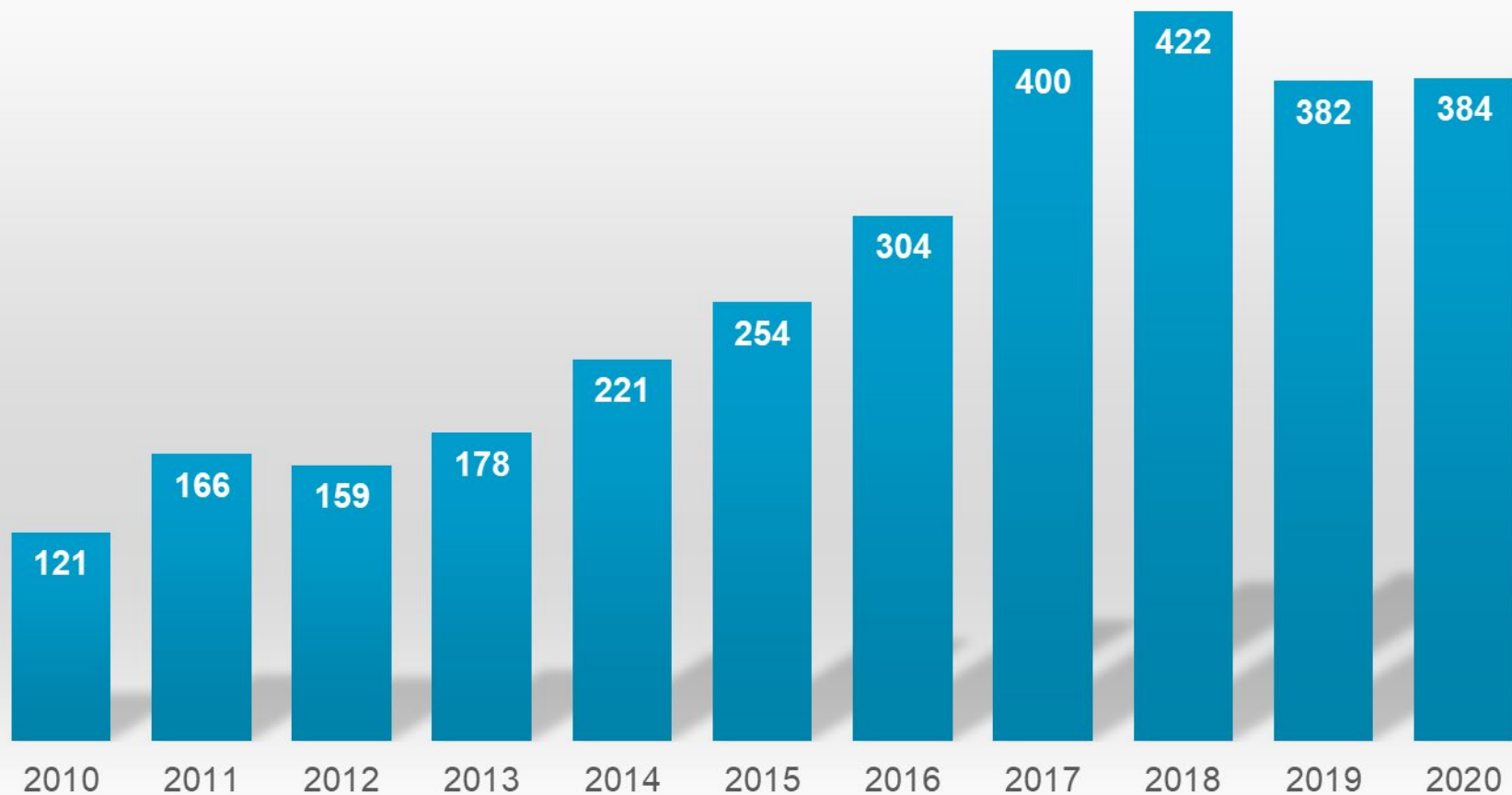
1,000 units



Source: World Robotics 2021

Annual installations of industrial robots - World

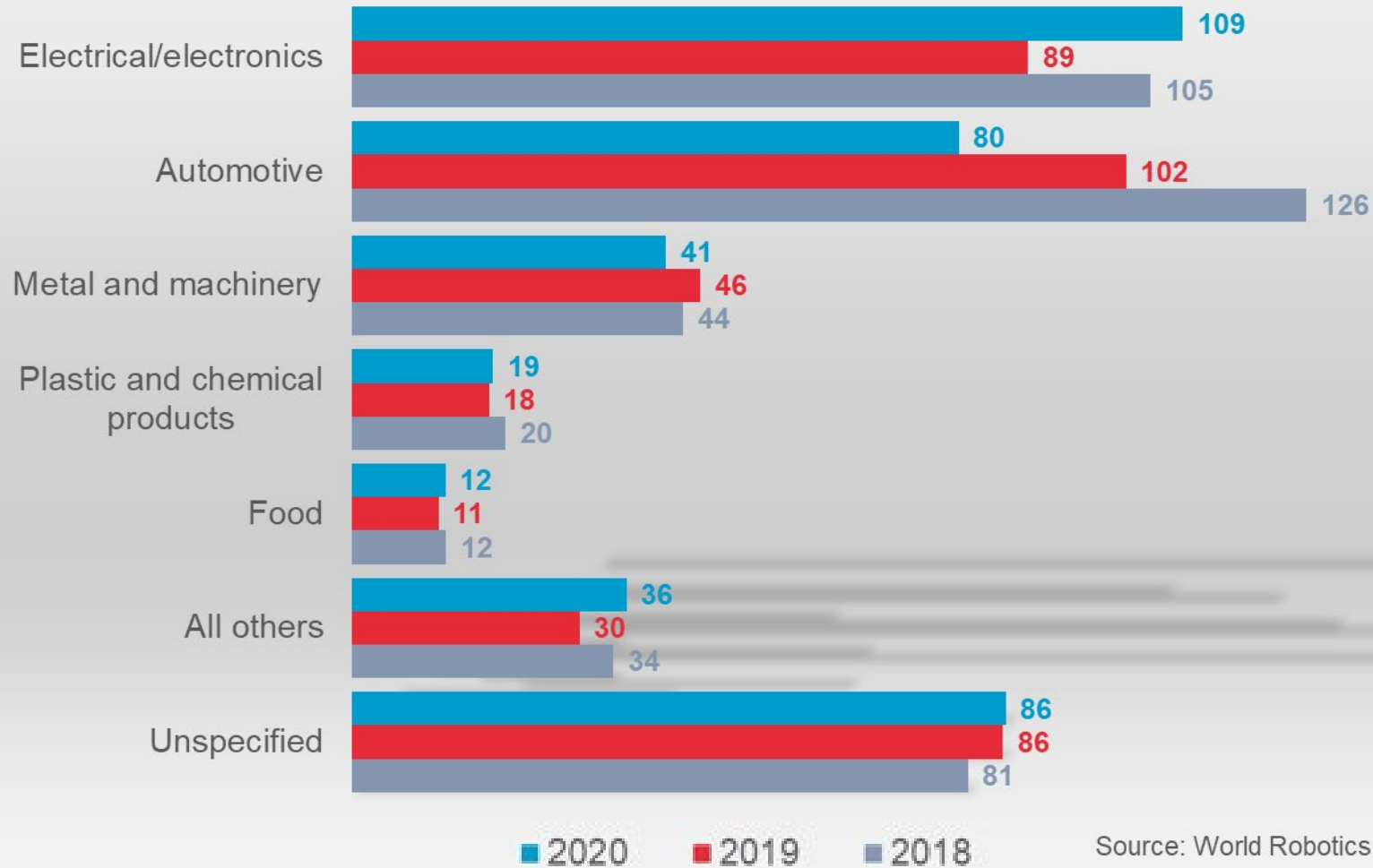
1,000 units



Source: World Robotics 2021

Annual installations of industrial robots by customer industry - World

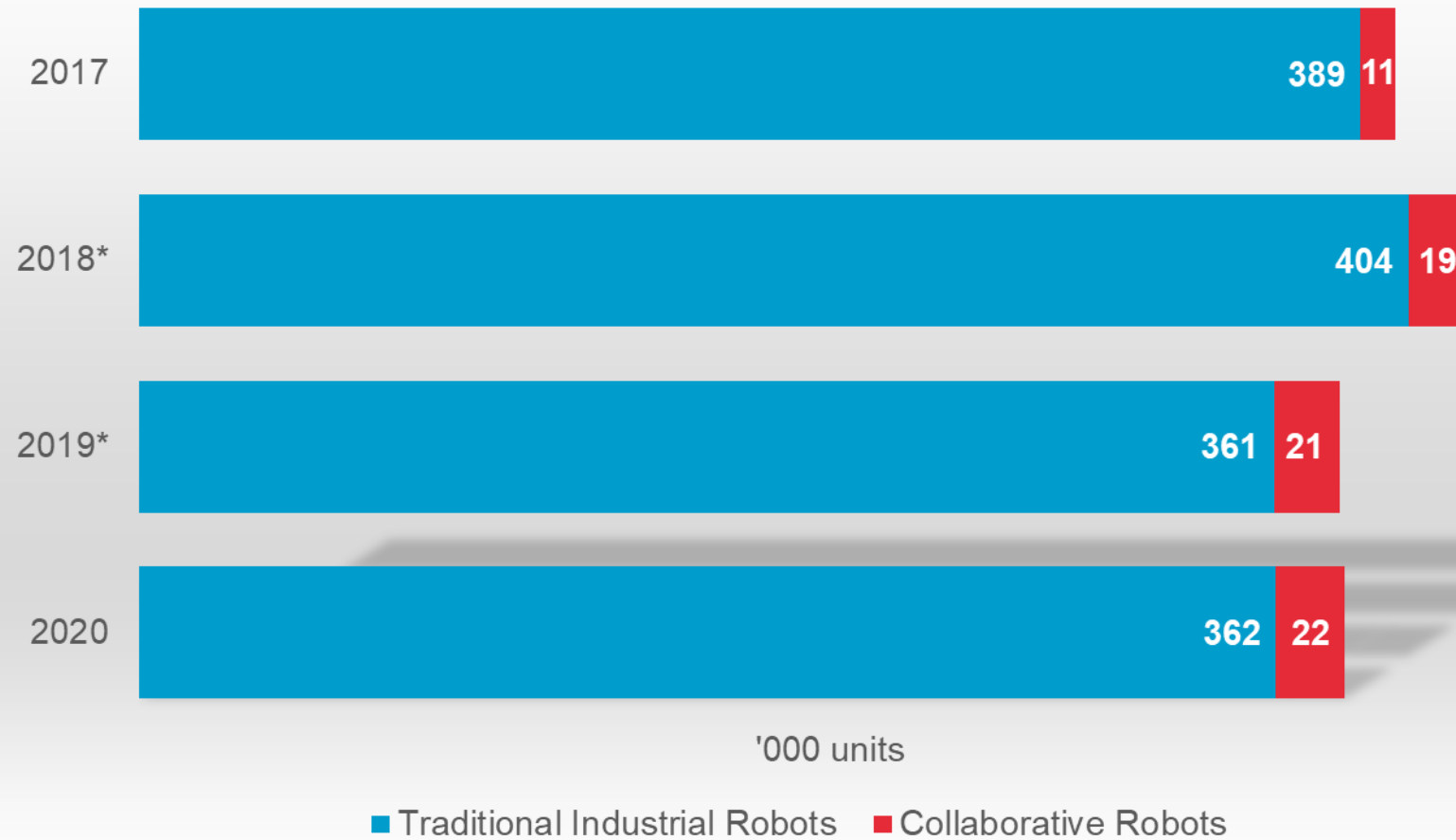
1,000 units



Source: World Robotics 2021

Collaborative robots: +6%

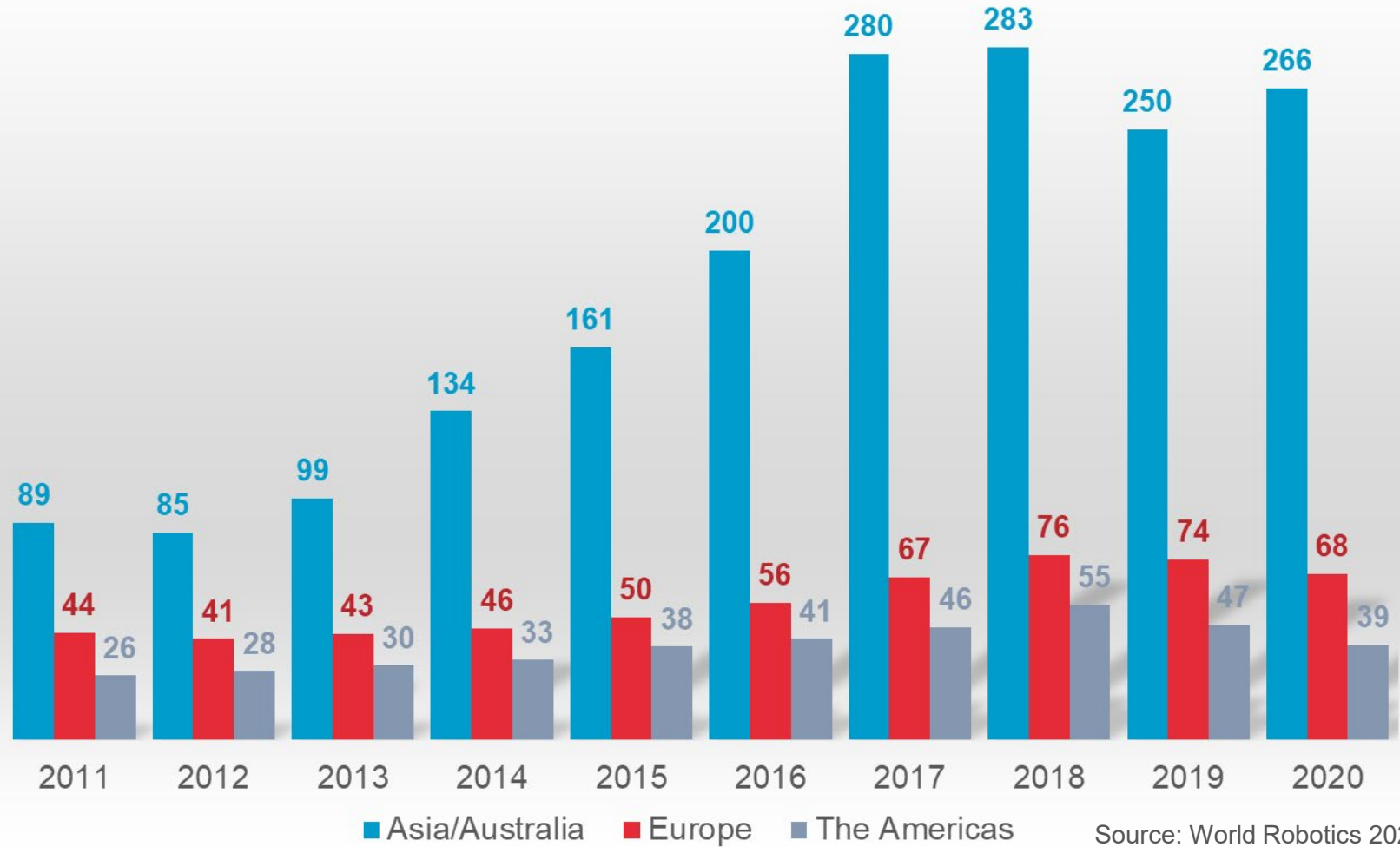
Collaborative and traditional industrial robots



*revised

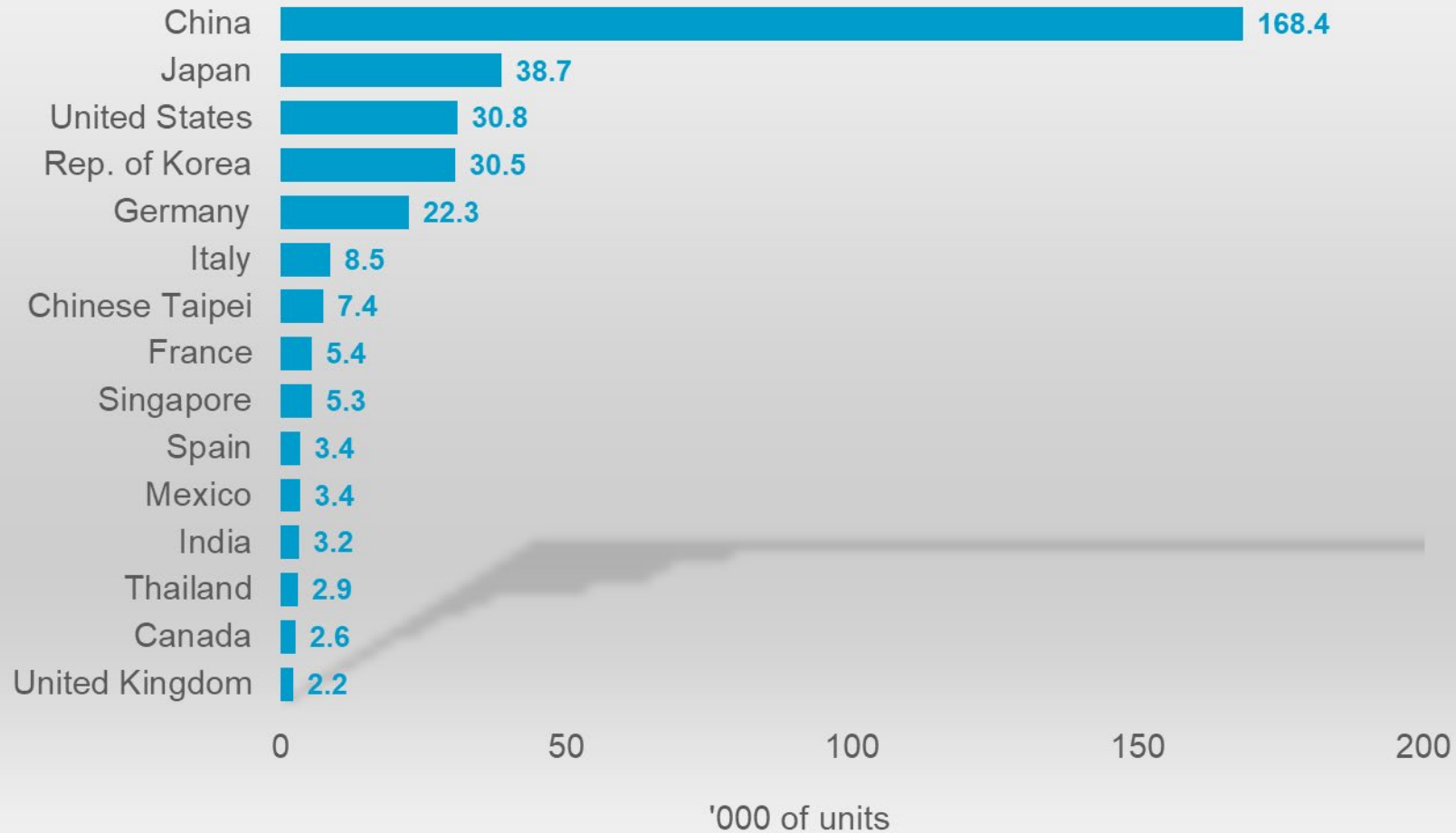
Source: International Federation of Robotics

Annual installations of industrial robots
(‘000 of units)



China increases its lead

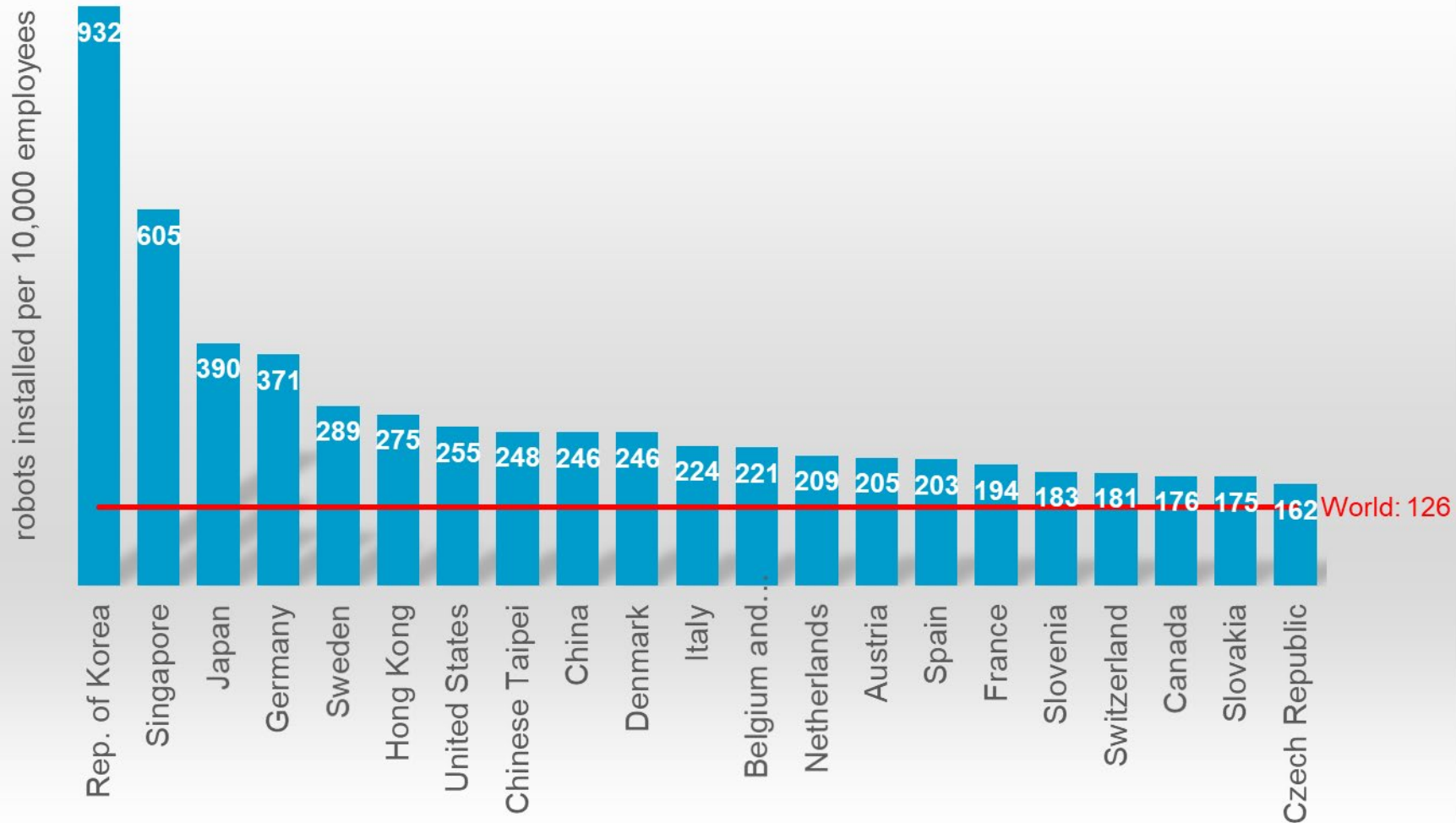
Annual installations of industrial robots 15 largest markets 2020



Source: World Robotics 2021

Global average robot density grows by 12%

Robot density in the manufacturing industry 2020



Source: World Robotics 2021

Trends and Forecast



Annual installations of industrial robots 2015-2020 and 2021*-2024*



Source: World Robotics 2021

Short-term market determinants

- Global economic **recovery**
- **Covid-19** restrictions still hamper business
- **Scarcity** of raw materials and intermediate products



Images: Pixabay

Market trends

- **Localization and regionalization of supply chains**
- **Lower total costs of ownership**
- **“Batch size 1”**



Image: Pixabay



Image: Pixabay



Image: Pixabay

Technological trends

- Advancements in **adjacent technologies**
- **Human-robot collaboration**
- **Sustainability**



Image: Pixabay



Image: Photoneo



Image: Pixabay

Service robots – top findings



2020: Still growing strongly

New professional service robots*

- 131,800 units (+41%)
- Turnover: USD 6.7 billion (+12%)

New consumer service robots

- 19 million units (+6%)
- Turnover: USD 4.4 billion (+16%)

Service Robotics – TOP 5 Application trends

- **AMR and delivery robots**
flexible solutions
- **Cleaning and disinfection**
+ 50 companies due to Covid-19
- **Medical and rehabilitation**
individual support
- **Social robots**
telepresence – particularly during Covid-19
- **Automated restaurant**
staff support, reduce personal contact due to Covid-19



Image: Effidence



Image: Bluebotics



Image: Cyberdyne



Image: Ava Robotics



Image: Miso Robotics

AMR and delivery robots: flexible solutions



Cleaning and disinfection: + 50 companies



Medical and rehabilitation: individual support



Social robots telepresence – particularly during Covid-19

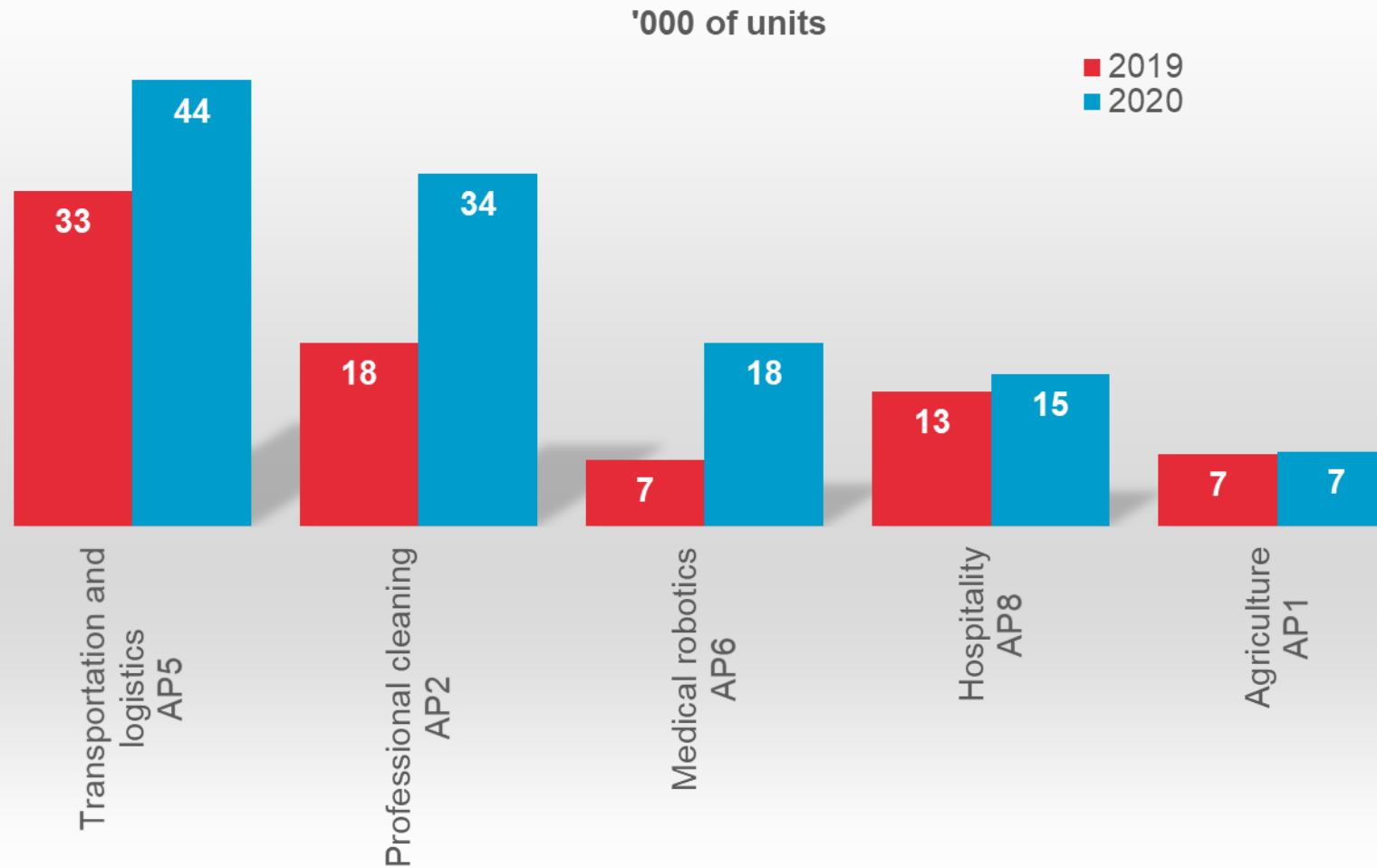


Automated restaurant staff support, reduce personal contact due to Covid-19



Main professional applications

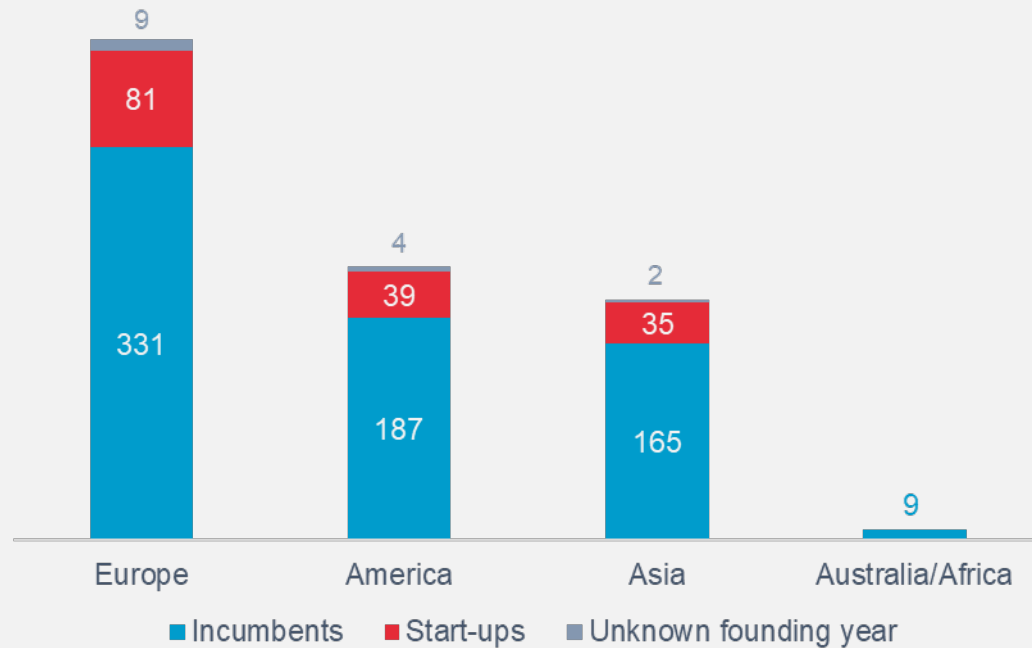
Service robots for professional use. Top 5 applications
Unit sales 2019 and 2020



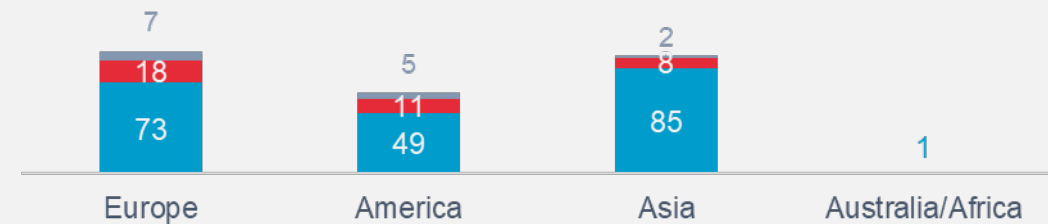
Source: World Robotics 2021

More than 1,000 service robot suppliers worldwide

Number of service robot suppliers by region and age - professional applications



Number of service robot suppliers by region and age - consumer applications



Source: World Robotics 2021

- Platforms as market place
- Safety, security, privacy
- Robots enter the open world



Image: Xito



Image: Mojin
Robotics/Deniz Saylan



Image: Savioke

Thank you for your attention.