

2022 Trends to Watch: Manufacturing technology

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Key messages

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Sustainability: net-zero

- The roadmap for the top 50 manufacturing companies.
- The sustainability challenge.

②

Supply chain bottlenecks

- Critical component shortages and prolonged lead-times.
- Shipping delays and bottlenecks in major shipping ports.

③

Input cost fluctuation

- Energy supply volatility in China impacting global markets.

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Shift from CapEx to OpEx :

- Critical component shortages.
- COVID-19 impacting order fulfillment and growing backlogs.

⑤

Enterprise and software

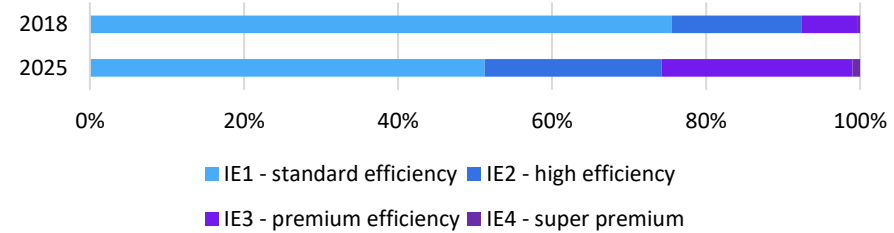
- Entrance of major software and cloud providers into the industrial space.
- Key applications include IIoT, factory and warehouse automation.
- The future of manufacturing through connectivity



Sustainability and carbon neutrality influencing manufacturing investment

Electric motors in manufacturing consume around one third of the world's electricity, a total of 8.6 Trillion KWH, the equivalent of the annual electricity consumed by China and India. MEPS (Minimum Energy Performance Standards) for low voltage motors have played an important role in helping countries to meet energy efficiency and carbon dioxide emission targets.

Global LV installed base by efficiency level
2018 vs 2025

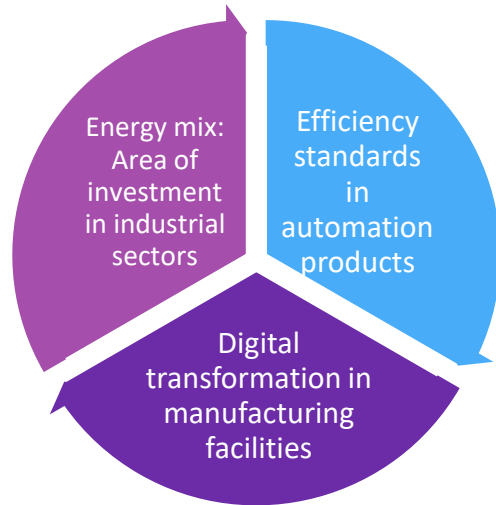


Attachment rate of motors and drives

~19% in 2014 → ~23% in 2020

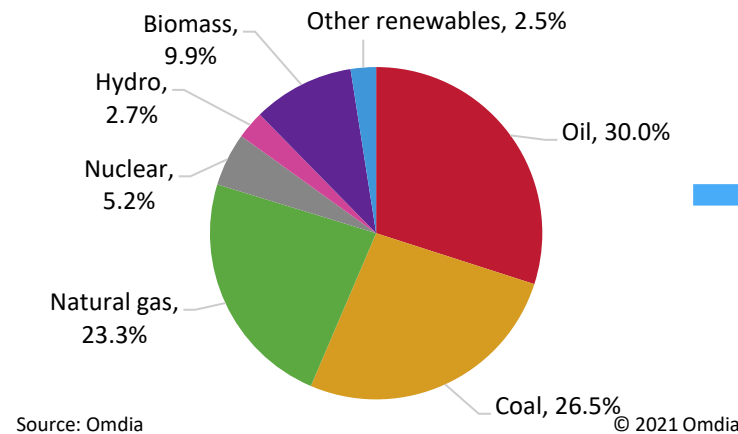
By 2025, the number of IE3 and IE4 installed motors is projected to double; attachment rate of drives increases to 26%.

Sustainability and carbon neutrality goals influencing global manufacturing investment from three aspects:

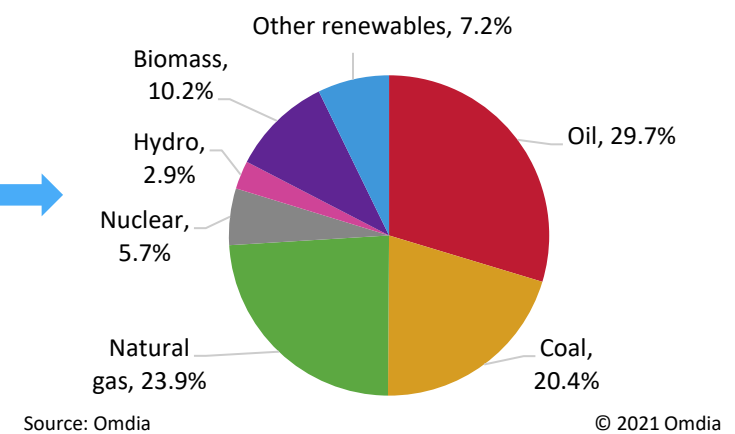


Primary energy demand shifting slowly from traditional to renewable sources, attracting investment to accelerate infrastructure development.

The world primary energy demand by fuel type, 2020



The world primary energy demand by fuel type, 2035



The sustainability challenge

In 2020 **35 billion tonnes** of Carbon Dioxide were emitted

One third was from manufacturing and construction.

Industrial energy consumption estimated to reach **240.2 quadrillion BTUs** in 2020

Only **8.5%** of industrial energy consumption was from renewable sources

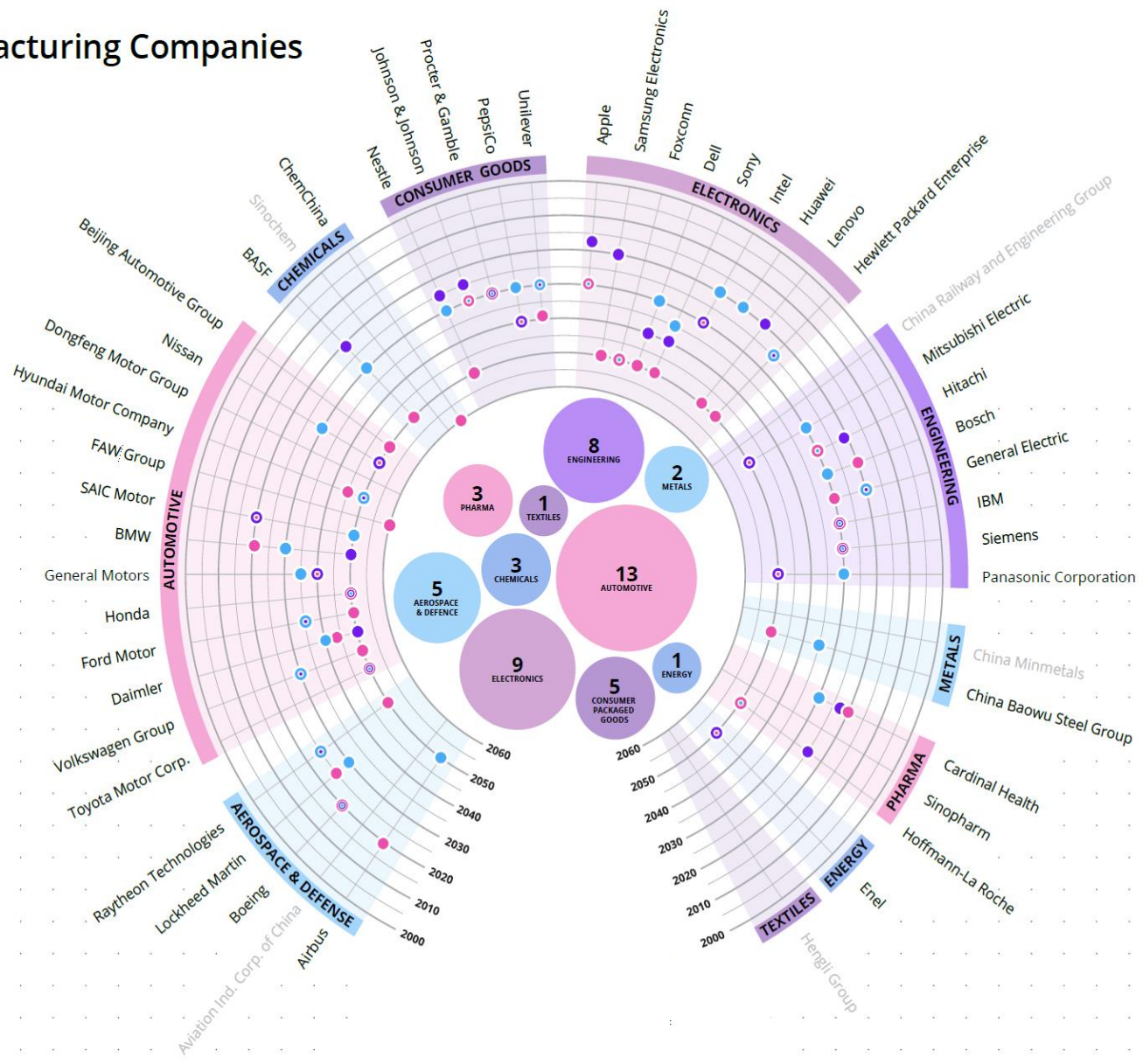
16 billion gallons of water are consumed by US factories every day.

US factories emit **1.2 trillion gallons** of untreated sewage and industrial waste every year

3.2 billion tonnes of metal and **4.1 billion tonnes** of cement were produced in 2019.

Industrial pollution accounts for **50%** of all pollution in the US

Top 50 Manufacturing Companies



HOW TO READ


- Year
- 2050 ● **RE100**
100% of a company's energy is from renewable sources
 - 2030 ● **Science Based Targets (SBT)**
Reduce greenhouse gas emissions consistent with the level of decarbonisation required by science to limit warming to less than 1.5°C / 2°C compared to pre-industrial temperatures
 - 2021 ● **Carbon Neutral**
A company's greenhouse gas emissions must be completely offset
- Company





Supply chain bottleneck reshapes industrial business models

Industrial automation equipment market

 Projected to reach \$22.5 billion in 2022
6.6% growth from 2021

 Revenue CAGR 20-24 by region
Asia & Oceania - 6.5%
EMEA - 5.3%
Americas - 6.1%

 **Global supply chain disruption**

Supply chain disruption worsening caused by components shortage and lead-time delays, restricting market growth.

 **Energy crunch**

Gas and coal prices soar as the energy supply crunch continues globally. This will further increase manufacturing costs and could lead to temporary closure of energy intensive factories.

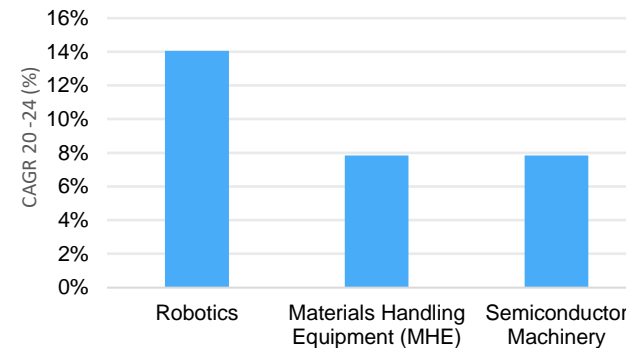
 **Rising input costs**

Increase in freight costs, commodity prices, and component costs are heavily impacting industrial markets.

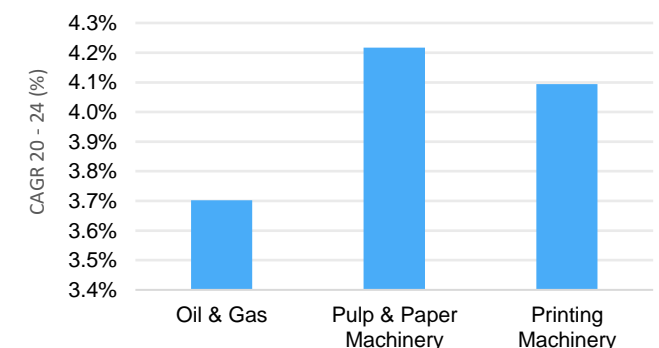
 **Orders surge as Covid-19 recovery begins**

Strong order intake reported by major automation equipment suppliers in post-pandemic recovery.

Global industrial automation equipment markets forecast highest % revenue growth



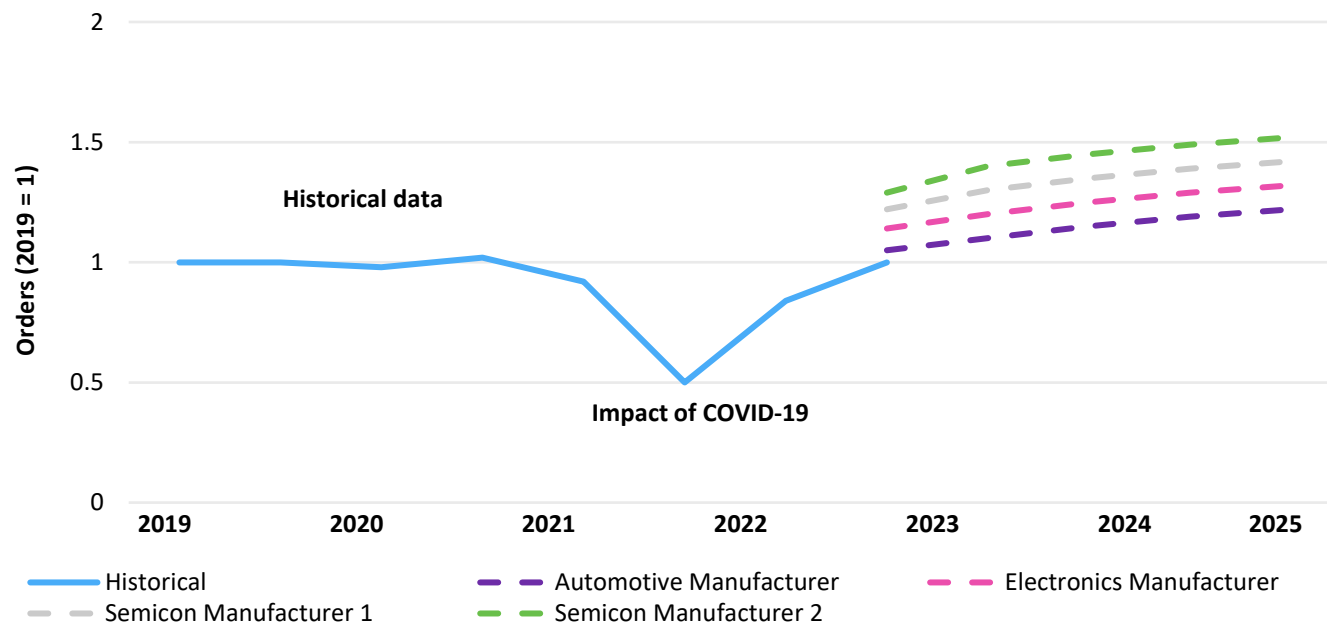
Global industrial automation equipment markets forecast lowest % revenue growth



Supply chain bottleneck reshapes industrial business models



Forecast scenario automotive order inflation



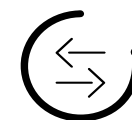
Source: Omdia

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Freight cost increased ~70-95% in 2021

Input cost spike ~15-20% in 2021

Average lead-times ~12 to 15 weeks in 2021



Secondhand equipment market

Supply chain disruptions have resulted in a boom in the secondhand equipment. Growth in 2nd hand equipment will inevitably dilute future growth of new machinery.



Minimum customization

In order to remain competitive in the market, equipment and automation vendors are targeting product markets with basic functionality with minimal customization to reduce the impact of extended lead-times.



Freight and shipping

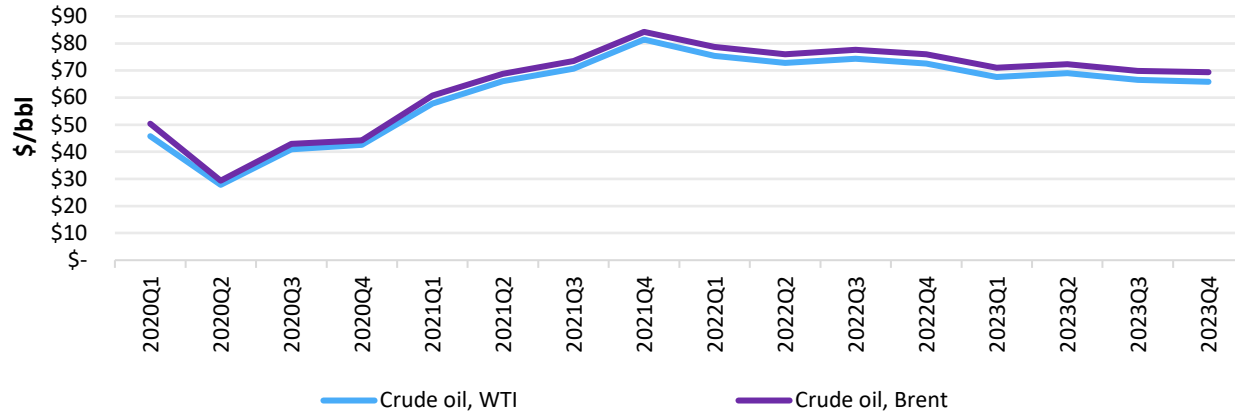
Increased delays and shipping costs have significantly impacted the industrial landscape throughout the pandemic. With the continuation of geopolitical tension with China and the US/Europe freight and shipping is expected to return to normalcy sometime in 2023.



Fluctuation in manufacturing input cost



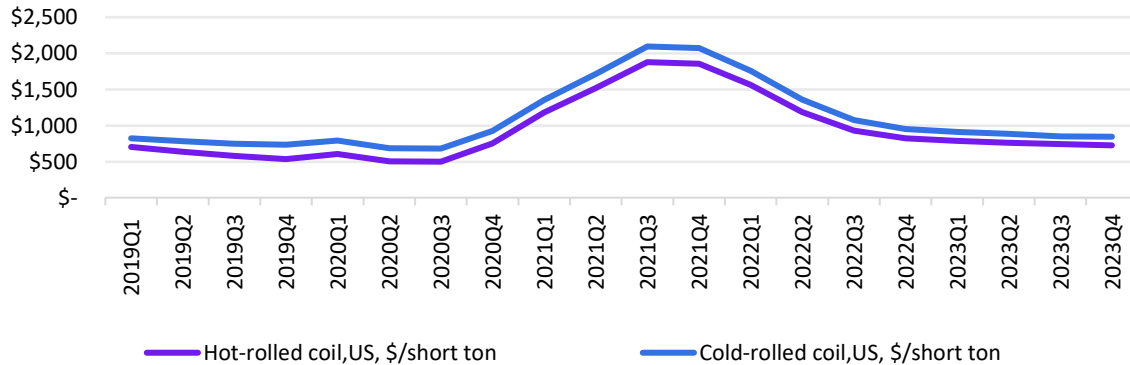
Crude oil price



Source: IHS Markit, November 2021

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Commodity price



Source: IHS Markit, November 2021

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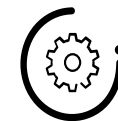
Manufacturing costs increasing

Rising manufacturing input costs coupled with soaring logistic costs are pressuring higher product prices for global manufactures. This is especially prevalent in US industrial markets.



Cost reduction

Manufacturers have suspended low- margin product in favor of higher profitability. Shortages have also impacted product functionality as seen in the automotive sector where some models have been released with less features.



Supply chain diversification

Manufactures are seeking supply chain alternatives to save procurement costs. In preparation for future markets manufactures will look to significantly de-risk supply chain dependency on Asia. This will be achieved through closer to consumption production.



Enterprise and software companies - New entrants into the industrial ecosystem

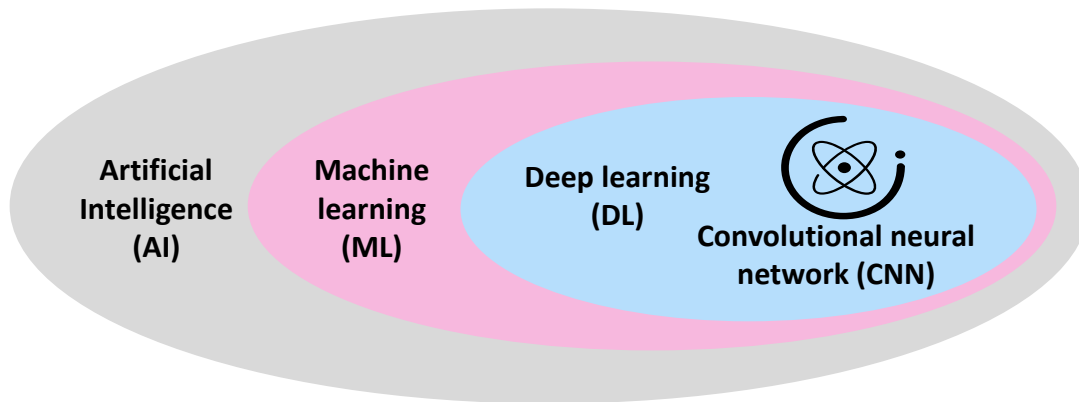


Cloud providers: Major machine vision providers are rapidly deploying deep-learning enabled solutions.

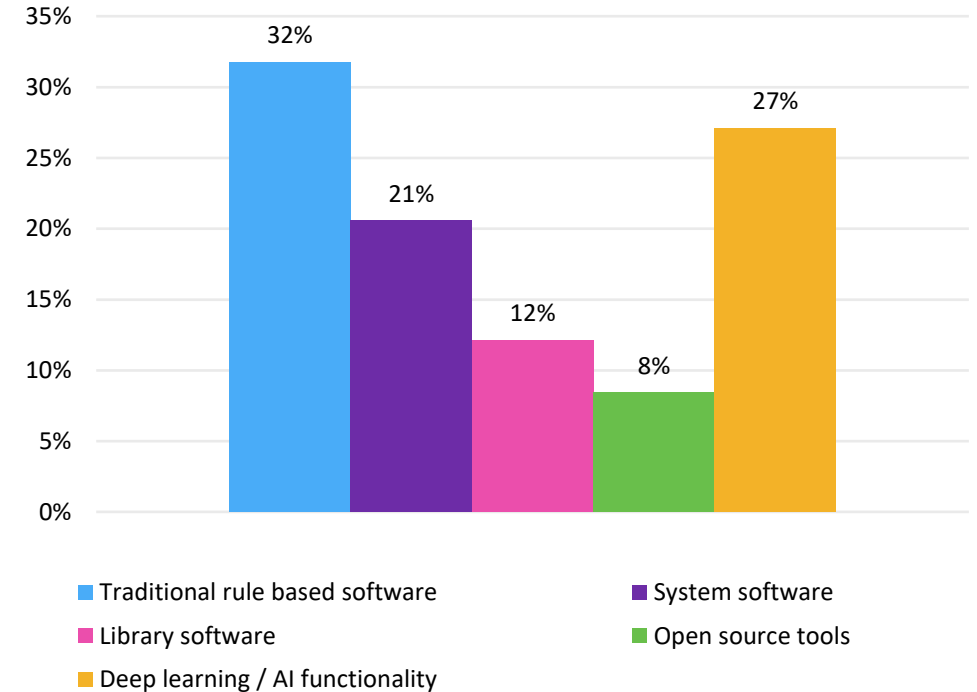
The entrance of Amazon, Microsoft and Google into the industrial vision space has accelerated the adoption of deep learning (DL) functionality for leading machine vision providers.

This trend will impact the growth of smart cameras and smart sensors deployment outside low volume-controlled environments. This will also be seen with the growing utility of system on chips (SOC). The impact of smart devices and DL solutions has been seen most ubiquitously in the logistics and packaging industry. Barcode track and trace solutions are being deployed to combat a boom in E-commerce demand constrained by manufacturing job shortages and COVID-19 restrictions.

Artificial intelligence and machine vision



Machine vision software provider landscape- 2021





Digitalization of the industry is driving the growth in the connected nodes.

Industrial communication market

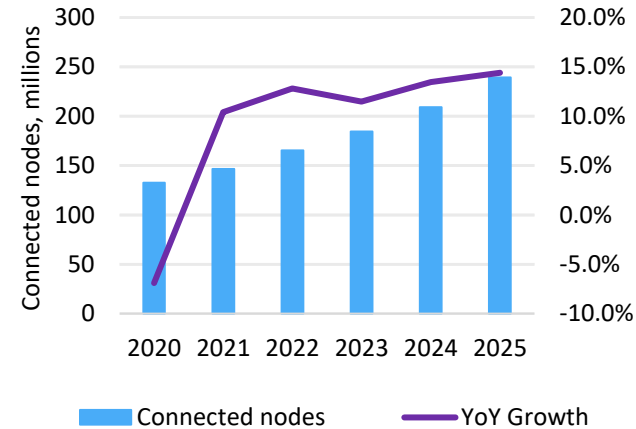


Estimated to grow 10.3% in 2021, after a hit in 2020 due to the pandemic



CAGR of the new connected nodes 2020-2025 : 13,1%

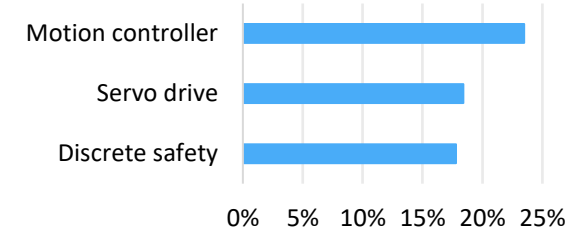
Global market for newly connected nodes



Top-3 products, based on amount of newly connected nodes:

- Remote I/O
- PLC
- Sensors

Top-3 product, based on CAGR of the amount of newly connected nodes:



Market growth driver – digitalization of the industry/smart manufacturing:

- Flexible and Modular production
- Remote manufacturing
- Sustainable production
- Cybersecurity
- Improved quality
- Reduced costs

Enabler and communication tools are:

- Converged network and device interoperability
- Open architecture of the network
- IT technologies growing into OT:
 - Digital Twin
 - Edge computing
 - Cloud integration
 - Artificial Intelligence
 - Industrial Ethernet in the field



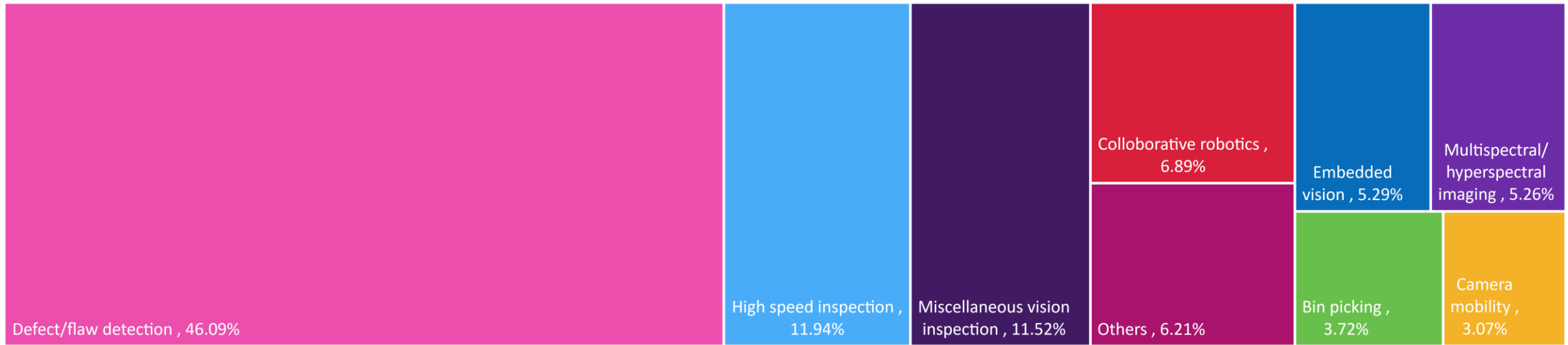
Key success factor is data availability, accessibility and data management capacity and tools

Vision applications: The product does not drive the application market

From the onset of the pandemic machine vision providers have raced to deploy AI and deep learning in the hope of exploiting new applications. This has also been illustrated by boom in M&A activity with the likes of sensor, chip and cloud providers. Ultimately the landscape of vision applications cannot be changed by short-term product launches and is still comprised of traditional vision use-cases.

Further progress and implementation of 3D vision and recent trends such as SOC's and event-based imaging will impact the overall landscape in a 5–10-year timeframe.

Machine vision in the worldwide application market, 2021



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