



# Industrial Robot Market Insights

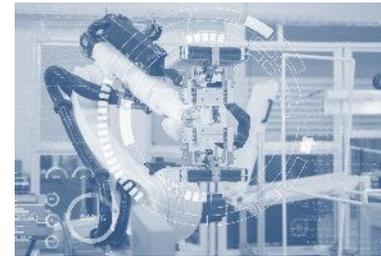
*- How cobots drive the automation*

Germany, September 2022

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# Industrial robotics are back on the growth path as technologies develop and production risks increase on a global level

- Industrial robotics market is expected to grow again after Covid-19 has stalled many investments into capital assets
- The # of industrial robots annual installations recovered in 2021 with a strong momentum and is expected to increase **by approx. 6% p.a.** until 2024
- The continuous demand for collaborative robots („cobots“) drives the automation especially in small- & mid size organizations
- Industrial robots are designed for high speed automation of complete processes, while **Cobots** are a **flexible entry solution** for automation of single tasks
- Cobots are applicable in a broad range of industries and **provide systematic advantages** for several key industry requirements

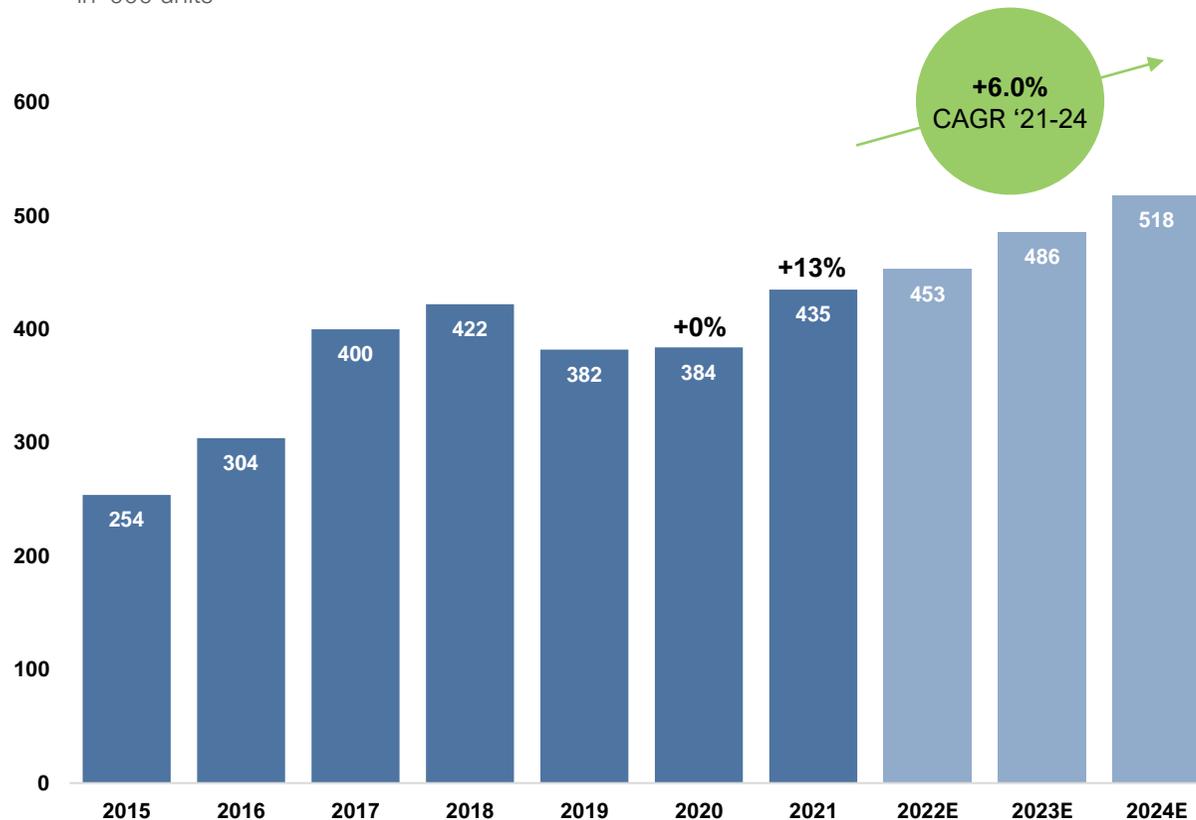


- The implementation of industrial robots drives value by **reducing direct and indirect costs**, improving production time and addressing output quality
- Automation will allow to flatten global supply chain issues due to **real-time control of the production** equipment along the value chain
- **The demand for industrial robots is expected to increase** to to the systematic shortage of qualified personnel in developed countries

The # of industrial robots annual installations recovered in 2021 with a strong momentum and is expected to increase by approx. 6% p.a. until 2024

— Annual installations of industrial robots

in '000 units



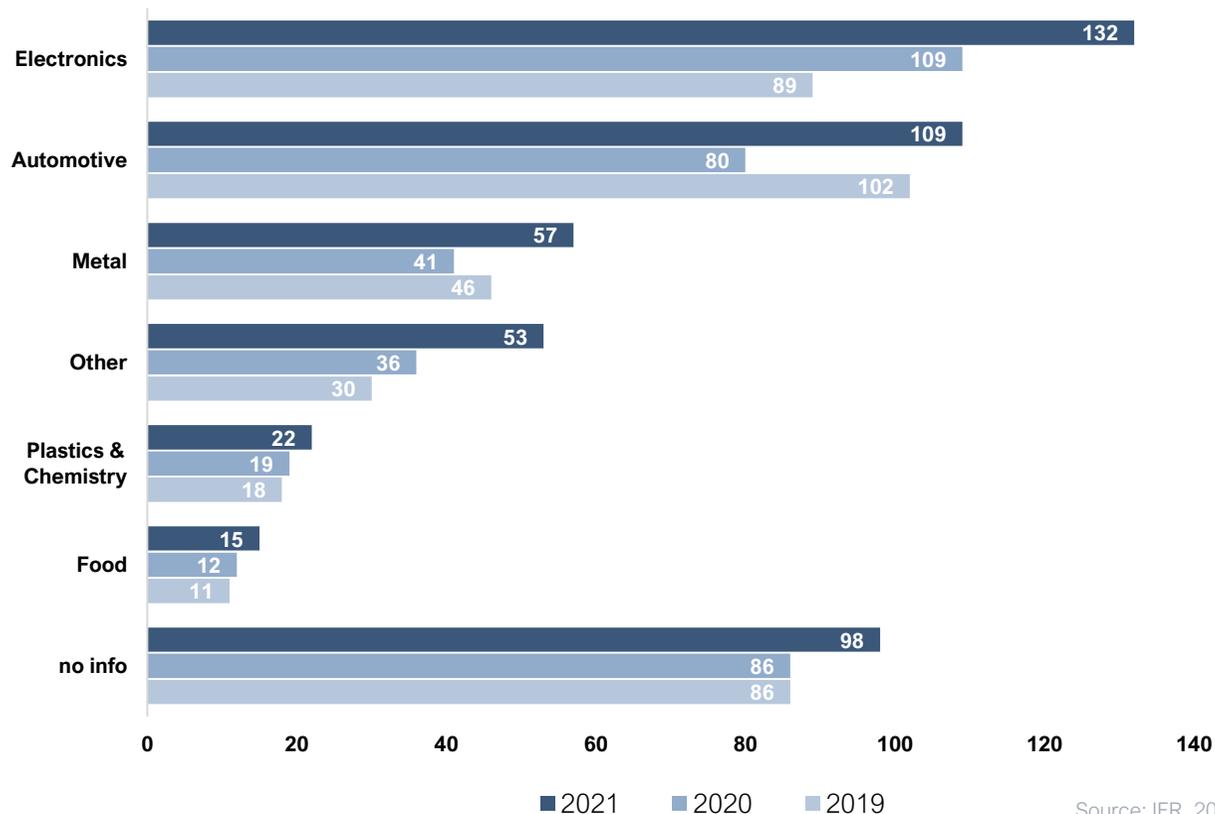
Source: IFR, 2021

- Industrial robots are expected to grow ~6% per year through 2024.
- Long-term growth is hinging on the economic and health recovery of countries and key sectors (including automotive and electronics) from vaccine programs. IMF forecasts 5-6% growth in the world economy in 2021 and 2022.
- Advancements in the degree of automation of robots will pose a positive impact, through speed and efficiencies in manufacturing, navigation/autonomy, while relying less on human control.

# Electronic production is now the most important end-industry for industrial robotics due to the high level of standardization

## Annual installations of industrial robots by industry

in '000 units



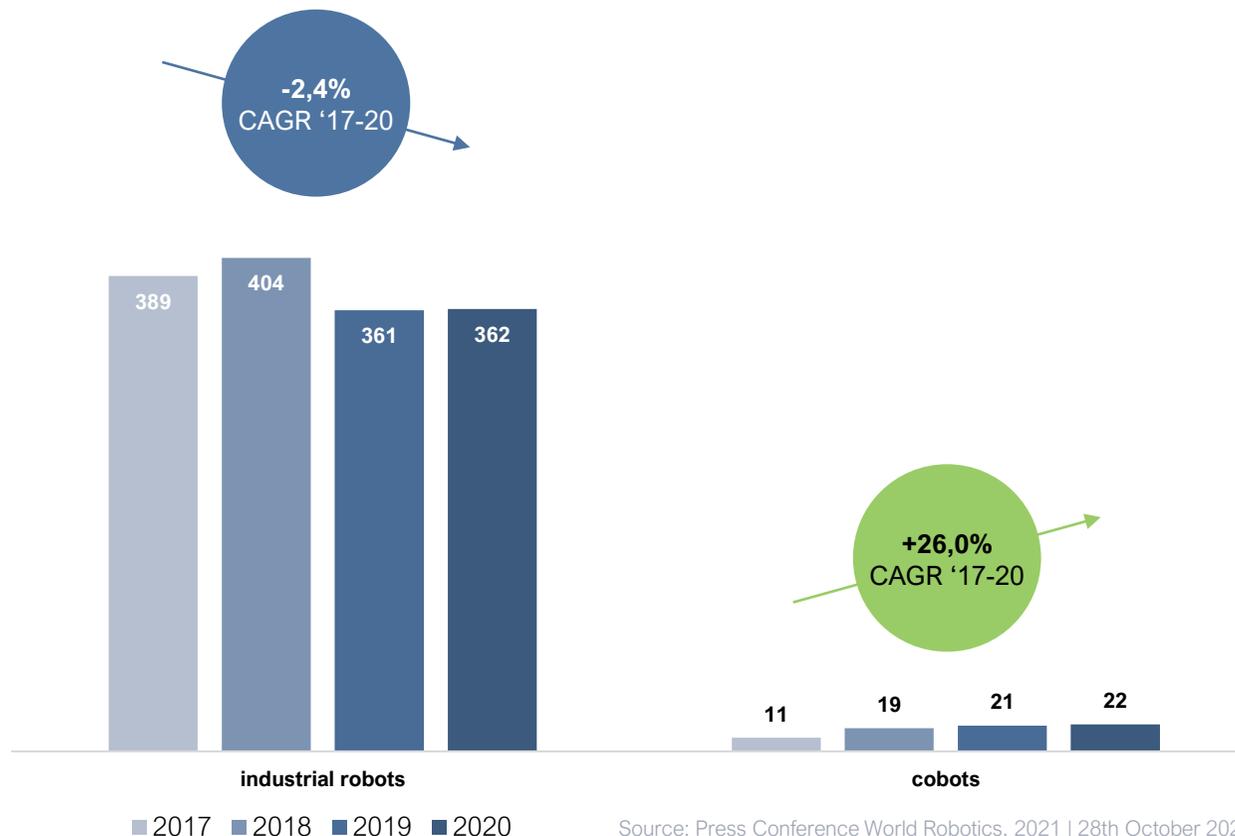
Source: IFR, 2021

- The year 2020 created a historic moment in the history of robotics. The automotive industry lost its position as the largest customer of industrial robots. 79,849 units (-22%) were installed.
- The limited production capacity and the disturbances in supply chains because of the pandemic have demonstrated the need for additional production capacity in the electronics industry.
- Electronic production profits from the high level of process standardization as well as a significant demand in throughput improvements to keep up with the global demand for electronic products in general.
- However, the “boom after crisis” is expected to fade out in 2022 on a global scale. From 2021 to 2024, average annual growth rates in the medium single-digit range are expected.

## The continuous demand for collaborative robots („cobots“) drives the automation especially in small- & mid size companies

### Global development of robots and cobots during Covid-19

in '000 units



Source: Press Conference World Robotics, 2021 | 28th October 2021

- Coming from a lower installed base, the market development of industrial cobots has been positive during the pandemic, while industrial robots in general had to face a slowing market demand.
- The segment of industrial cobots opens a lot of new opportunities for small- & midsize companies, who are normally not capable to make large scale investments into a fully automated production line consisting of industrial robots.
- Cobots are financeable for small size companies and can be easily integrated into existing value chains.
- We assume the positive cobot trend to continue and even to accelerate as soon as a wider scale adoption on the market further reduces doubts and reservations.

# Industrial robots are designed for high speed automation of complete processes, while Cobots are a flexible entry solution for automation of tasks

## Industrial Robots



Industrial robots are designed and programmed to take over one specific task at high speed. They are capable to transport high loads and conduct repetitive tasks.

Goal of industrial robots is to maximize output, speed and utilization time in controlled environments.

- ✓ High speed operation in controlled environment
- ✓ Allows full automation of production sites (reduction of staff)
- ✓ Very robust with long lifetime
- Requires security zones
- Redesign of production processes is often required
- Very expensive and only useful for full-scale automation of production lines

## Cobots



Cobots shall support human work, but not replace humans at all. Cobots are used in flexible environments to cover or parallelize repetitive work.

Goal of cobots is to improve productivity in complex production environments.

- ✓ Able to cover multiple applications
- ✓ Low cost & low entry hurdles
- ✓ Small weight allows transportation to multiple places in the production environment
- Often requires task-individual programming
- Still low acceptance from workers & decision makers
- Low operational speed due to functional safety demand

# Cobots are applicable in a broad range of industries and provide systematic advantages for several key industry requirements

## — The top seven industries for cobot use

	<b>Performance</b> High throughput and make-to-stock operations	<b>Reliability</b> Low error-tolerance and intense quality control	<b>Accuracy</b> Standardized tasks that require high precision work	<b>Safety</b> Dangerous tasks or careful product treatment	<b>Versatility</b> Customizable production programs with changing requirements
<b>01</b> Electronics	✓	✓	✓		✓
<b>02</b> Automotive	✓	✓	✓		✓
<b>03</b> Pharma	✓	✓	✓	✓	
<b>04</b> Food	✓	✓		✓	
<b>05</b> Metalwork			✓	✓	✓
<b>06</b> Packaging	✓		✓		
<b>07</b> Logistics	✓				✓

In 2022, the market environment for cobots already covers a broad range of products with different key capabilities and price tags

— Competitive environment for cobots (extract)



**Rethink robotics Sawyer black edition**

**Fanuc CR series**

**Universal robots UR+ series**

**Kawasaki robotics duAro2**

**Yuanda Roboter**

**Yasakawa HC series**

**Capabilities / Key Benefits**

- pick-and-place capable
- integrated software with plug & play

- maintenance-free up to 8 years
- intuitive programming & control

- broad range of products covers multiple applications

- double-arm robot allows parallel and cooperative arm motion

- integrated ML capability
- incl. high precision camera

- simple programming capability allows highly flexible motion

**Price range in EUR (indicative)**

30.000 – 32.000

28.000 – 31.000

25.000 – 45.000

~52.500

~30.000

upon request



Cobots often require additional effort and cost for programming, maintenance and operation, which highly depend on the specific operational environment. We would assume a general additional factor of **up to 50%** of the purchase price as reasonable. If you would like to evaluate the possibilities of cobots for your business, please get in [contact](#) with us.

# The implementation of industrial robots drives value by reducing direct and indirect costs, improving production time and addressing output quality

## — Primary benefits along the value chain

Key benefits	Value lever		
	Time	Cost	Quality
Increase efficiency & productivity	✓	✓	
Reduce errors, scrap & re-work	✓	✓	✓
Improve safety		✓	✓
Take over repetitive low value tasks	✓	✓	
Increase revenue by improving cycle times & fulfillment rates	✓		✓

✓ addresses the value category

Source: INVENSITY research

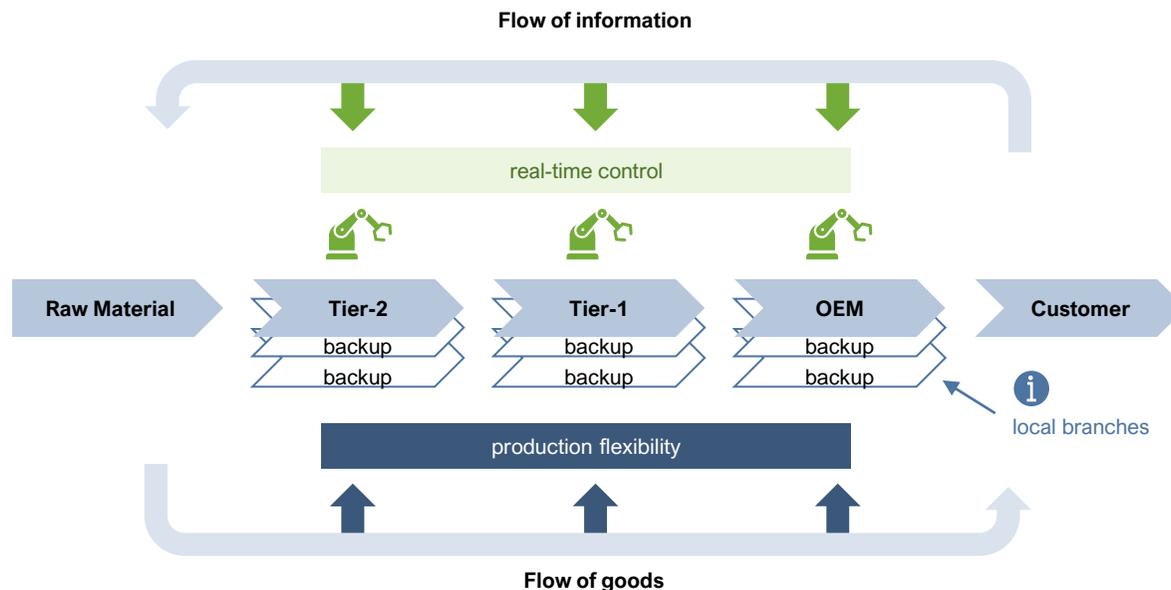
- The key benefits of industrial robots along the value chain address the core value categories time, cost and quality for both – customer and supplier.
- Ultimately the customer satisfaction can be significantly improved in multiple areas by optimizing the production environment with industrial robotics – either as a fully automated production environment or as a hybrid solution with humans and cobots.

# Automation will allow to flatten global supply chain issues due to real-time control of the production equipment along the value chain

## — Anticipated effects of automation in the supply chain

- Degree of production automation will become a key driver of profitability
- As costs for processing labor decreases, transport costs and energy costs will become a decisive factor in re-locating issues
- Parallelization of production with local branches can cover breaks in supply
- Output quality and customer satisfaction will improve

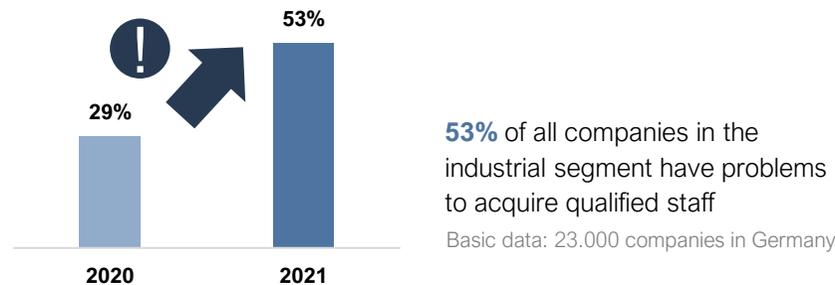
- As the market for autonomous robots grows, the end-to-end supply chain will become more stabilized due to flattening of supply & demand in real-time.
- Industrial robots have the potential to overcome transportation-induced supply chain issues as production environments will again move closer to the demand of the final products.
- Ultimately the implementation of industrial robots is also an advanced way to stabilize production quality, as error-reduction and cycle-time improvements drive customer loyalty and drive sales growth in any industry.



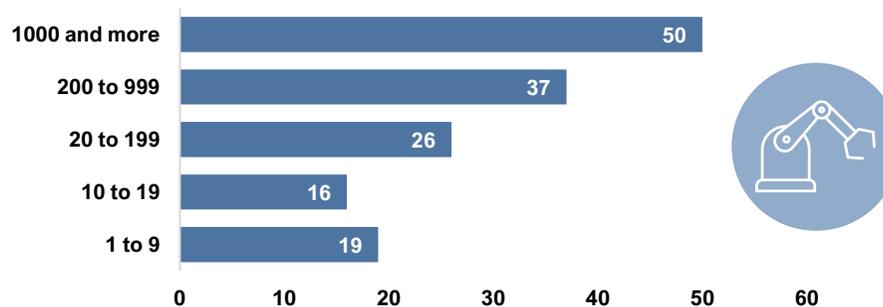
# The demand for industrial robots is expected to increase to to the systematic shortage of qualified personnel in developed countries

## — The pandemic resulted in a systematic personnel shortage in industrial production

Share of companies that are unable to fill open positions over a longer time



Share of companies, who consider robots as a short-term solution to overcome staff shortage [in %] by size of the organization (# of employees)



Source: DIHK - Fachkräftereport

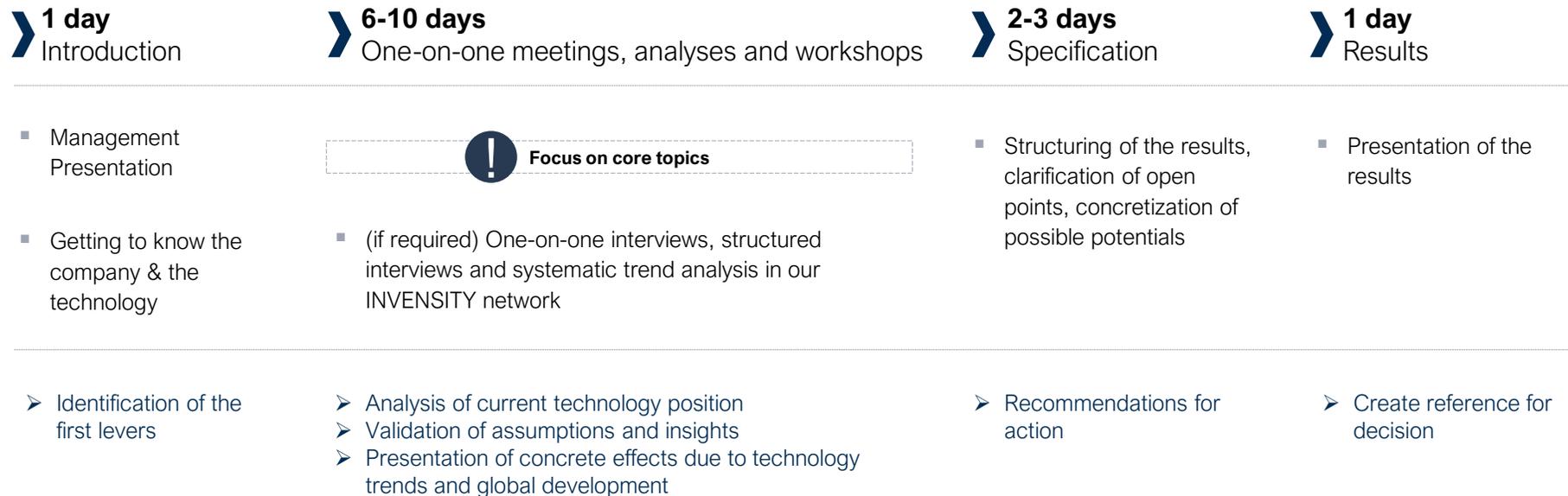
- Throughout the pandemic, many employees faced additional pressures at work, such as sudden layoffs and lockdowns and extraordinary personal challenges, including homeschooling their children and caring for aging parents.

These stressors have spurred a shift in workers' expectations. At the forefront of these expectations is the desire to maintain a healthy work-life balance. Today's workers are looking for greater flexibility by means of remote work options, flexible schedules, additional paid time off, and greater autonomy to set their own schedules.

- This is contrary to the typical demand in production environments, where constant work, following a specific tact rate in multiple shifts is a precondition of being productive. One solution to flatten the contradiction in supply and demand is the systematic implementation of industrial robots.

# The INVENSITY technology assessment supports your long-term investment strategy with technologically sound expertise

## — INVENSITY technology assessment (example)



We conduct the INVENSITY technology assessment within 2-3 weeks.  
The results are concrete recommendations for actions based on short- and long-term technology trends

# As part of a non-binding appointment, we jointly identify possible starting points for your organization

## Review

Are you planning a review of your portfolio or a strategic realignment? Then tell us about your current situation. Together we work out key opportunities and challenges and jointly define the objectives.

## Starting points

On the basis of the insights gained, we will show you initial starting points and jointly discuss possible approaches considering future technological developments and innovations.

## Next steps

We define the next steps together with you for either risk analysis or the creation of a long-term technology strategy and also provide an indicative estimation of the time & effort required.



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