

Information Material

TREND STUDY IN NEXT-GEN ROBOTICS

Exploring opportunities of AI-powered robotics in complex industrial environments

The challenge

Current solutions for automation are insufficient to address future-relevant needs

Rising labor costs, lack of skilled workers, productivity demands and intensifying global competition are putting growing pressure on Germany's economy.

Automation has been Germany's key lever to counter rising costs and labor shortage for decades but current solutions...



... are designed and pre-programmed for high-volume production that is characterized by repetitive processes in structured environments.



... do not address hard-to-automate processes that deal with a certain variety of different/ customized product types.



... cannot adapt to changing production environments and/ or new tasks in order to increase productivity while maintaining flexibility.

The promise

Advancements in robotics enable new automation opportunities ...

Software-related advancements

Physical/ embodied AI

Enables robots to go beyond pre-programming and allows it to reason and act in real-world environments



Advanced foundation models

AI models with enhanced reasoning, multimodal understanding, enabling generalization across tasks and supporting decision-making



Imitation and sim learning

Accelerates the optimization of complex automation by training models leveraging real-world data, mimicking or simulation



Enhanced kinematics

Enables performing fine-motor tasks by moving and manipulating irregular objects with precision, flexibility and adaptability



Enhanced computer vision

Allows robots to precisely observe and interpret its environment and to extract information via multi-sensor systems



Higher battery lifespan

Stimulates mobility applications for general-purpose robots, mitigating downtime with high-performance batteries



Hardware-related advancements







Next-gen robotics involve “context-aware” and AI-powered robots that interact with a dynamic real-world environment autonomously.

They go beyond pre-programmed activities and can perform real-time decision making.

The promise

... and increasingly gain traction by investment, industrial and tech companies

Extract

	Manufacturing scale-up	Physical AI	High-performance components
Investment companies	 <p>Figure AI secured over \$1B to expand manufacturing and scale real-world deployment of general-purpose humanoids.</p> <p>Parkway, Brookfield, Macquire etc.</p>	 <p>Skild AI raised \$1.4B to advance their general-purpose unified foundation model for physical AI, independent from robot form.</p> <p>SoftBank, NVentures etc.</p>	 <p>AILOS Robotics raised €3.5M to industrialize next-gen robotic gearboxes, enabling lighter, safer, and efficient actuation.</p> <p>QBIC, HTGF etc.</p>
Industrial and tech companies	 <p>Apptronik raised over \$935M and partnered with Jabil to ramp-up production and expand deployment of their humanoids.</p> <p>Mercedez-Benz, Google etc.</p>	 <p>NEURA received \$1.2B to advance foundation models, deploying Physical AI for their cognitive robot fleet.</p> <p>Tether, Amazon, Bosch etc.</p>	 <p>Xynova raised over \$13.7M to advance high-DOF dexterous robotic hands and integrated actuation systems.</p> <p>CATL, Xiaomi etc.</p>



Strong investment momentum supports the development and deployment of next-gen robotics in industrial environments, driven by advancements along the value chain.

Source: Figure (2025), Skild AI (2026), AILOS (2025), Apptronik (2026), NEURA (2026), Xynova (2025)

The promise

Manufacturing companies already start piloting and exploring the potential of next-gen robotics

Extract



NEURA x Bitzer x SAP

Bitzer increased productivity in warehouse operations and realized a flexible support system during demand fluctuations or peak periods.



Path Robotics x Saronic

Saronic partners with Path Robotics to accelerate the production of autonomous maritime vessels in its US' shipyard, leveraging physical AI-powered welding robots.



BMW x Hexagon/ Figure AI

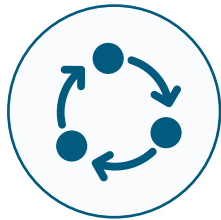
BMW tests humanoid robots in its production sites in Leipzig and Spartanburg, reducing manual labor in hard-to-automate processes.

The limitation

Current pilot projects are characterized by specific tasks and show distinct development levers

Current industry pilots focus on task, which...

... are highly repetitive



Tasks executed in **identical cycles throughout the entire shift**

... require low dexterity



Tasks involved **limited force-sensitive skills** or **sub-millimeter precision**

... include limited human interaction



Tasks operated in **physically separated zones with limited human contact**

Development potentials for next-gen robots, extract

Robot learning & data collection

Dexterity & kinematics

Operating time in mobile applications

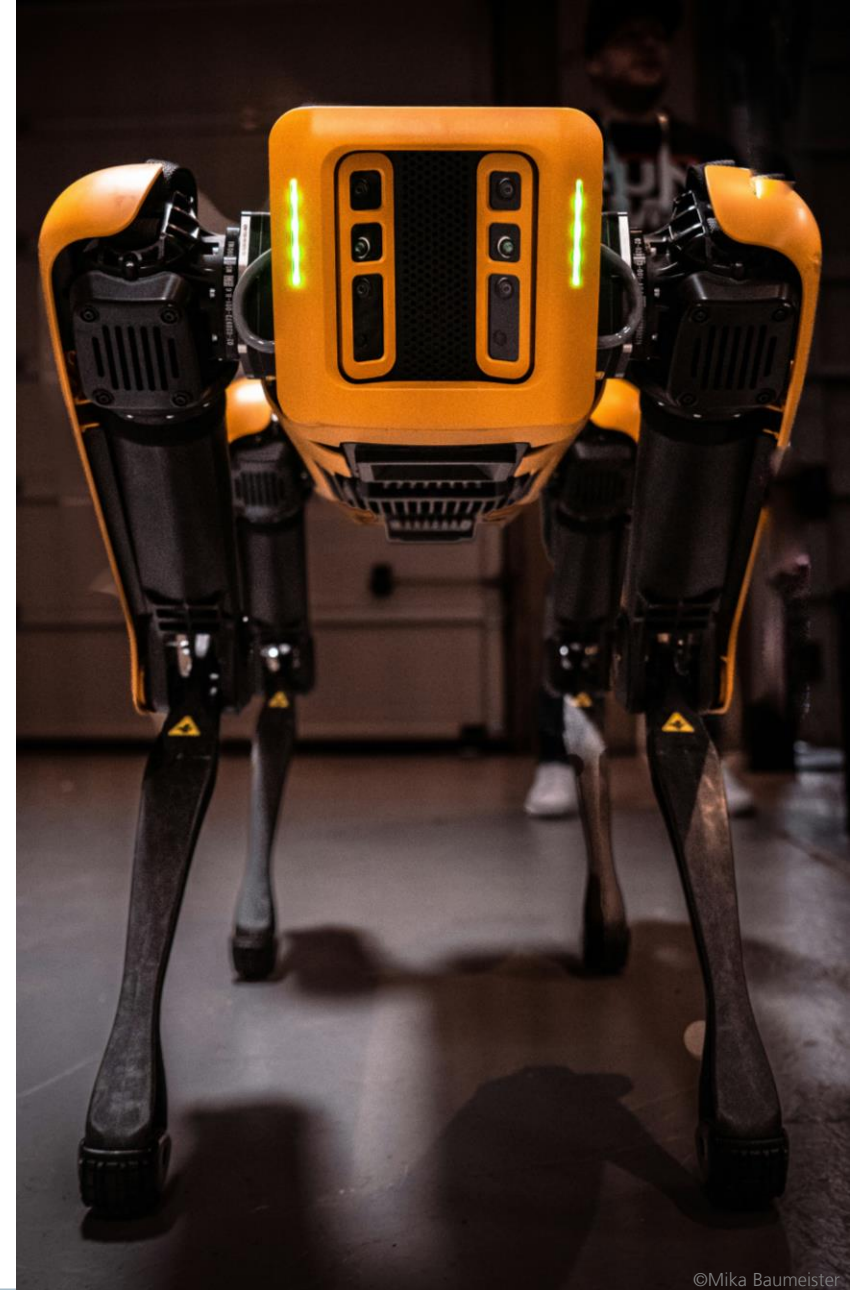
Safety standards

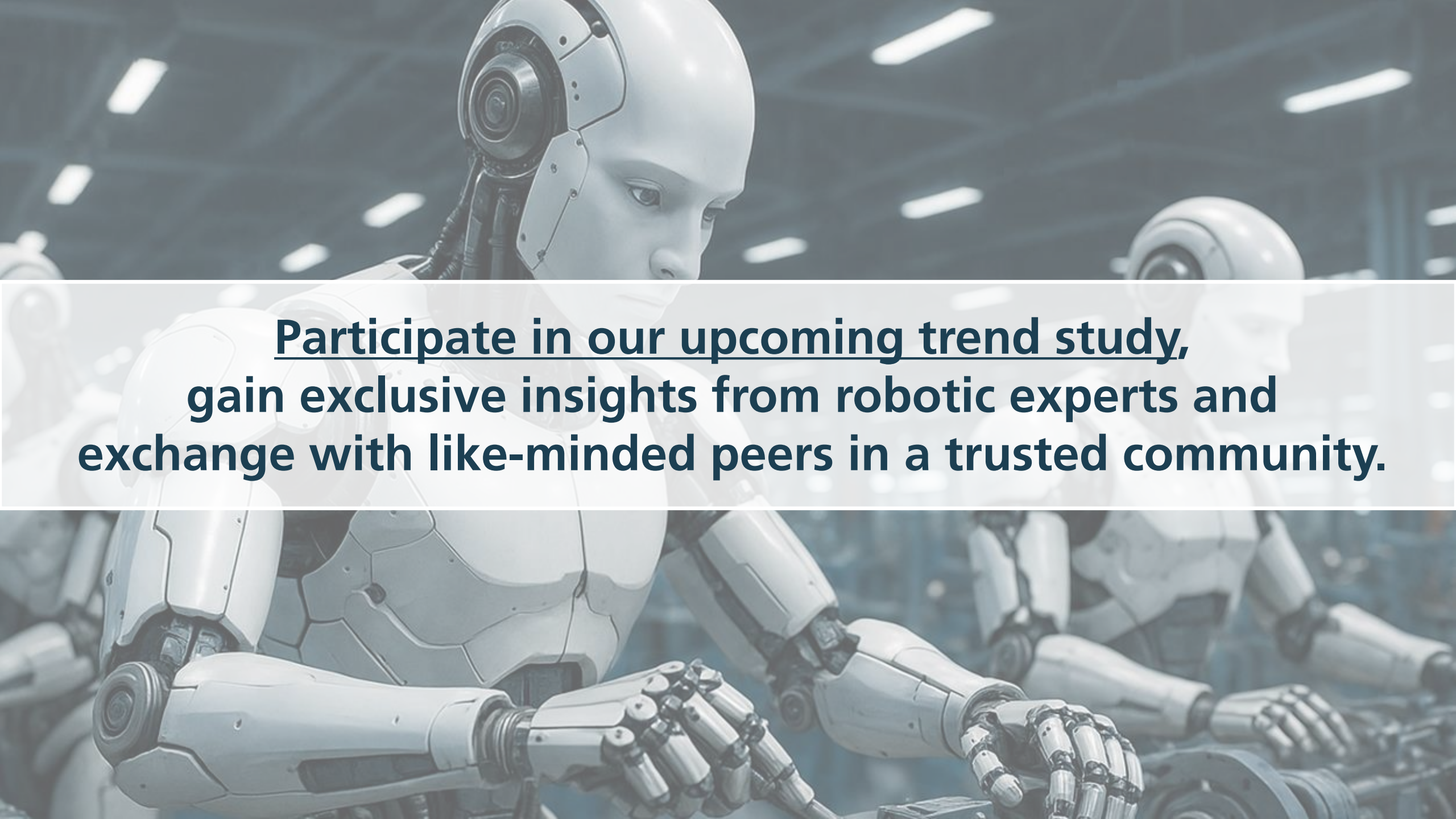
Scaled deployment

The implication

Three reasons why you should start exploring next-gen robotics now

- 1 Next-gen robotics offers the possibility to automate processes in unstructured and human-centric environments – without significant changes to processes or machines
- 2 Understand the market and its signals, build meaningful connections, invest in required capabilities and prepare early for a seamless integration
- 3 Explore opportunities for diversification, technology leadership and positioning options along the value chain in a fast-evolving and growing market



A futuristic white humanoid robot is the central focus, shown from the chest up. It has a sleek, metallic design with visible joints and a human-like face. The robot is looking down at its hands, which are positioned as if working on a task. The background is a blurred industrial or factory environment with overhead lights and other robots in the distance. A semi-transparent white banner is overlaid across the middle of the image, containing the text.

**Participate in our upcoming trend study,
gain exclusive insights from robotic experts and
exchange with like-minded peers in a trusted community.**

Our trend study

Understanding the playing field as well as when and how to exploit the potential of next-gen robotics



Offering

- Joint definition of study contents
- Scientific analysis of advances in next-gen robotics
- Pre-competitive exchange in a trusted community
- Discussion of and working sessions to selected topics with robotic experts in interactive sessions
- Individual transfer of results to your company



Deliverables

- Analyzed market landscape (incl. value chain, companies, investments) and research activities
- Validated use cases, roadmap and action items to best prepare for a smooth implementation
- Comprehensive trend study report on »Next-Gen Robotics«



Study details

- **Costs:** 9,900 EUR per participant
- **Duration:** ~6 months (start in Q3)
- **Target group:** Manufacturing companies with hard-to-automate processes exploring next-gen robotics applications
- **Expenses:** Arise only from participation costs and voluntary consortium meetings (incl. travel costs)

Our trend study

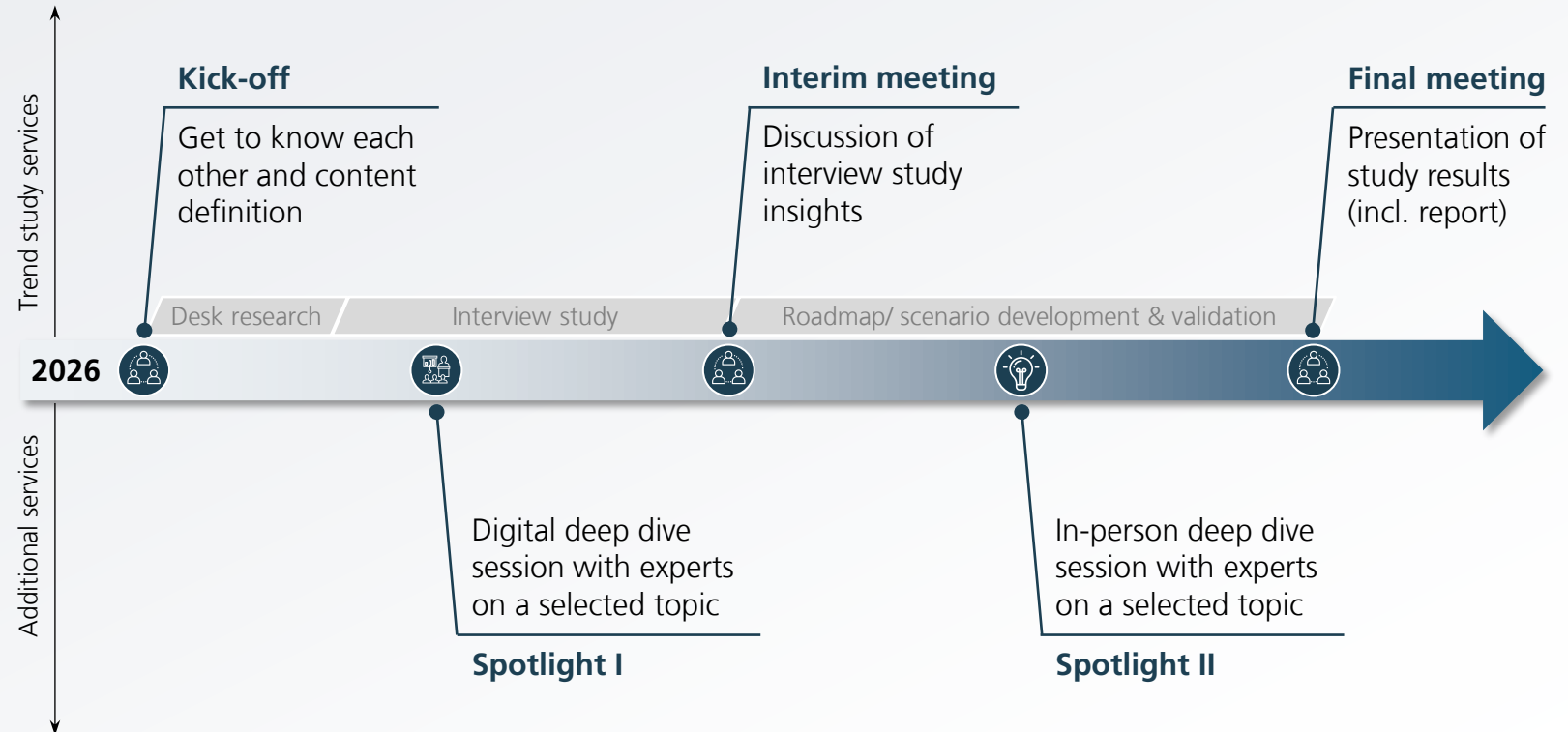
Study design and exemplary range of services throughout the trend study

Exemplary

Study design

The study incorporates a **mixed-method approach** combining publicly available information with expert knowledge:

- **Desk research** to capture publicly available information such as studies, developments, investments and/ or research
- **Semi-structured interviews** with a selected panel of robotic experts to detail relevant needs and implementation requirements
- **Development of a roadmap** and/or **scenarios** to derive realistic development paths and distinct measures to benefit from next-gen robotics



In-person meeting



Digital meeting



Experience day

Our potential focus topics

Exemplary core questions to be analyzed during the trend study

Exemplary



Potential future users of next-gen robotics

- What is the **status quo** in the next-gen robotics market, i.e., drivers, investments, actors within the value chain?
- What **use cases** are deployment-ready and which are expected in the mid- to long-term?
- What (technological) **challenges** need to be solved for widespread adoption with meaningful impact?
- How does a realistic **roadmap** for next-gen robotics look like?
- What **actions** are required for the smooth deployment and scaling of next-gen robotics?

Potential future suppliers of next-gen robotics OEM

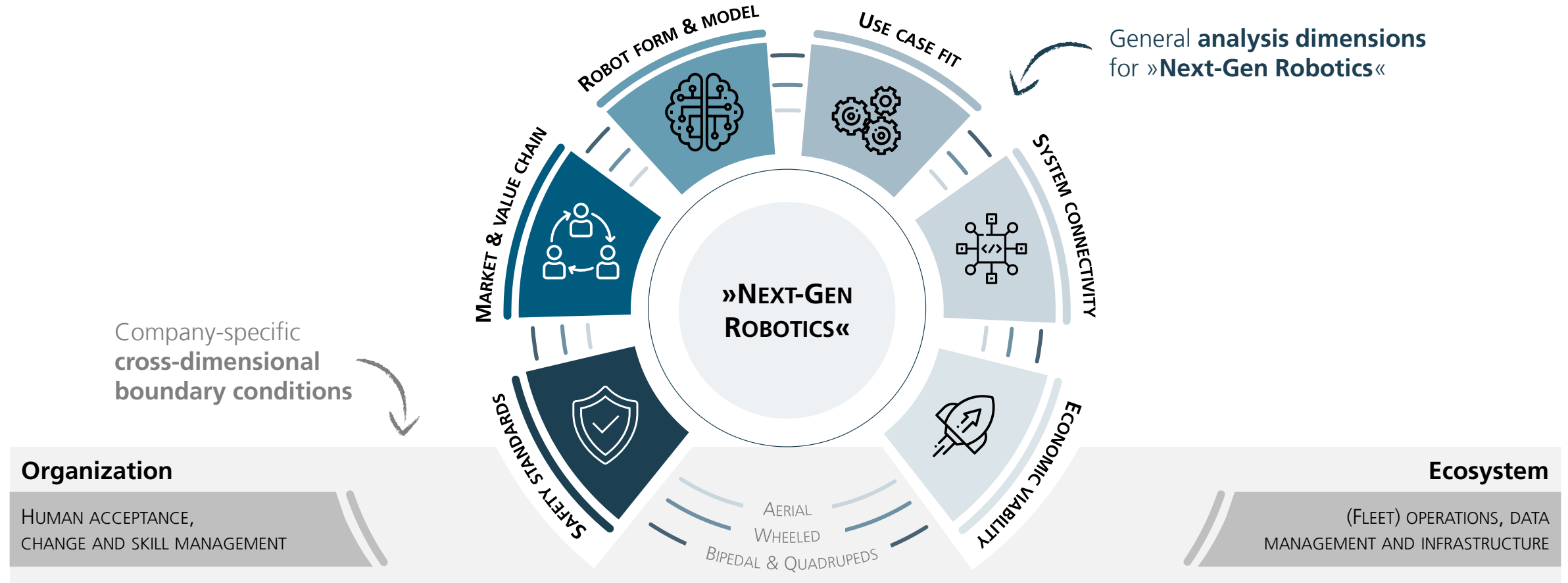
- What is the current and future **value chain** of next-gen robotics?
- What is the **design architecture** for and **cost structure** of next-gen robots?
- What are (relevant) **hardware components** of next-gen robots that offer potential opportunities to position as a supplier?
- What are **key challenges, requirements** and **technical maturities** of the robot's hardware components?
- What are (hardware) **investment activities** of manufacturing and investment companies along the value chain?

As a participating company in the consortium, you will have the opportunity to define relevant topics of this trend study.

Our framework

Leveraging next-gen robots requires a lot more than the AI-powered robot itself

Preliminary



Our edge

Our trend study combines the benefits of available market and trend studies with bilateral projects

Market and trend studies, extract



- ✓ Free-of-charge white paper studies
- ✓ Groundwork (trends, tech., barriers, outlook)
- ✗ No peer-learning & no content definition
- ✗ Limited utilization & transferability of results

Consortium trend study



- ✓ Shared financing across multiple partners
- ✓ Groundwork & action-oriented dev. scenarios
- ✓ Expert exchange & shared content definition
- ✓ Direct utilization & transferability of results

Bilateral studies



- ✗ High costs for bilateral projects
- ✓ Groundwork & action-oriented dev. scenarios
- ✓ Individual content definition (full control)
- ✓ Direct utilization & full transferability of results

Our edge

We have access to a wide range of experts from the Fraunhofer Society and the RWTH Aachen Campus



1 Cluster Production Engineering



2 Laboratory for Machine Tools WZL



3 Fraunhofer IPT



4 Cluster Smart Logistics



5 Institute for Motor Vehicles (ika)



6 Institute for Plastics Processing (ikv)

Our further offerings

Explore next-gen robotics in consortium and bilateral projects



Consortium projects

Investigate relevant questions in a cross-industry consortium, connect with robotic experts and exchange experiences in a trusted community.



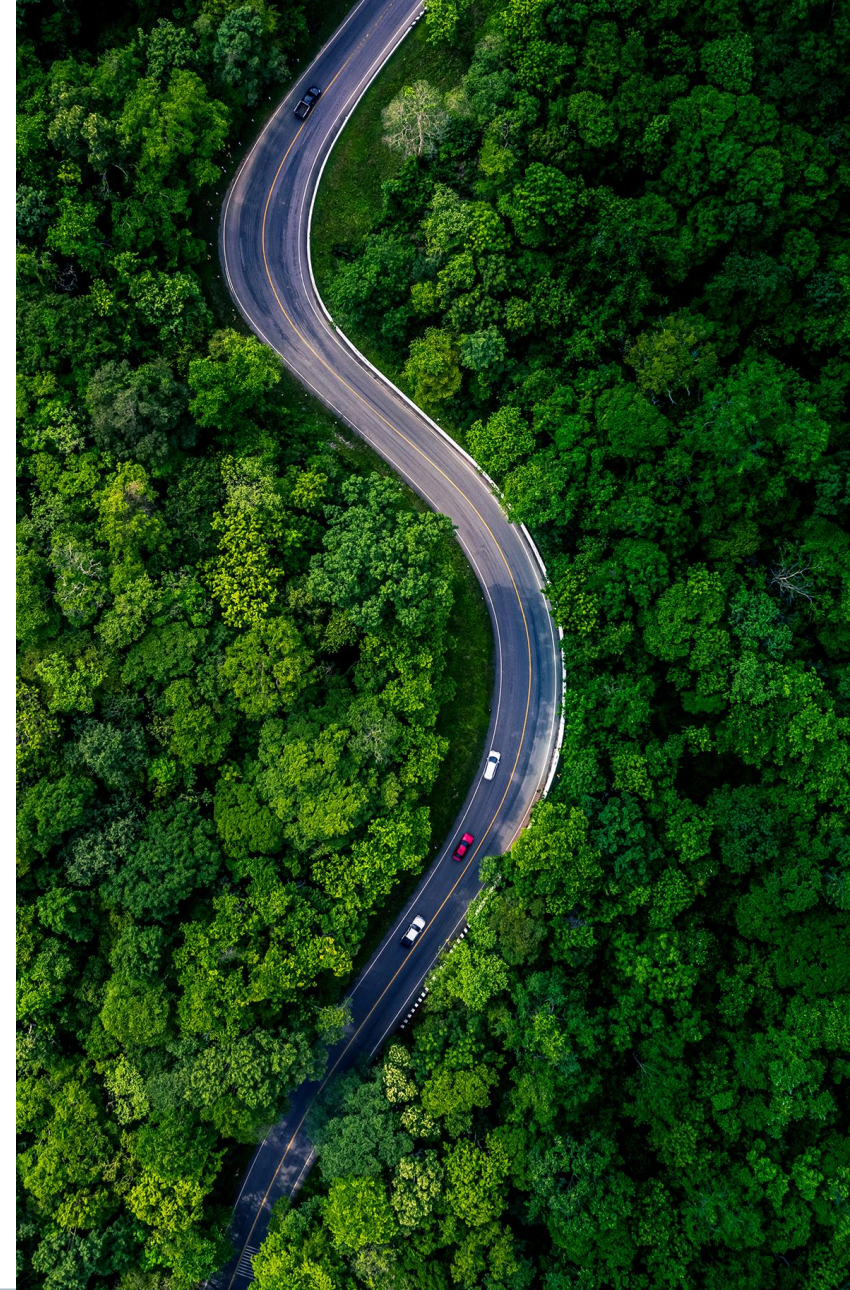
Experience days

Experience the potential of next-gen robotics in your company at first hand, connect with selected experts and R&D partners, and plan your way forward in guided sessions.



Technology development

Explore shopfloor demonstrators at Fraunhofer IPT and develop customized hard- and software solutions in joint research projects with our technology experts.



Fraunhofer IPT

Your contact for Next-Gen Robotics



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