



AUTOMATION &  
MECHATRONICS ENGINEERING

 **Fraunhofer**  
ITALIA

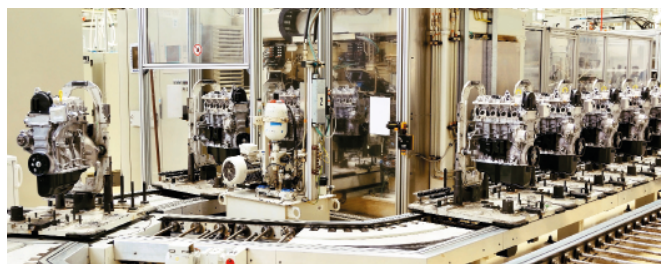


## SERVICE OFFERINGS

### Promotion of the digitalization of production technologies

In the research area of Automation & Mechatronics Engineering of Fraunhofer Italia we assist SMEs in their development processes through research and preliminary development projects:

- Implementation of **intelligent and integrated automation solutions** for industrial production processes (control systems, sensors, actuators);
- Concepts for the **self-optimizing, self-configuration and self-diagnosis**, on both component and system levels, and application of **machine cognition** for higher productivity and quality;
- New forms of interaction with the user in the context of **adaptive cooperation** concepts;
- In the area of **technological transfer**, concepts and solutions from the industrial production technology are applied to the areas of **smart building and agrimechatronics**.



## FRAUNHOFER ITALIA

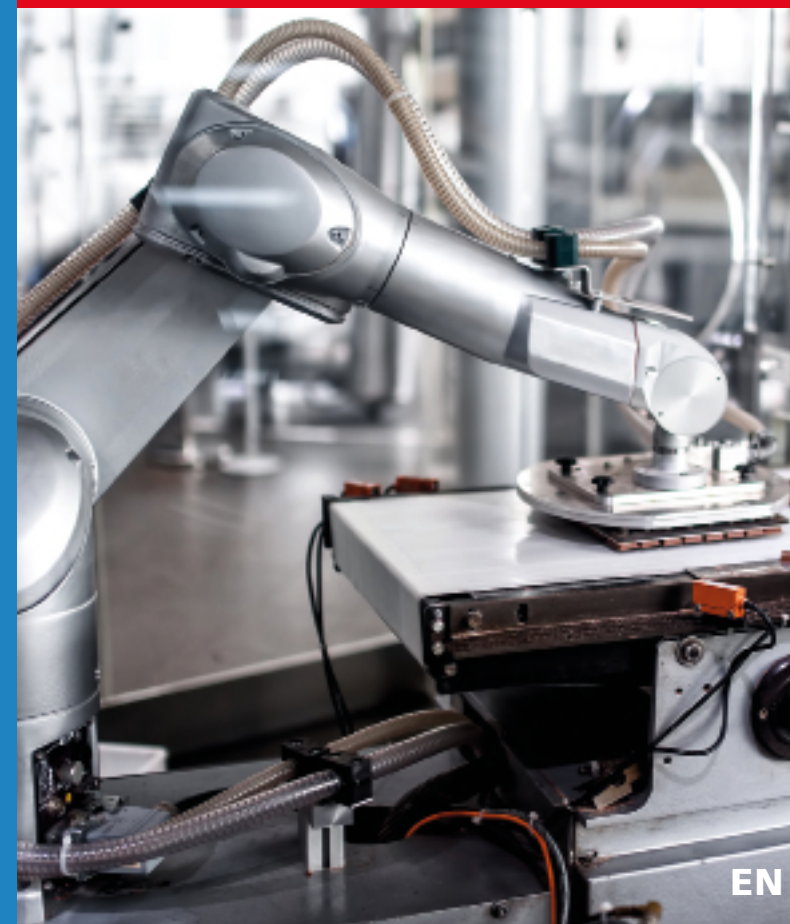
...we automate your innovation

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## AUTOMATION & MECHATRONICS ENGINEERING



## CHALLENGES

Today, companies face the challenge to meet the requests of fast running development cycles. This is particularly relevant in sectors strictly related to automation. For a sustainable market success, companies must deal with these challenges on a process and product level and align their innovation strategy to future developments.

### Challenges: Rising volatility and uncertainty along the entire value chain

#### Supplier



- Drastically shortened product life cycles
- Bankruptcy of supplier
- Uncertain replacement times

#### Producer



- Growing product complexity
- Small batch sizes
- Increasing intensity of market competition
- Economy: Growth or recession?

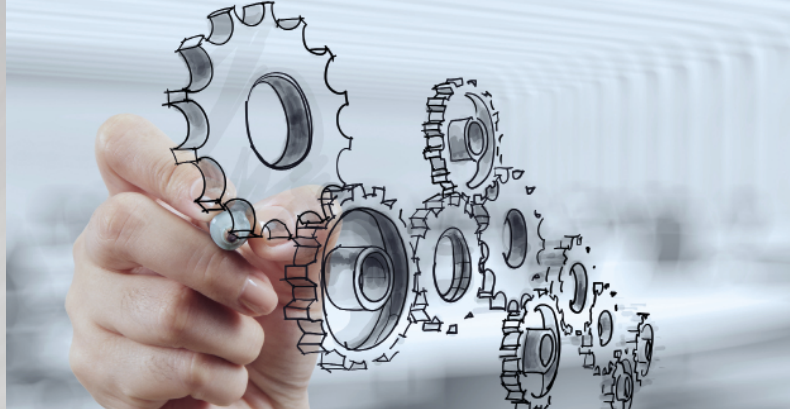
#### Clients



- Increasing number of variants and customized products
- Late orders and short delivery times

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## RESEARCH FOCUS

The aim of the **Automation & Mechatronics Engineering Team** is to support enterprises through engineering expertise in the field of automation, especially manufacturing industries, construction industries and agricultural industries. The AME Team operates in the context of industry-related and pre-development projects in the field of automation and mechatronics. Specifically, these research fields address issues such as **flexible manufacturing, advanced robotics, sensing & measuring technologies, interfaces & modularity, data security and data safety.**

### Techological trends

Three technology trends can of increasing importance across all sectors can be identified as follow:

- **increase in energy efficiency** due to growing environmental requirements and cost pressure;
- **networking** in the smart factory as a prerequisite for the use of optimization potential (industry 4.0);
- **modularisation** and development of platform concepts to be able to offer solutions for various applications with the required efficiency.

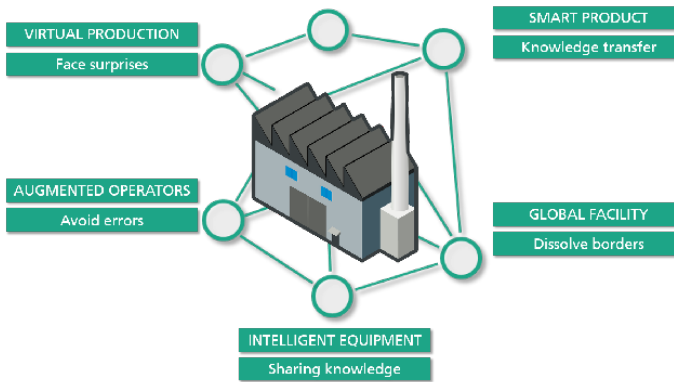
The approach of the **smart automation** is the main driver for digitalization of classic industries, e.g. production technologies. At the same time concepts of **self-optimization** and **self-diagnosis** are increasing their relevance.

## INTELLIGENT FACTORY

The key to the intelligent factory of the future lies in the digitalization of manufacturing processes:

- **plug&produce**: modular and networked approaches in combination with unified interfaces allow a bigger flexibility and a high efficiency in production;
- **smart process**: organize intelligent products and optimize independently and autonomously their production processes even with high variety and small quantities;
- **virtual factory**: real world and virtual world are linked and make adaptive assistance in production work through virtual and augmented reality technologies.

In order to provide a real added value for the companies our scientists combine approaches from various fields for the perfect coordinated individual solution.

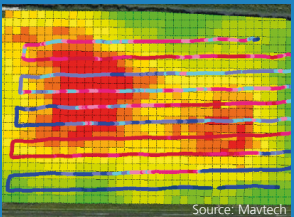


## AGRIMECHATRONICS

- The field of **intelligent agricultural machinery** will be of increased importance in the future also in the Alpine regions.
- Many approaches of industrial production engineering can help **efficiently and cost-effectively** to make profits out of the production of high-quality agricultural products.
- The precision agriculture will rely even more on the **principle of targeted farming**.
- The AME Team focuses its research on both the development of **intelligent, networked sensors and actuators** in the agricultural sector. Both areas in combination will allow new forms of farming in the future.

### Project example of industrial research:

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*In the research project SMILE, Fraunhofer Italia research associates, Mavtech and the Free University of Bolzano are exploring together possible applications of remote controlled drones (UAV) in the field of precision agriculture. Fraunhofer Italia is responsible for the used sensor system to monitor agricultural fields and studies further applications for the use of a UAV with very small dimensions.*



Source: Mavtech

## SMART BUILDING

- Intelligent buildings, so called „smart buildings“, are the **intelligent networking of individual components inside a house** and their centralized or decentralized monitoring via terminals.
- The added value is the intelligent interaction of components providing **additional functionalities** that support the tenants in their everyday life.
- Future drivers are the areas of **ambient assisted living, energy efficiency** and open-standard and freely accessible solutions. This regards not only new buildings but also the existing building stock, as part of renovation measurements.

### Project example of a EU research project:

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*In the renovation of old buildings, there is often the problem that the space for the installation of large central ventilation units and channels is missing. As part of the Interreg IV project „Vent4Reno“, engineers of Fraunhofer Italia developed in collaboration with the University of Innsbruck a compact device that reaches a heat recovery higher than other marketable and popular devices. Furthermore, air quality sensors allow a demand controlled ventilation.*

