



SMART DIGITAL INDUSTRY
ARTIFICIAL INTELLIGENCE FOR INDUSTRY 4.0



1st ITALIAN RESEARCH INSTITUTE

Top research institute in Italy, ranked
at the 1st place for scientific excellence and for the
economic and social impact (ANVUR).

230
scientific
publications

250
contributions in conferences
and scientific publication

+100
scientific
events organised



WE BELIEVE IN A FUTURE BUILT ON KNOWLEDGE

FBK's mission is **excellence of science** which
extend our innovation capability and involve the
community and the economy in the circulation of
knowledge and technologies (impact).

+100 PhD students
+400 researchers
7 research centers



INTERNATIONAL IMPACT

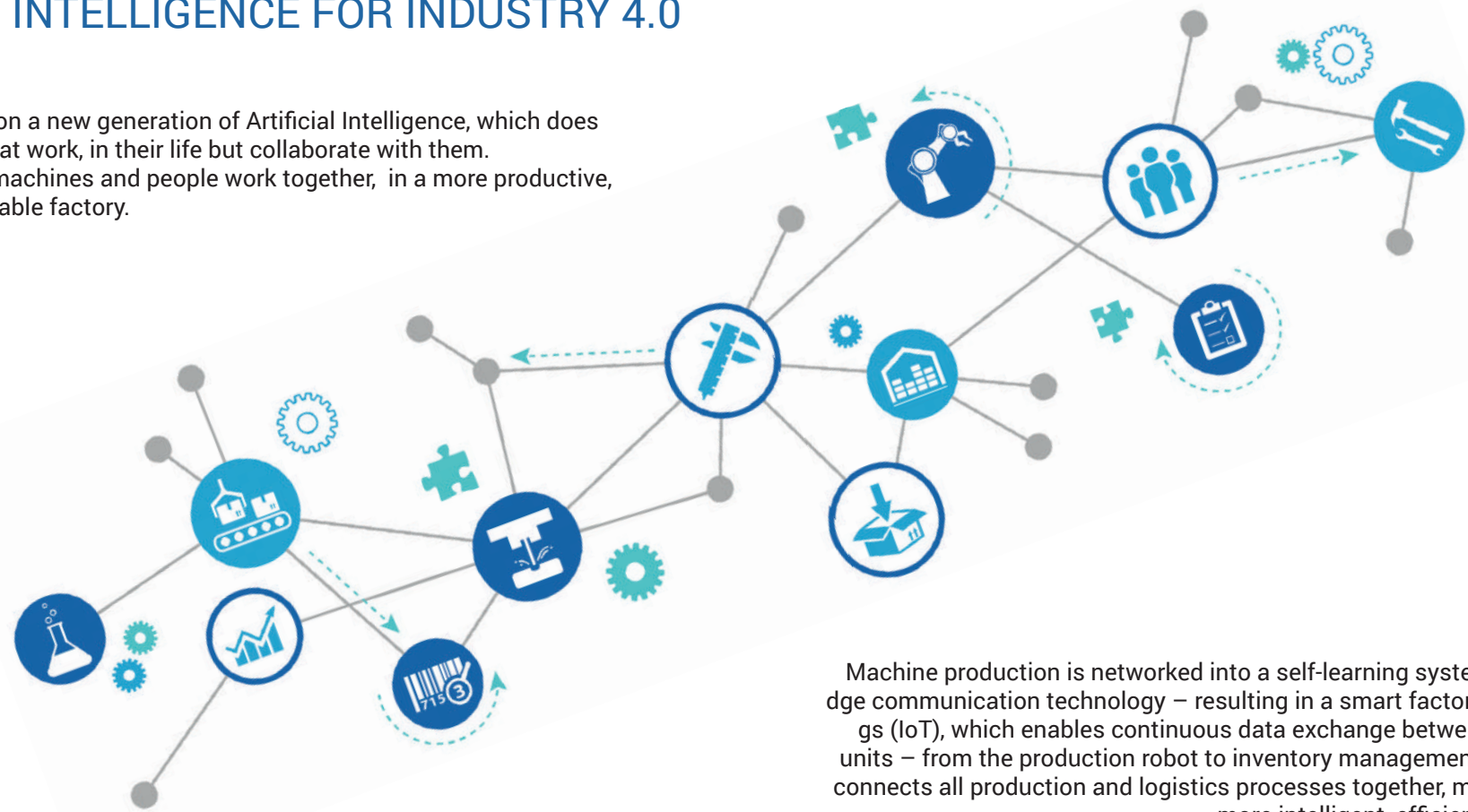
FBK works with **international big industries** as main partner for
research & development projects but also as a key player for
their **innovation focused projects**.

We understand better the needs of the market, and companies
can introduce innovation faster in their product cycle.

101 EU projects
in 2016
20 innovative
startups
42 patents

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FBK built the future on a new generation of Artificial Intelligence, which does not replace humans at work, in their life but collaborate with them. FBK for AI that lets machines and people work together, in a more productive, safe, pleasant, enjoyable factory.



Machine production is networked into a self-learning system using cutting-edge communication technology – resulting in a smart factory. Internet of Things (IoT), which enables continuous data exchange between all participating units – from the production robot to inventory management to the microchip, connects all production and logistics processes together, making our industry more intelligent, efficient and sustainable.



APPLICATION CASES

Intralogistics enabled by autonomous vehicles cooperating with operators and robots

- Intra-logistic management within plant;
- Enable automated replenishment;
- Support for complex event detections and handling;
- Autonomously reconfigure the internal flow;
- Simplify the Human-robot interaction at line side.

Complex system monitoring for predictive maintenance

- Transform data into actionable insights;
- Leverage model based reasoning and machine learning for data analytics;
- Cloud-based analytics for real-time alerting and mid-term predictions;
- Ensure security of the monitored data.

50 industrial partners
10 industrial projects
20 proofs of concept



AUTONOMOUS SYSTEMS

Development and experimentation: advanced sensing for smart monitoring (e.g. quality control); adaptive control for smart online closed-loop control leveraging on fog computing and IoT infrastructure (2020).on fog computing and IoT infrastructure (2020)

In production: design, validation, delivery of (safety & resilient) critical systems for industry 4.0 in the avionics, oil and gas, and railway sectors supported by industrial partners (2018).



APPLICATION AREAS



PREDICTIVE MAINTENANCE

Development and experimentation: design and implementation of an integrated platform for big data analytics for diagnosis, prognosis, and predictive maintenance leveraging a decentralised (fog/edge) computing infrastructure (2018).

In production: integrated platform in realistic environments (2020).

STRATEGIC PROGRAM

- Model-based design**
A technological platform supporting the design, deployment and certification of complex critical processes and systems.
- Advanced perception systems**
Complex industrial process operations with leading-edge research techniques (DSP, vision, ...) leveraging on proximity (fog/edge) computing and IoT.
- Autonomous Systems**
Design and development of deliberative, autonomous robotic applications for exploration and monitoring of extreme environments.
- Smart Adaptive Operation**
Run time integrated solution for adaptive, self-learning decision making supported by simulation, planning, scheduling.



AVAILABLE TECHNOLOGIES TOWARDS INDUSTRY 5.0

Development: interdisciplinary approach for human-aware robotics in complex industrial environments (2018);

Experimentation: integration of techniques for automated planning and control for highly flexible production (e.g., chemical production) (2020)