Competence Center Industry 4.0
Bi-Rex Mission

BI-REX is a public-private Consortium born on the 11th December 2018 in Bologna gathering in partnership 57 actors between Universities, Research Centers and 45 enterprises of excellence to assist companies and in particular SMEs in the Adoption of Industry 4.0 enabling technologies through technology consulting and assessment, design and validation of innovative solutions, and training.

Located in Bologna, BI-REX will collect the know-how of the Emilia Romagna High Technology network (existing industrial research laboratories, infrastructures, Digital innovation Hubs) but with a national and international road map aimed at developing solutions with an high TRL (close to the market) in particular for SMEs; through:

- A training, orientation and consultancy system for companies closely integrated with the Digital Innovation Hub (DIH) present on the RER and national territory;
- A large ecosystem of industrial Innovation projects, collaborative public-private industrial research projects;
- A demonstration production plant (Pilot) on which to implement and optimize the adoption of enabling technologies.
The 45 companies (2017 data related to Ind4.0):
- 250,000 direct employees, aggregate turnover of almost 80 billion euros (+ 6% vs 2016)
- 190 Technology Transfer projects, 10,400 patents (+ 10% vs 2016)

The 12 "other entities" (2017 data relating to Ind4.0):
- 5 universities, 4 research institutes, 1 business school, 1 private foundation (very active on training), 1 innovation institution
- Nearly 1,000 TT projects, 4,700 publications, 31 departments, 1,500 research fellows, 1,100 PhD students, 250 projects funded by competitive calls for a total of about € 15M
- Cineca + INFN -> 90% of national computing capability; global leadership in calculation speed BIG DATA (super computers of Tecnopolo)
Shareholders

12 Institutions
Università di Bologna
Università di Ferrara
Università di Modena Reggio Emilia
Università di Parma
Università Cattolica del Sacro Cuore
Consiglio Nazionale delle Ricerche
Istituto Nazionale di Fisica Nucleare
Istituti Ortopedici Rizzoli
CINECA
Bologna Business School
Fondazione Golinelli (Host CC Headquarter)
ART-ER (RER)

28 End User Enterprises
Philip Morris
Poggi-polini
Marposs
Circle
IMA
Aetna Group
Conad
Marposs Italia
Samp
Rekeep
Hera
CRIF
Bonfiglioli
CNS
Eni
Euro Coating
Sacmi
Modis
Ducati
Filippetti
Ferrara Bio
UPMC
Rem Tec
Nanosurfaces
Camst
Alascom
Link Italia
Service

17 Provider Enterprises
Intesa Sanpaolo
Eascon
Juno Design
Altair
IBM
Kaitec
PTC
Data River
Nier
Manz
DVP
TIM
Nextema
Siemens
Energy Group
Etna Bio
Fancy Pixel
BI-REX Ecosystem

- Existing industrial research Labs, infrastructures ("Tecnopoli")
- European Digital Innovation Hubs & Competence Centers
- Digital Innovation Hubs of the territory
- Italian Competence Centers
- Industrial Associations
- The players of Emilia-Romagna Smart Specialization Strategy (S3)
- BI-REX with all Partners
Services & Activities

Innovation Projects
8 thematic areas that make use of the Ind. 4.0 enabling technologies in an integrated way

Training & Education
On-line, in class, on the pilot
Entry level - on specific technologies– administrative and managerial on business models

Orientation & Consultancy
In collaboration with DIH and Business Associations
Workshops and conferences, thematic tables, reports and analysis on Key Enabling Technologies; assessment services, digital readiness, digital marketing, cybersecurity
Consultancy services, understanding and testing the real advantages offered by I4.0 technologies
Contribution

**MISE: up to 9,200,000 euro - 3 years:**
- Up to 3,850,000 euro in order to set up the Center and to implement the activity program
- Up to 5,350,000 euro, as contribution to the Innovation Projects with a maximum amount of 200,000 euro per project

**CONSORTIUM MEMBERS: up to around 14,400,000 euro - 3 years:**
- Up to 7,200,000 euro in «cash»
- Up to 7,200,000 euro in «kind»
# Innovation Projects

## 8 Thematic Areas

| 1. | Big Data for Sustainability |
| 2. | Big Data for Manufacturing |
| 3. | ICT for machines and production lines |
| 4. | Advanced Systems to manage production processes |
| 5. | Security & Blockchain |
| 6. | Additive & Advanced manufacturing |
| 7. | Collaborative Robotics, Warehousing and Automated Guided Vehicle - AGV |
| 8. | Sustainability & Social Responsibility |
On October 25 BI-REX launched the first call; 16 projects within 7 thematic areas. €3.2 M budget allocated out of €5.35 M of the total public contribution.

<table>
<thead>
<tr>
<th>Area</th>
<th>N. Project</th>
<th>Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – Big Data for sustainability</td>
<td>3</td>
<td>€600k</td>
</tr>
<tr>
<td>2 – Big Data for Manufacturing</td>
<td>4</td>
<td>€800k</td>
</tr>
<tr>
<td>3 – ICT for machine and production lines</td>
<td>2</td>
<td>€400k</td>
</tr>
<tr>
<td>4 – Advanced Systems to manage Production Processes</td>
<td>1</td>
<td>€200k</td>
</tr>
<tr>
<td>5 – Security and Blockchain</td>
<td>1</td>
<td>€200k</td>
</tr>
<tr>
<td>6 – Additive &amp; Advanced Manufacturing</td>
<td>3</td>
<td>€600k</td>
</tr>
<tr>
<td>7 – Collaborative Robotics, Warehousing and Automated Guided Vehicle</td>
<td>2</td>
<td>€400k</td>
</tr>
</tbody>
</table>

First call total grant 16 €3.2M
First 16 Innovation Projects

Industrial innovation projects, collaborative public-private industrial research projects to support SMEs & other companies in the implementation of I.4.0 enabling technologies

<table>
<thead>
<tr>
<th>Big Data for sustainability</th>
<th>Big Data for Manufacturing</th>
<th>Advanced Systems for management of production processes</th>
<th>ICT for machine and production lines</th>
<th>Security &amp; Blockchain</th>
<th>Additive &amp; Advanced Manufacturing</th>
<th>Collaborative Robotics, Warehousing and AGV</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Smart City Services for Circular Economy and Sustainable Applications</td>
<td>• Big Data for Optimization and Reconfiguration of Production Lines</td>
<td>• Traceability of Products and Processes in Real Time</td>
<td>• Platforms for the production process optimal maintainance</td>
<td>• IoT Connected Security Platforms in Distributed Production Lines</td>
<td>• Design for AM Metal components</td>
<td>• Collaborative Robotics for Productive Processes</td>
</tr>
<tr>
<td>• Big Data for Prevention Models Development to support precision medicine in the oncology sector</td>
<td>• Productive Processes Management through Edge Computing</td>
<td></td>
<td>• Predictive Diagnostics based on Data Analytics and Machine Learning Techniques</td>
<td>• Integration Technologies Connected IoT</td>
<td>• Development of AM Technologies for Metal material</td>
<td>• Flexible Automatic Transport Systems (AGV / LGV / Collaborative Vehicles) and Advanced Storage Systems</td>
</tr>
<tr>
<td>• Integrated IoT-Cloud platforms for Facility Management Services</td>
<td>• Integration Technologies Connected IoT</td>
<td>• Integration Solutions with Low Latency and High Availability Industrial Cloud</td>
<td></td>
<td>• Integration Solutions with Low Latency and High Availability Industrial Cloud</td>
<td>• Tailor made Prosthesis Design and implementation for Surgical Replacement</td>
<td></td>
</tr>
</tbody>
</table>
Innovation Projects Call 1 Main Principles

➢ At least one of the following objectives:
  ➢ production processes improvement and innovation
  ➢ product improvement and innovation
  ➢ organisation and business models improvement and innovation

➢ Innovativeness of project proposals
➢ Quality of implementation and industrial plan
➢ Broad collaboration among companies
➢ SMEs involvement
➢ Collaboration with Universities and research centres
➢ Positive impact on the framework of the UN Sustainable Development Goals 2030
The pilot plant (Digital Capability Centre) is an advanced production line, which implements and enables 4.0 technologies in a digital connected environment. The plant is an example of a Smart Factory, located at BI-REX venue in Bologna.
Pilot plant
Basic structure

- Additive and laser-based primary production (metals and polymers), integrated with secondary processing (e.g. heat treatment, laser hardening);
- Highly automated dimensional control system (with or without contact, structural, imaging), numerical controlled finishing;
- High use of advanced robotics, mobile and collaborative, for production, assembly tasks, logistics (fleet manager, 5g communication);
- Development of connection systems (IoT), data storage and elaboration (cloud), Artificial Intelligence (AI), digital twin simulations.
Pilot plant
Functional Map

Big-data and connectivity

Robot
- Data acquisition and storage
- 5G

Additive manufacturing
- Direct Energy Deposition (DED metals)
- Selective Laser Melting (SLM metals)
- FDM (polymers)
- Heat treatment
- wire EDM
- Laser hardening

Robotics and automation
- AGV
- Magazine
- Robot
- Collaborative robot
- Assembly station
- 5G field bus
- Data center
- Cloud
- Tool;
- Equipment;
- Materials;
- Semi-finished;

Metrology and finishing
- CNC milling
- Metrology
Pilot plant

Objectives

1. To make a production system available to innovation projects, where to carry out, test and implement the proposed solutions, while enabling the required technology for the realisation of project deliverables;

2. To have a production system without productivity constraints, reconfigurable and flexible on demand, where development activities and industrial research are enabled.

3. To integrate, transfer and systemize technological skills of public and private technopoles, in order to maximize the ability to produce innovation;

4. To allow the realisation of advanced prototypes and small batches of high added value components, to be made available on the market then.

5. To be understandable and recognisable for external entities, such as schools, universities, companies, visitors, partners.

6. To allow the realisation of hands-on educational and training programs, for partners, SME, etc.
### EXECUTIVE COMMITTEE

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domenico Bambi</td>
<td>SACMI</td>
<td>L1</td>
</tr>
<tr>
<td>Francesco Millo</td>
<td>Bonfiglioli</td>
<td>L1</td>
</tr>
<tr>
<td>Michele Poggiopolini</td>
<td>Poggipoloni</td>
<td>L2</td>
</tr>
<tr>
<td>Andrea Zanotti</td>
<td>Fond. Golinelli</td>
<td>NoIMP</td>
</tr>
<tr>
<td>Cesare Stefanelli</td>
<td>UniFe</td>
<td>U</td>
</tr>
<tr>
<td>Fabio Fava</td>
<td>UniBo</td>
<td>U</td>
</tr>
</tbody>
</table>

### MANAGEMENT

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stefano Cattorini</td>
<td>Direttore Generale</td>
</tr>
<tr>
<td>Simona Campo</td>
<td>Responsabile Amministrativo</td>
</tr>
<tr>
<td>Francesco Meoni</td>
<td>Responsabile Impianto Pilota</td>
</tr>
<tr>
<td>Giampaolo Amadori</td>
<td>Business Development</td>
</tr>
</tbody>
</table>

**Industrial company leadership** well integrated with academic and other public entities. **Effective, balanced and inclusive Governance**

### STEERING COMMITTEE

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sergio Bertolucci</td>
<td>UniBo</td>
<td>U</td>
</tr>
<tr>
<td>Cesare Fantuzzi</td>
<td>UniMoRe</td>
<td>U</td>
</tr>
<tr>
<td>Roberto Menozzi</td>
<td>UniPr</td>
<td>U</td>
</tr>
<tr>
<td>Ettore Capri</td>
<td>UniCatt</td>
<td>U</td>
</tr>
<tr>
<td>Massimo Bergami</td>
<td>BBS</td>
<td>NoIMP</td>
</tr>
<tr>
<td>Roberta Turra</td>
<td>CINECA</td>
<td>NoIMP</td>
</tr>
<tr>
<td>Paola Landini</td>
<td>IOR</td>
<td>NoIMP</td>
</tr>
<tr>
<td>Emilio F. Campana</td>
<td>CNR</td>
<td>EPR</td>
</tr>
<tr>
<td>M. Cristina Vistoli</td>
<td>INFN</td>
<td>EPR</td>
</tr>
<tr>
<td>Leda Bologni</td>
<td>ASTER</td>
<td>NoIMP</td>
</tr>
<tr>
<td>Domenico Bambi</td>
<td>SACMI</td>
<td>L1</td>
</tr>
<tr>
<td>Enrico Landi</td>
<td>SAMP</td>
<td>L1</td>
</tr>
<tr>
<td>Dario Rea</td>
<td>IMA</td>
<td>L1</td>
</tr>
<tr>
<td>Emanuele Masciarri</td>
<td>Philip Morris</td>
<td>L1</td>
</tr>
<tr>
<td>Andrea Torcelli</td>
<td>Bonfiglioli</td>
<td>L1</td>
</tr>
<tr>
<td>Enrico Gessi</td>
<td>Ferrara Bio</td>
<td>L1</td>
</tr>
<tr>
<td>Maurizio Massanelli</td>
<td>Rekeep</td>
<td>L2</td>
</tr>
<tr>
<td>Massimiliano Vaccari</td>
<td>Aetna Group / Robopac</td>
<td>L2</td>
</tr>
<tr>
<td>Roberto Mansolillo</td>
<td>MODIS</td>
<td>L2</td>
</tr>
<tr>
<td>Enrico Piraccini</td>
<td>Hera</td>
<td>L3</td>
</tr>
</tbody>
</table>
Building Layout

at: Fondazione Golinelli, Bologna
Venue: Opificio Golinelli