AIRIC | POLITECNICO MILANO 1863

Artificial Intelligence Research and Innovation Center

Artificial Intelligence in Italy and Abroad

Nicola Gatti

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Artificial Intelligence Research and Innovation Center

"It's hard to think of a single technology that will shape our world more in the next 50 years than Artificial Intelligence" Barack Obama

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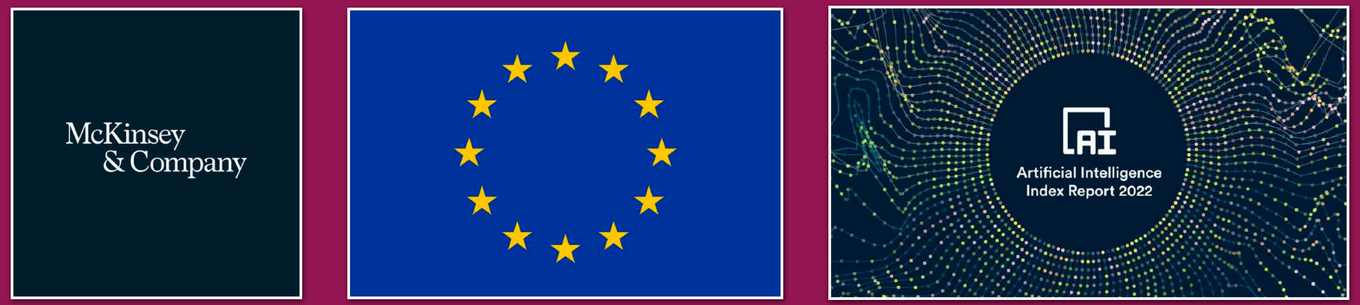
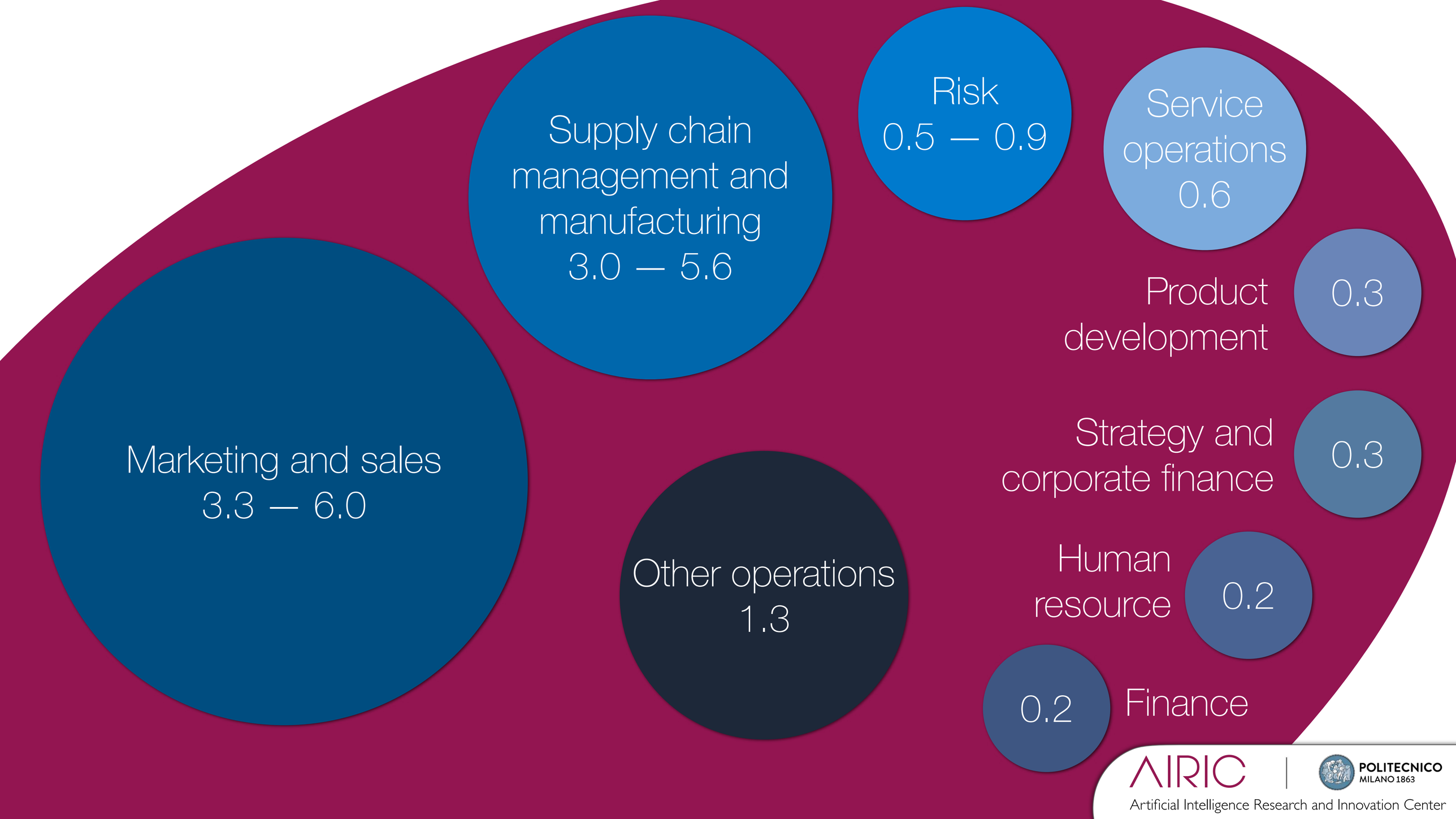


Value unlocked from 2030 on

9.6 — 15.3 trillion USD/year worldwide



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Eric Schimdt
Commission Chair
Former Google CEO

"US is not sufficiently prepared to defend or compete against China in the AI era."

The report's recommendations include:

- increasing **non-defense** federal spending on **AI R&D**, from $2 billion in 2022, to **$32 billion in 2026**
- creation of a Digital Corps to bring skilled tech workers into the government
- founding of a Digital Service Academy
- include **civil rights** and **civil liberty** reports for new AI systems or major updates to existing systems
- **expanding** allocations of employment-based **green cards**
- reforming the acquisition management system Department of Defence

The Jobs Landscape in 2022

emerging roles, global change by 2022

133 Million

Top 10 Emerging

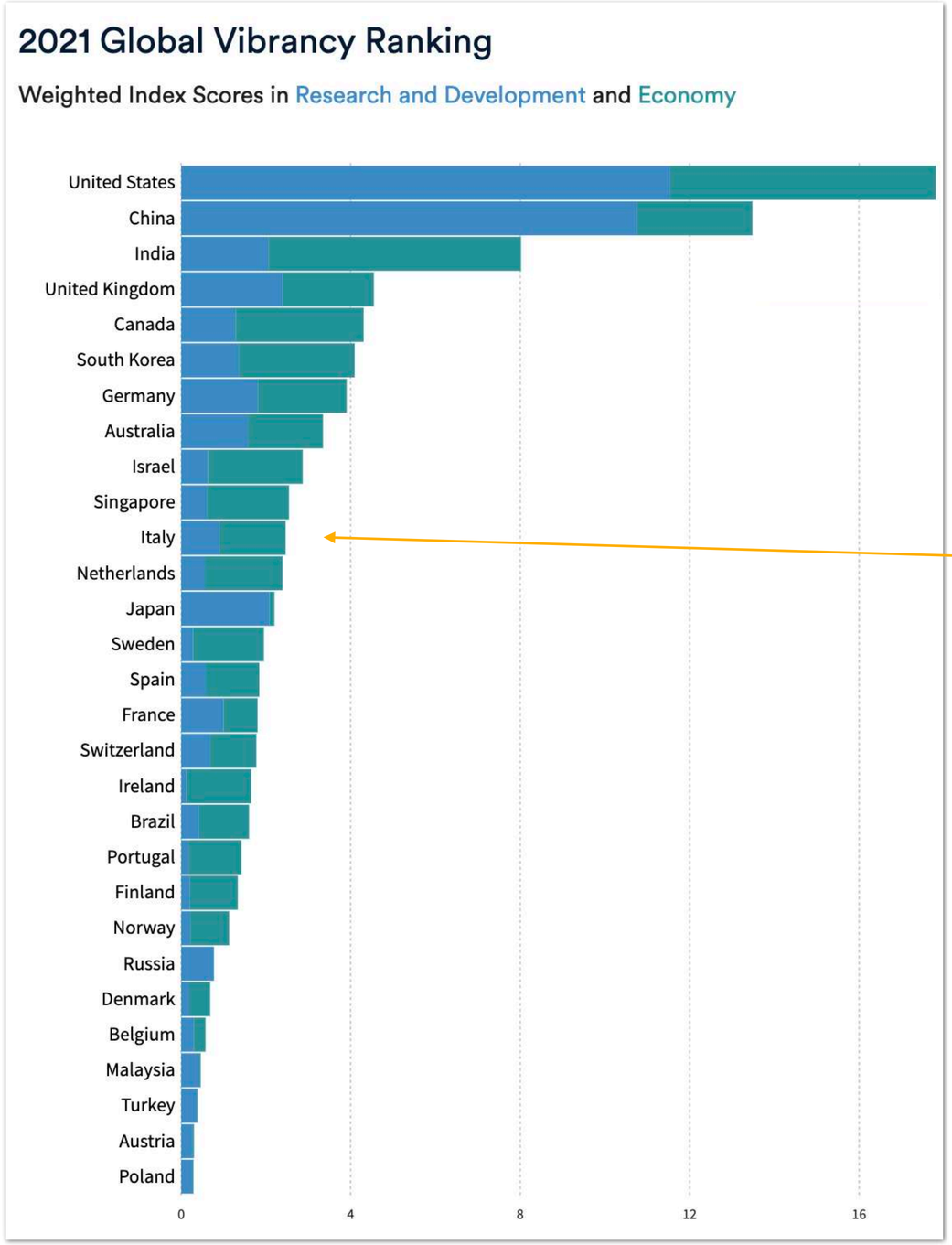
1. Data Analysts and Scientists
2. AI and Machine Learning Specialists
3. General and Operations Managers
4. Software and Applications Developers and Analysts
5. Sales and Marketing Professionals
6. Big Data Specialists
7. Digital Transformation Specialists
8. New Technology Specialists
9. Organisational Development Specialists
10. Information Technology Services

declining roles, global change by 2022

75 Million

Top 10 Declining

1. Data Entry Clerks
2. Accounting, Bookkeeping and Payroll Clerks
3. Administrative and Executive Secretaries
4. Assembly and Factory Workers
5. Client Information and Customer Service Workers
6. Business Services and Administration Managers
7. Accountants and Auditors
8. Material-Recording and Stock-Keeping Clerks
9. General and Operations Managers
10. Postal Service Clerks



Italy
11-*th* place

Economy

stronger than

Research and Development

Stanford University
Human-Centered
Artificial Intelligence

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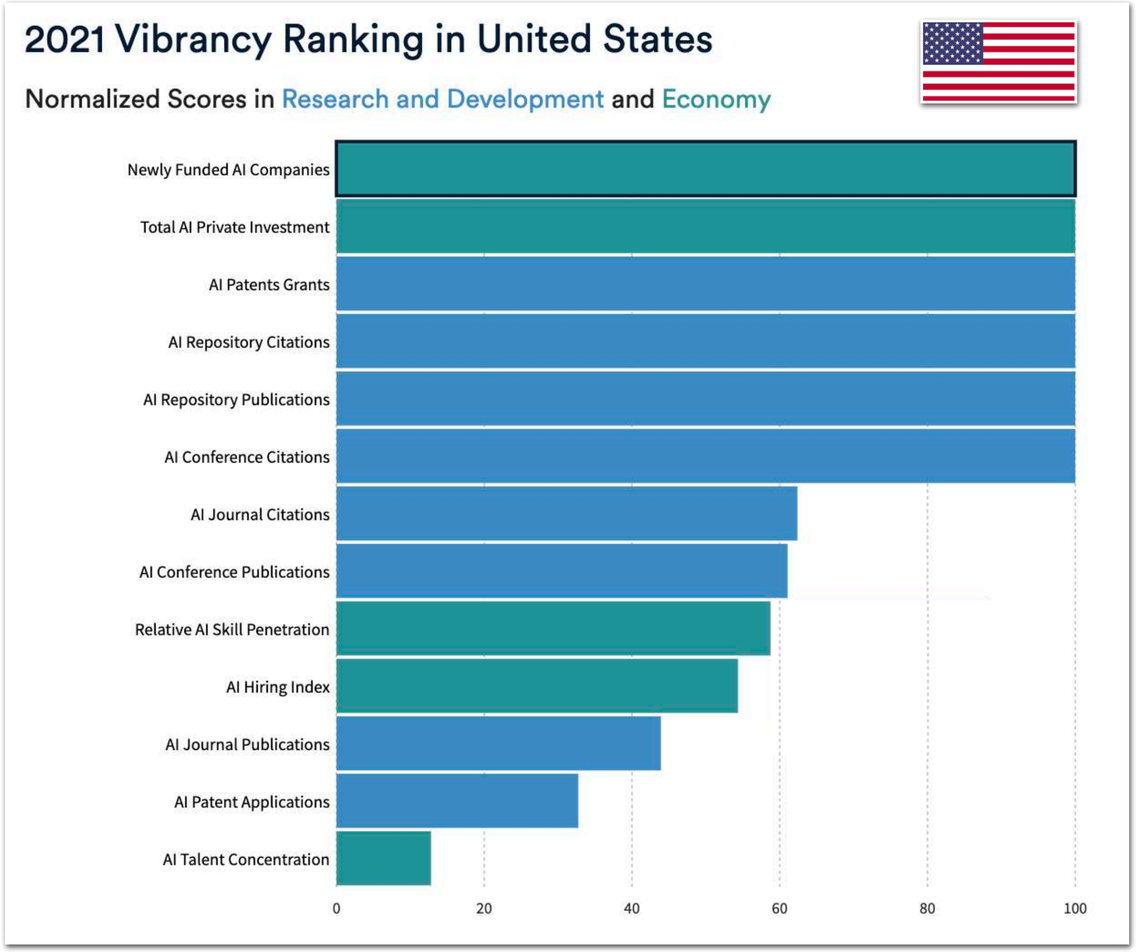

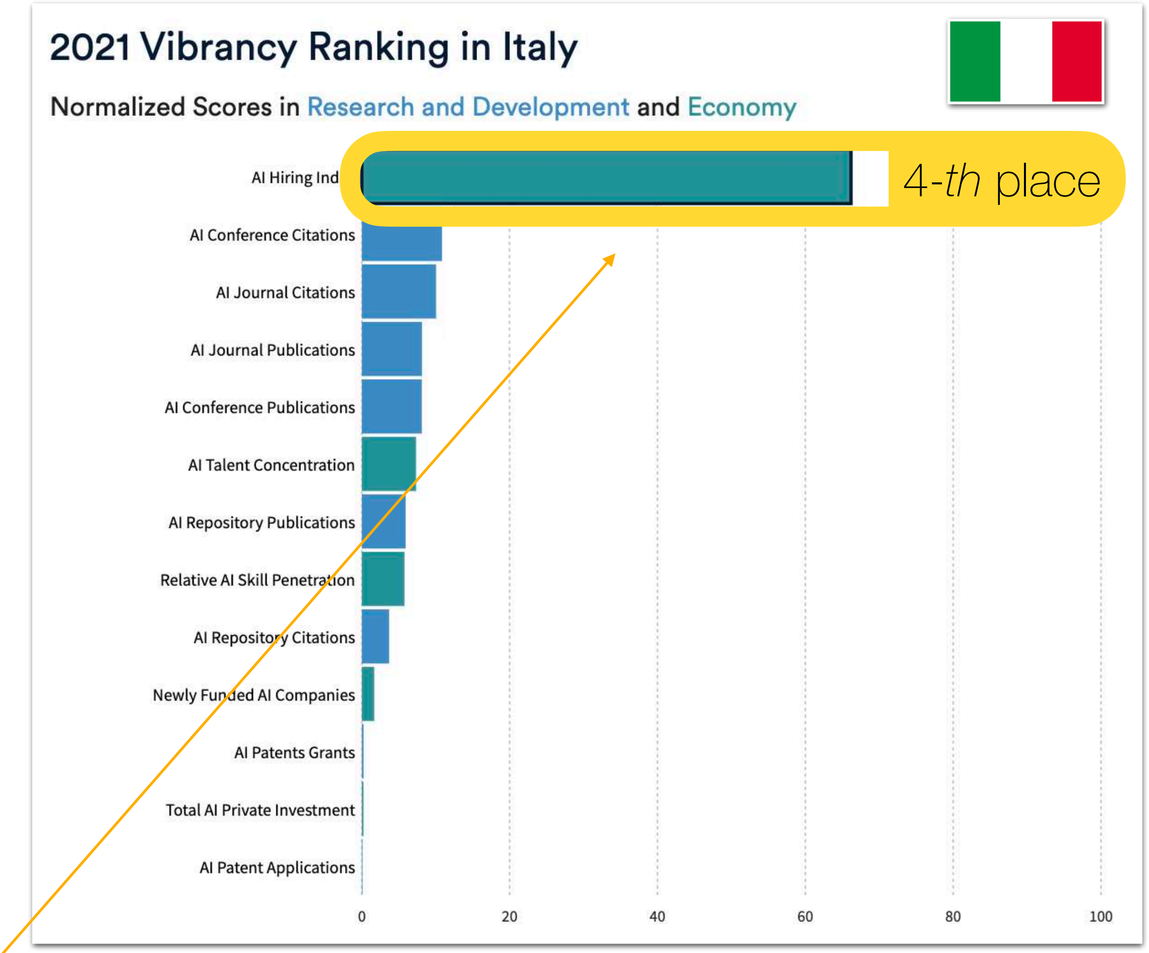

Italy strength

Stanford University
Human-Centered
Artificial Intelligence

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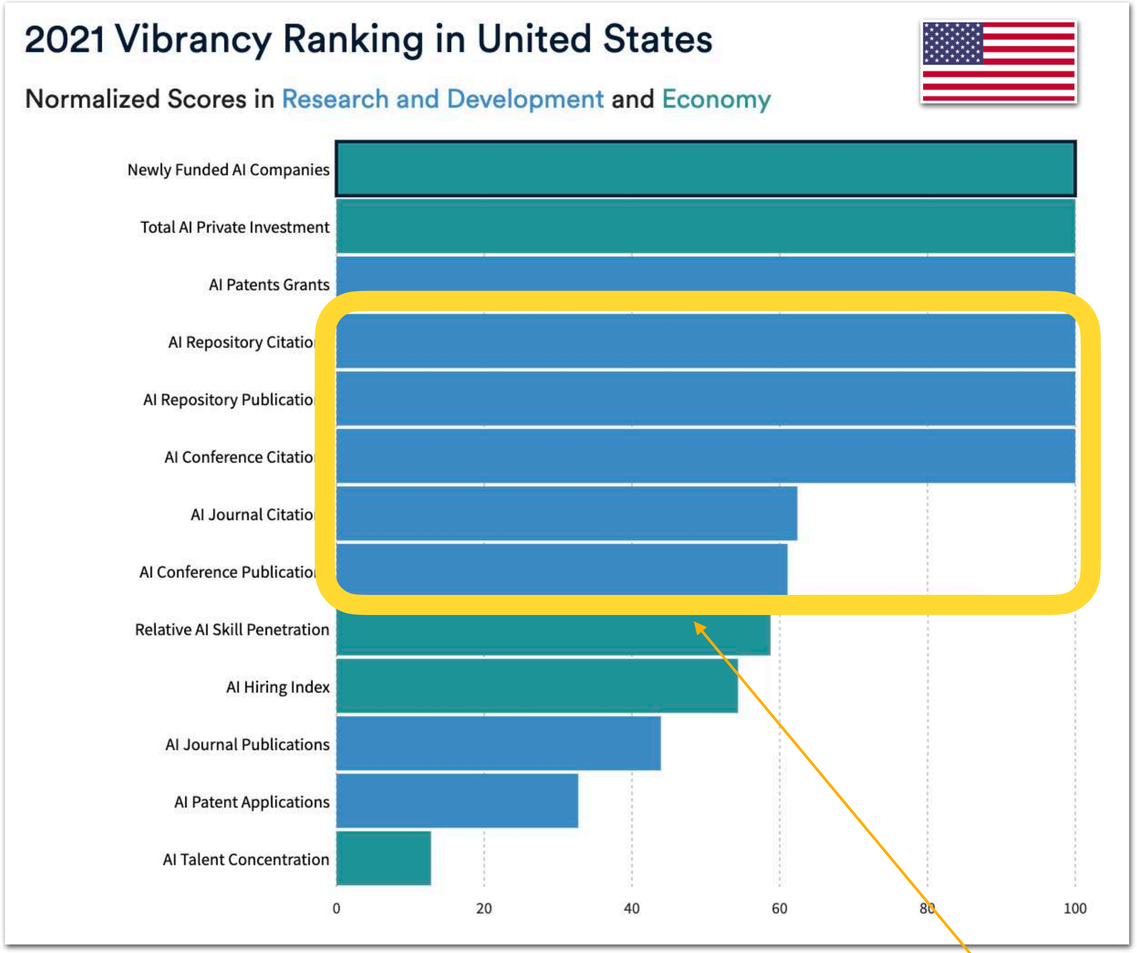

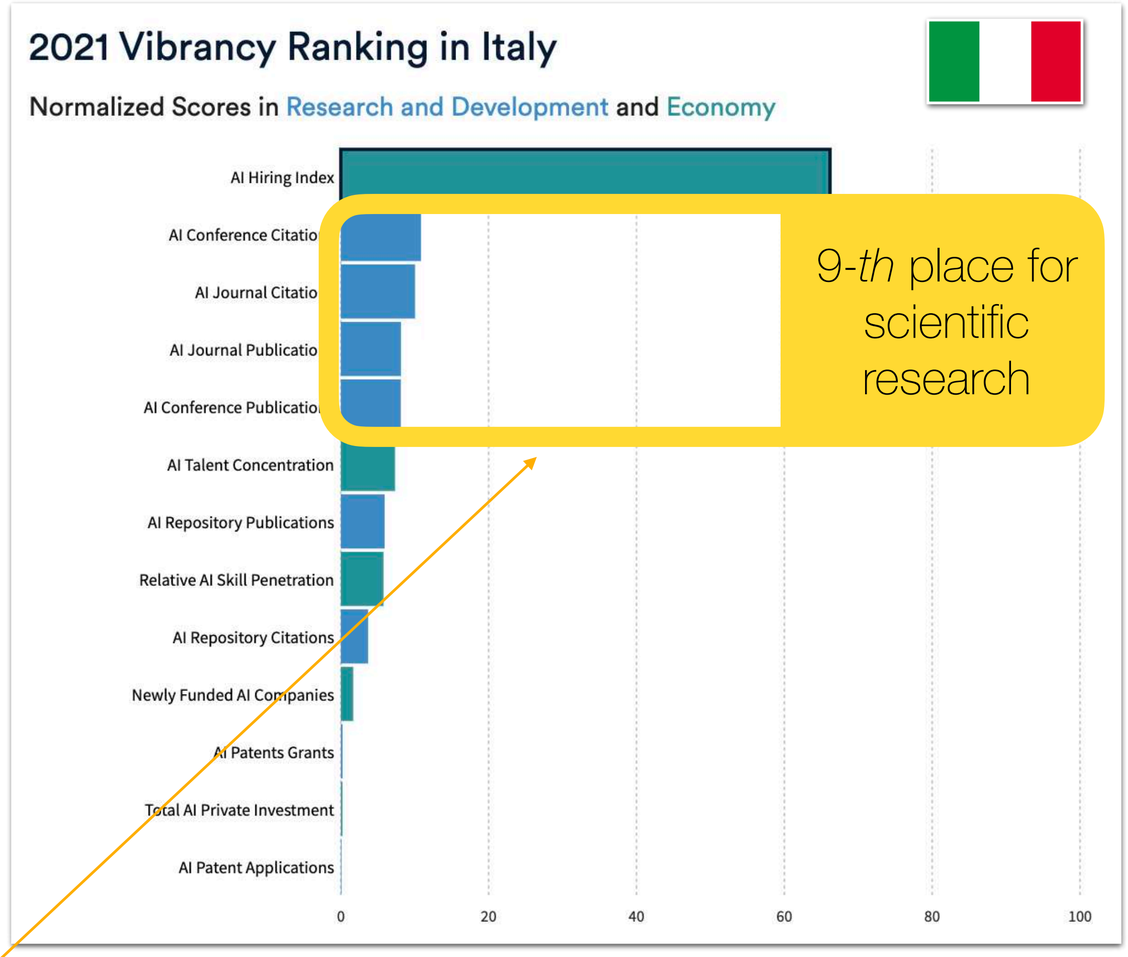

Comparison: Scientific research

Stanford University
Human-Centered
Artificial Intelligence

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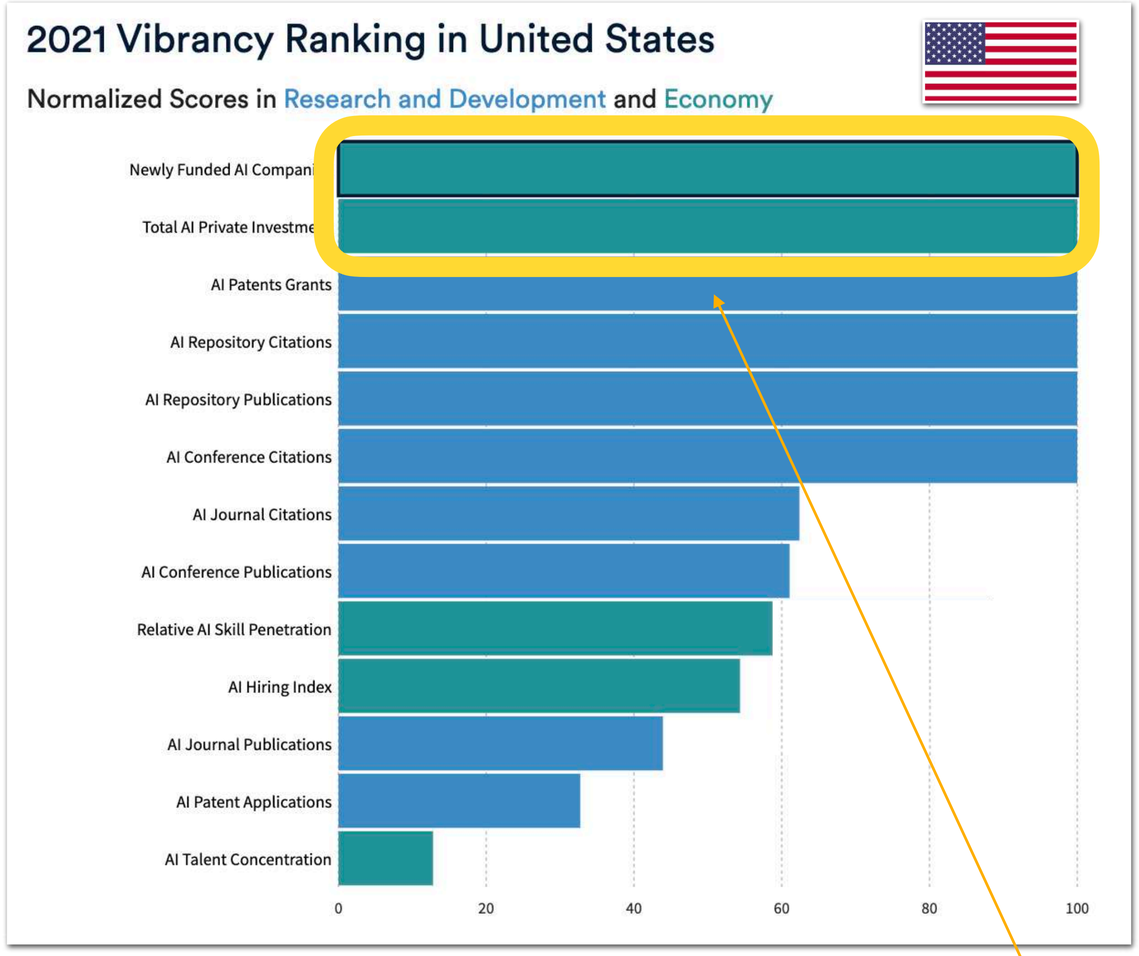
Artificial Intelligence Research and Innovation Center



Comparison: Private investments

Stanford University
Human-Centered
Artificial Intelligence

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Artificial Intelligence Research and Innovation Center

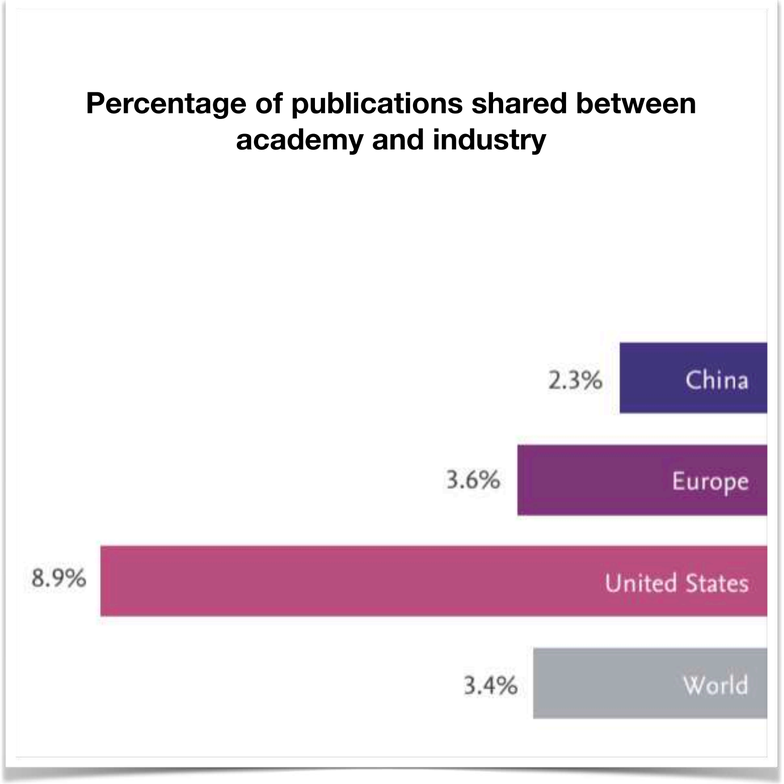
There is a large spread of AI readiness in Europe, but even the most ready countries are behind the US AI frontier.

% — Top 25% rank in AI Readiness Index — Above average (next 25%) — Below average (but not in bottom 25%) — Bottom 25%

Countries ranked by AI readiness	Components: AI index	AI startup	Auto-mation	Digital readiness	Innovation	Investment capacity	Human skills	ICT connect-edness
United States								
United Kingdom								
Sweden								
Finland								
Italy								

Several weaknesses
Most critical: innovation

Weak academy/industry collaboration



Stanford University
Human-Centered
Artificial Intelligence

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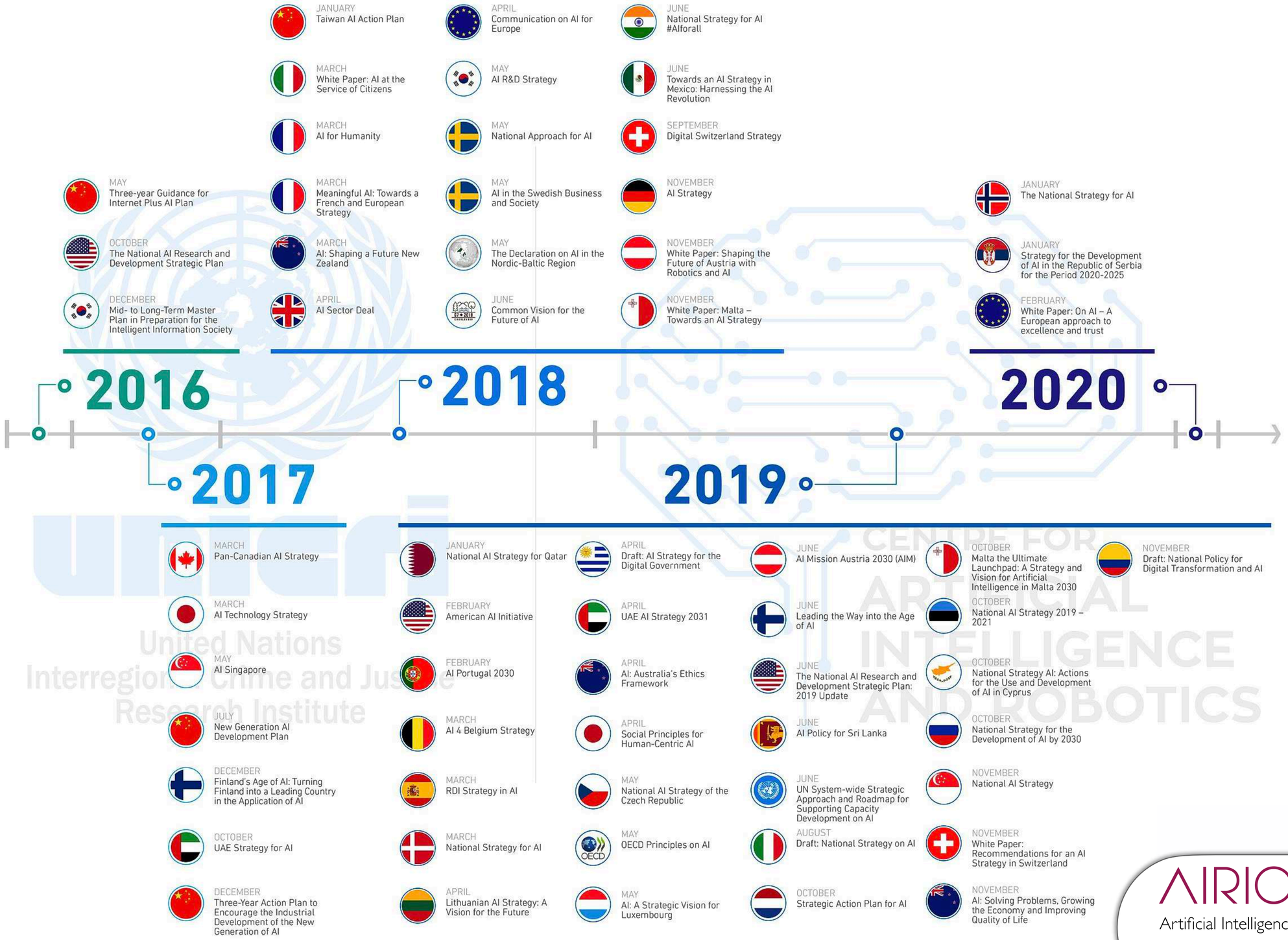

United Nations Interregional Crime and Justice Research Institute
CENTRE FOR ARTIFICIAL INTELLIGENCE AND ROBOTICS

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Elaborata dal Gruppo di Esperti MISE sull'intelligenza artificiale

Proposte per una

Strategia italiana

per l'intelligenza artificiale

Ministero dello sviluppo economico

AL CUORE DELLO SVILUPPO

Spring 2020

30 national experts

Autumn 2021

9 national experts

Programma strategico

Intelligenza Artificiale

2022-2024

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AI Research Institute

Centralized/hub+spokes
Public fundings
Participation in EU Calls
Collaboration with Universities

TRL 1 - 5

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Dipartimento per la trasformazione digitale

MUR
Ministero dell'Università e della Ricerca

Ministero dello sviluppo economico

AI Research Institute

Companies

Centralized/hub+spokes
Public fundings
Participation in EU Calls
Collaboration with Universities

TRL 1 - 5

TRL 6 - 9

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Artificial Intelligence Research and Innovation Center

Dipartimento per la trasformazione digitale

MUR
Ministero dell'Università e della Ricerca

Ministero dello sviluppo economico

AI Research Institute

Centralized/hub+spokes
Public fundings
Participation in EU Calls
Collaboration with Universities

TRL 1 - 5

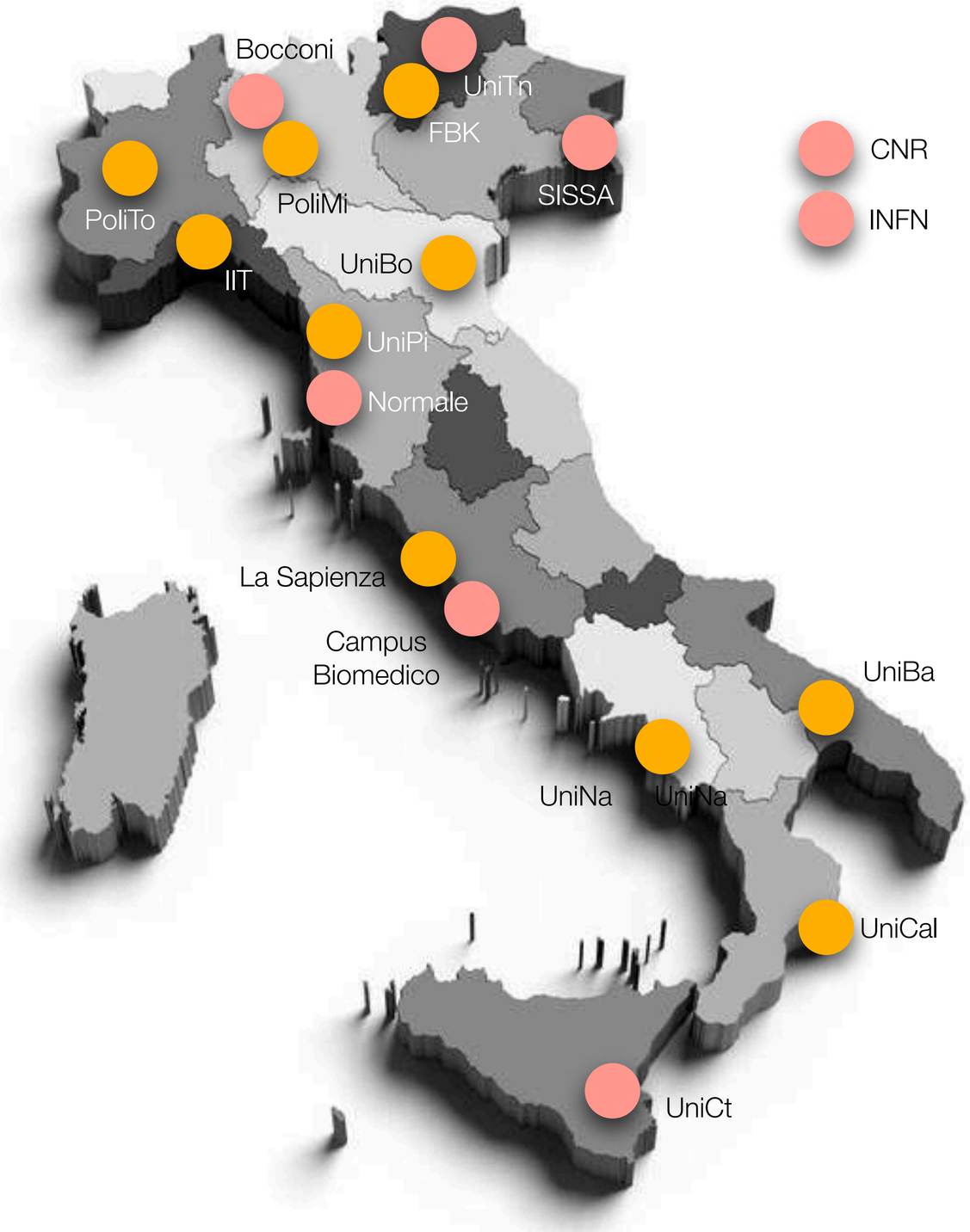
Institute for Industrial Research and Technology Transfer

Decentralized
Private fundings
Participation in R&D Calls
Collaboration with Startup Hubs

TRL 4 - 8

Companies

TRL 6 - 9



Piano Nazionale
di Ripresa e Resilienza

Call budget

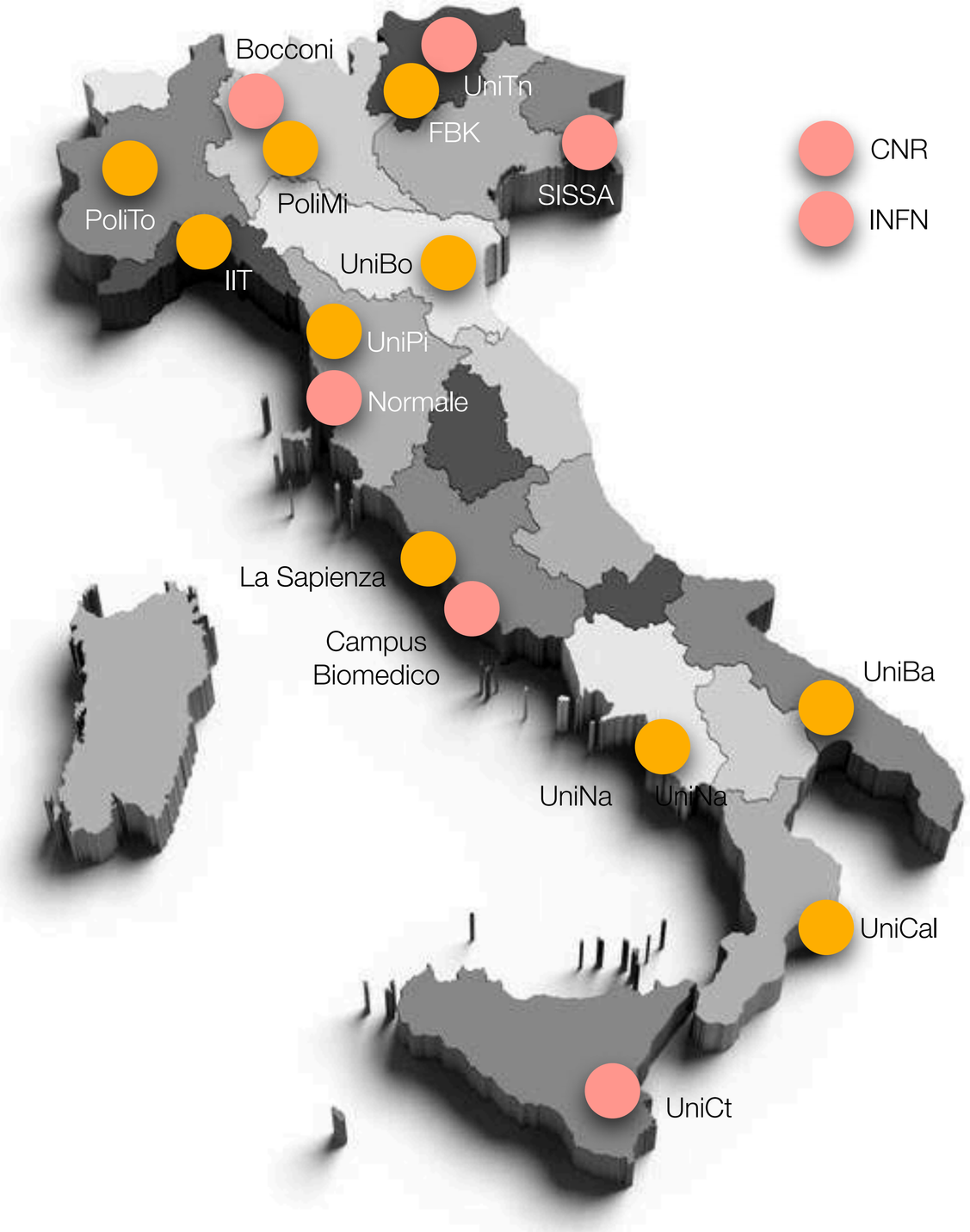
- 1.6 GEuro

Budget per EP

- 114 MEuro (>30% cascade funding)

Budget per Milan Spoke

- 9 MEuro (>30% cascade funding)



Piano Nazionale
di Ripresa e Resilienza

Call budget

- 1.6 GEuro

Budget per EP

- 114 MEuro (>30% cascade funding)

Budget per Milan Spoke

- 9 MEuro (>30% cascade funding)

Governo italiano

Ministero delle Imprese
e del Made in Italy

Several calls

>1.0 GEuro

Required Presence of Research Centers

Higher valuations, higher fundings

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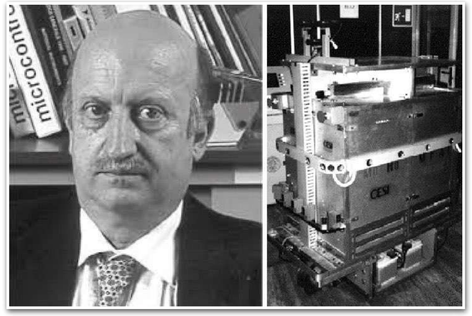
Artificial Intelligence Ecosystem at Politecnico di Milano

Marcello Restelli

AI at Politecnico di Milano

AIRLab
1971



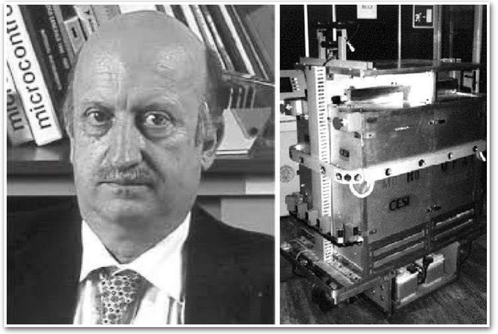
AIRLAB
ARTIFICIAL INTELLIGENCE AND ROBOTICS LAB

- From AI to Robotics
  - Deep learning, reinforcement learning, multi-agent systems, algorithmic game theory, genetic algorithms, computer vision, natural language processing

- Goal: to develop scientific research in AI and Robotics

- Members:
  - 12 professors
  - 6 postdocs
  - 6 assistant researchers
  - 45 PhDs
  - 100 + MSc students

- First course on Artificial Intelligence in Italy



AI at Politecnico di Milano

AIRLab
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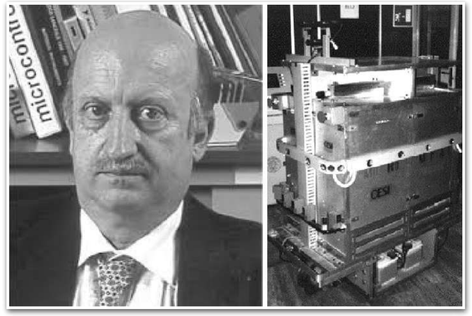
Associazione Italiana per l'Intelligenza Artificiale



1987
IJCAI
AIxIA

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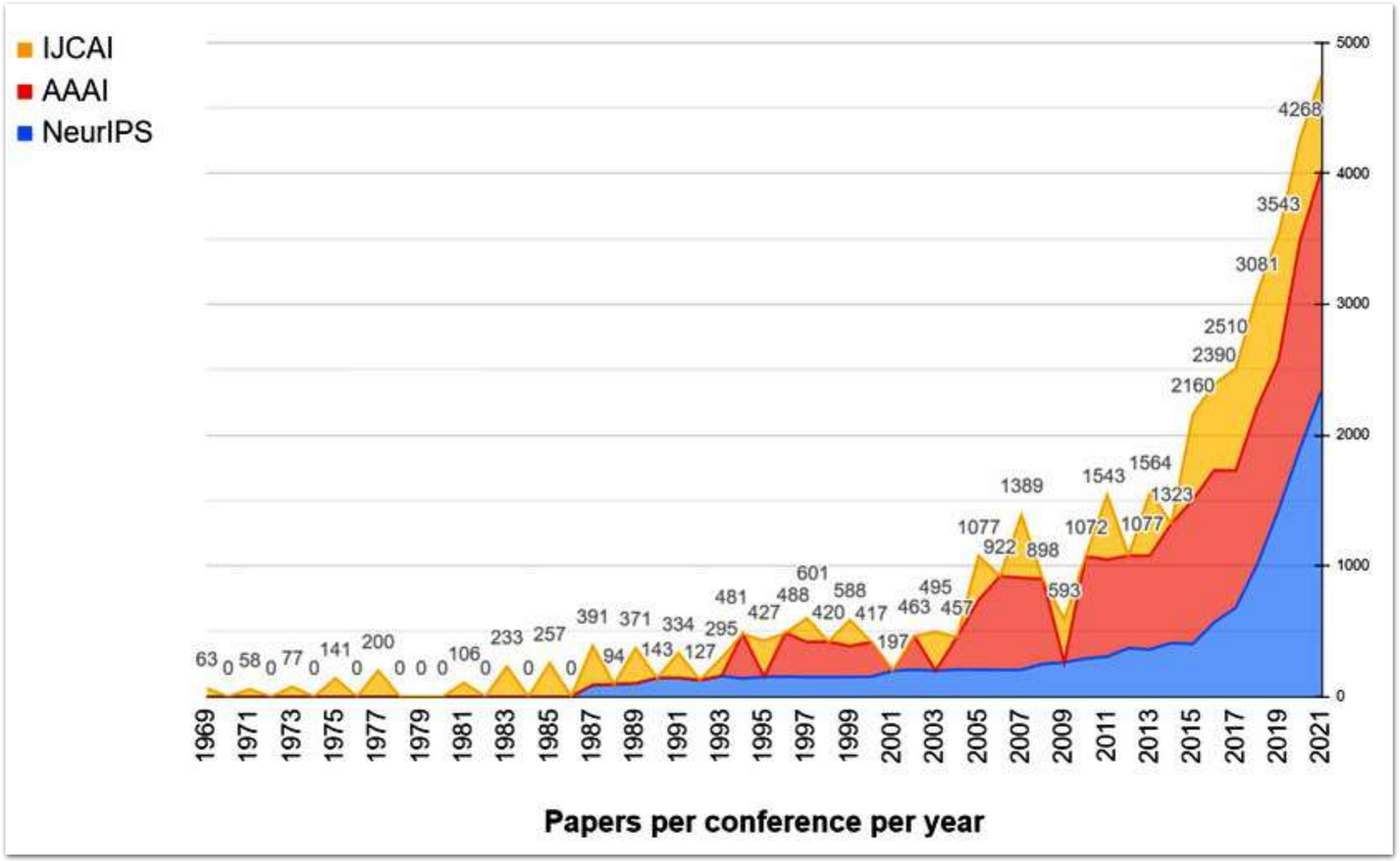
Artificial Intelligence Research and Innovation Center

Associazione Italiana per l'Intelligenza Artificiale

- IJCAI 1987 is held at Milan
- After IJCAI 1987: Italian Association for Artificial Intelligence (AIxIA) was born
- **Goal**: to foster scientific research and promote the adoption of AI techniques in Italy



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AI at Politecnico di Milano

AIRLab
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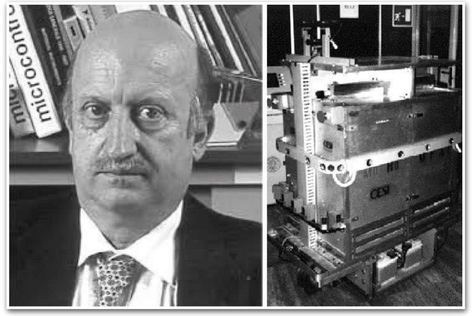
Associazione Italiana per l'Intelligenza Artificiale

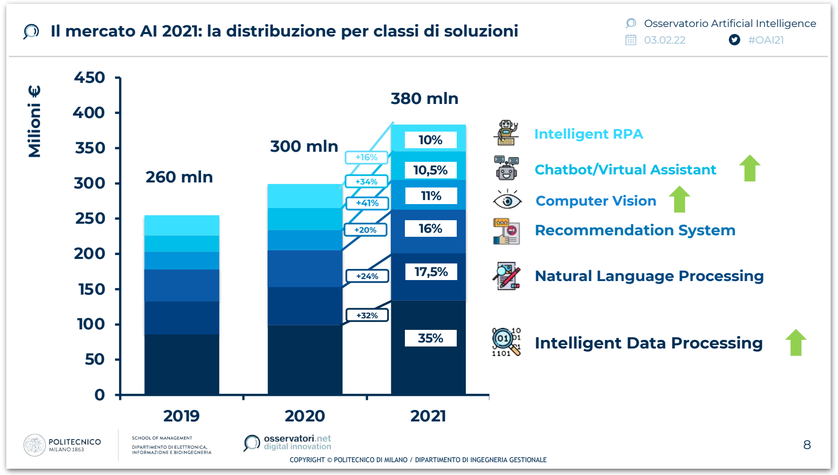
Oss. AI
2017



1987
IJCAI
AIxIA

osservatori.net
digital innovation

- Osservatori digital innovation
  - 100+ professors, researchers, analysts
  - 51 osservatori
  - 560 companies involved
- Goal: market research and trends, updates, communication, networking
- 6-th edition of Osservatorio Artificial Intelligence
  - 46 companies involved



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AI at Politecnico di Milano

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Associazione Italiana per l'Intelligenza Artificiale

Oss. AI
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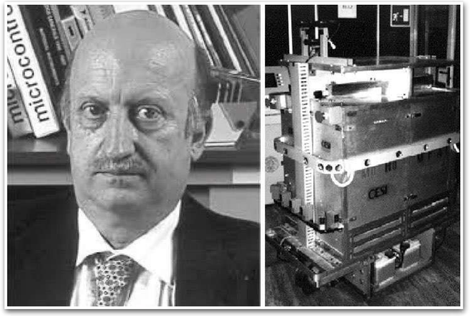

1987
IJCAI
AIxIA

2021
ELLIS
Unit Milan

European Laboratory for Learning and Intelligent Systems | MILAN

- European Laboratory for Learning and Intelligent Systems (ELLIS) was born in 2018
  - 35 units
  - 932 members
- Goal: promote European scientific excellence in AI
- In 2021, the Milan ELLIS Unit was accepted

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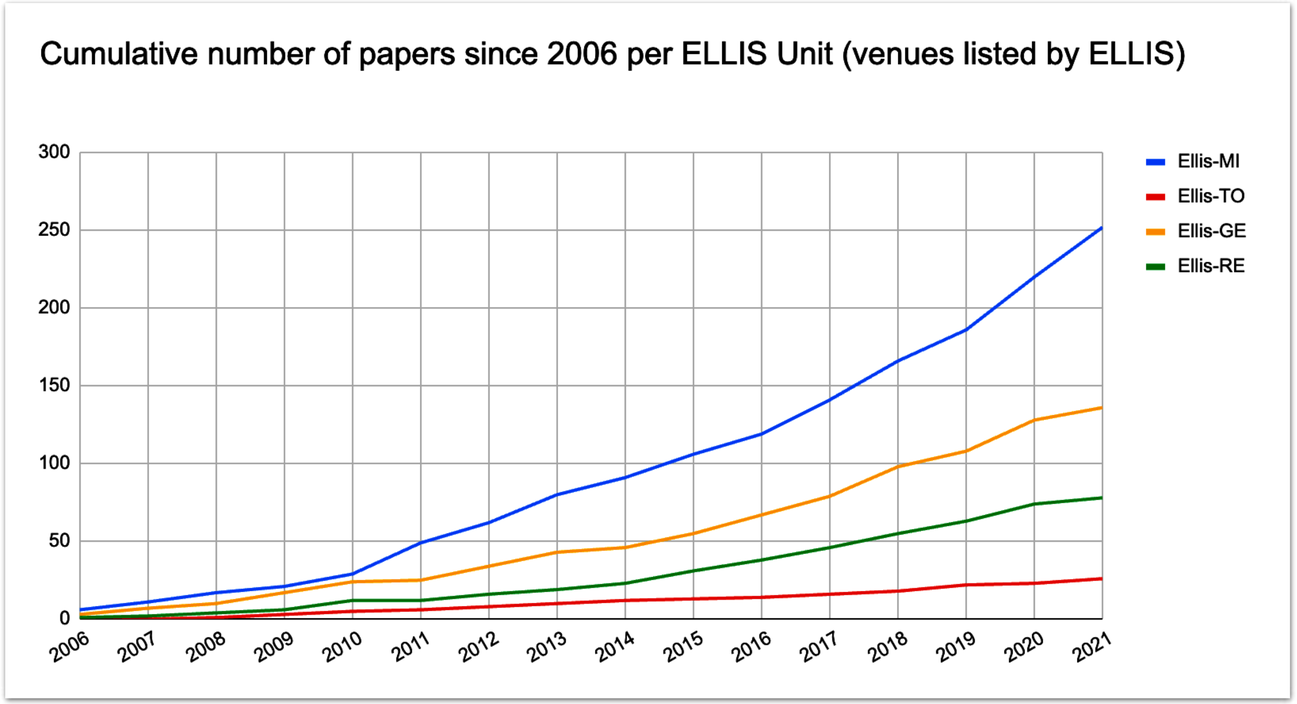

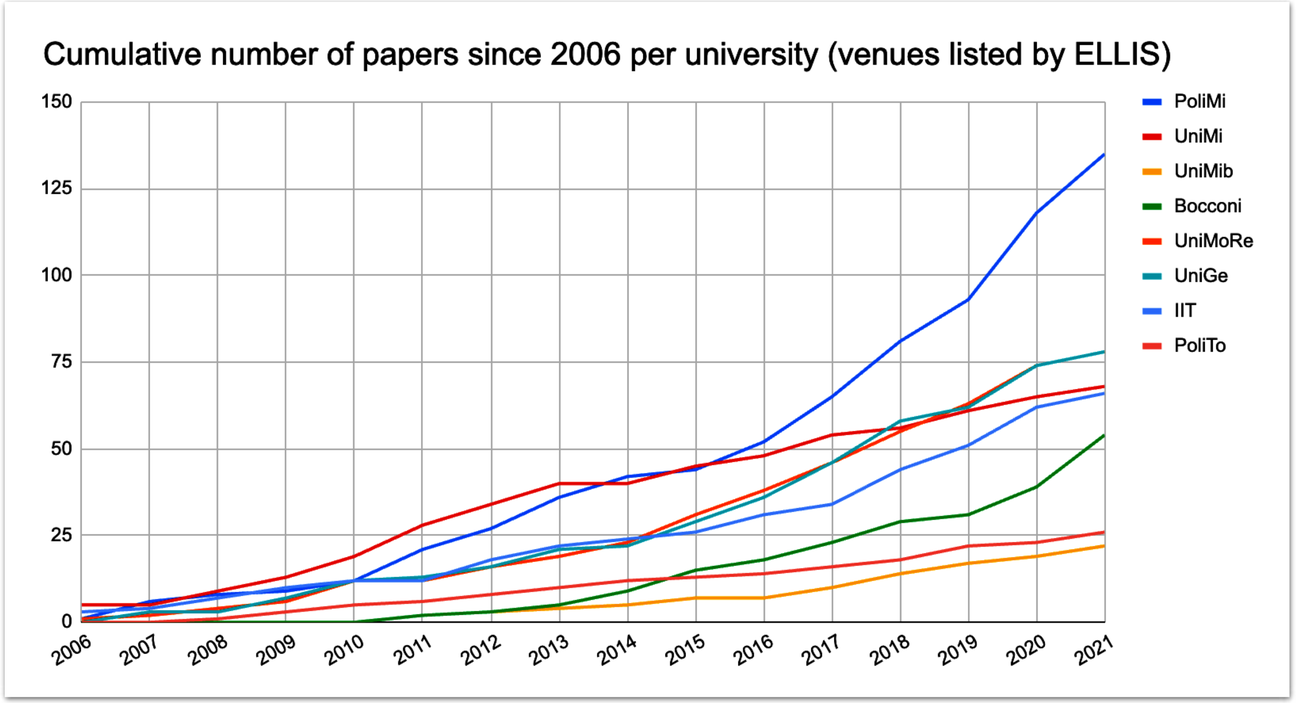

Venues listed by ELLIS

NeurIPS, ICML, ICLR, JMLR, CVPR, ICCV, ECCV, IJCV, PAMI, RSS, CoRL, ACL, EMNLP, KDD, AAAI, IJCAI, COLT, UAI, AAMAS, AISTATS, TACL, SIGIR, WSDM, WWW

2022 (Politecnico di Milano)

- NeurIPS 12
- ICML 6
- AAAI 4
- IJCAI 3
- ICLR 2
- AAMAS 2

Outstanding paper award

NEURAL INFORMATION PROCESSING SYSTEMS

2020

ICML
International Conference On Machine Learning

2022

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AI at Politecnico di Milano

AIRLab
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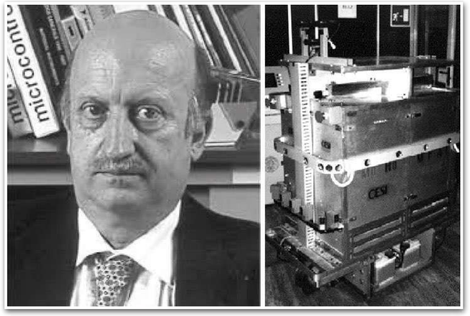
Associazione Italiana per l'Intelligenza Artificiale

Oss. AI
2017

AIRIC
2022



1987
IJCAI
AIxIA

2021
ELLIS
Unit Milan

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AIRIC

- More than 70 Joint Research Centers (JRC): *medium/long-term strategic partnership between a company and the Politecnico on shared research, innovation, and development issues*

- In the framework of JRC, the Artificial Intelligence Research and Innovation Center (AIRIC) was born in 2021
- Inter-department structure
- Goal: to support companies to adopt AI-driven solution
- Point of contact between companies and Politecnico di Milano
- Staff composed of young researchers supervised by professors of Politecnico di Milano

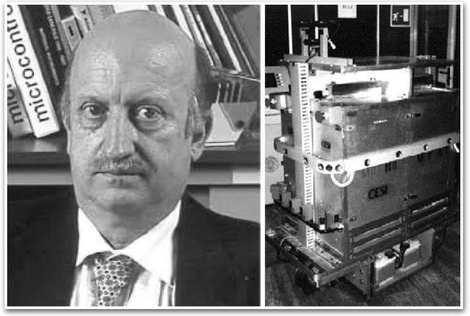
AI at Politecnico di Milano

AIRLab
1971

Associazione Italiana per l'Intelligenza Artificiale

Oss. AI
2017

AIRIC
2022



1987
IJCAI
AIxIA

2021
ELLIS
Unit Milan

2023
PNRR

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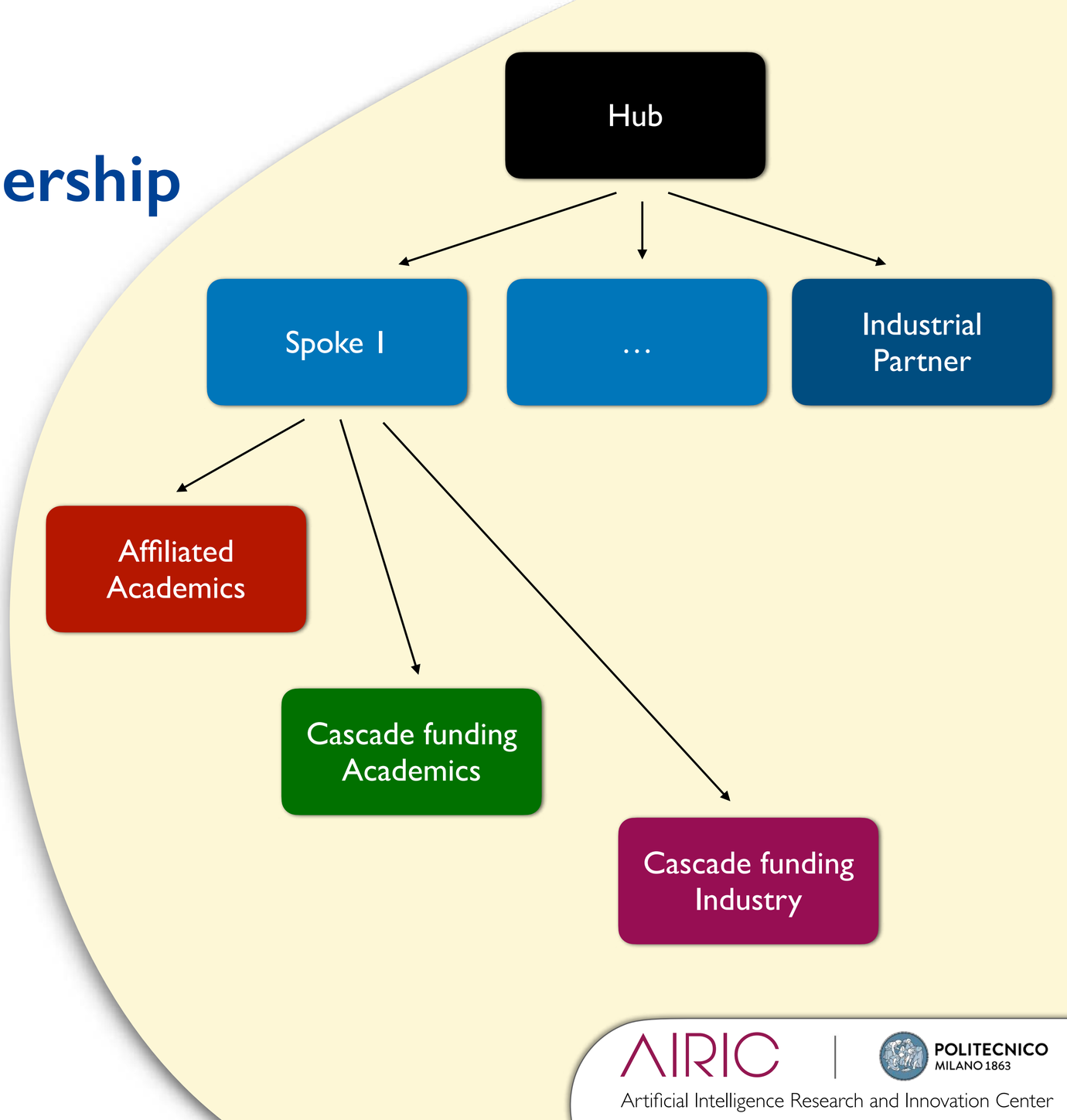
Piano Nazionale
di Ripresa e Resilienza

Call

Extended Partnership

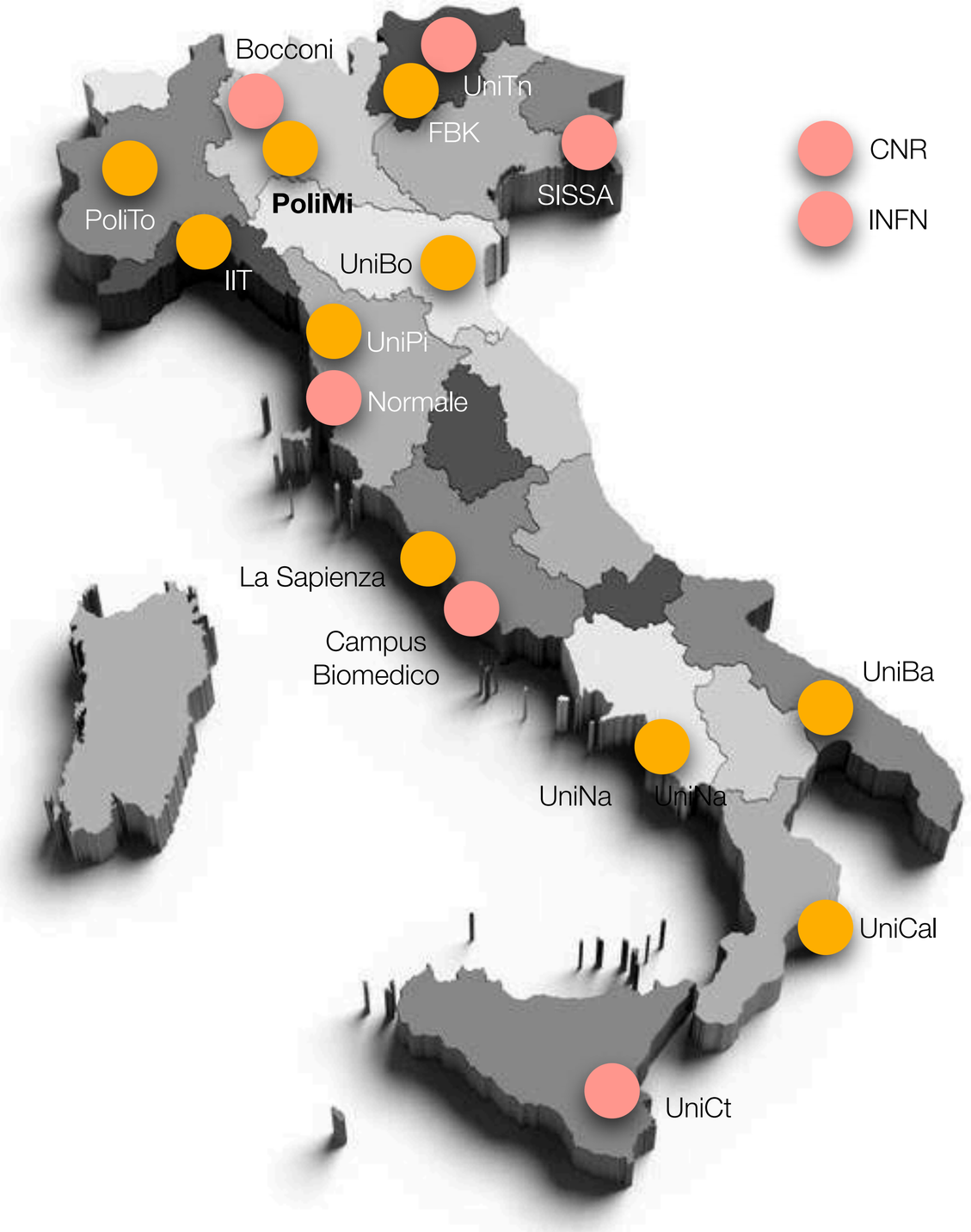


Goals

- Identifying topic-specific excellence centers
- Strengthening the excellence centers by funding positions (RTDAs, PostDocs, PhDs, equipment)
- Strengthening the collaboration between academics and industry

Outcomes

- Papers (TRL 1-3)
- Datasets (TRL 1-5)
- Experimental activities (TRL 3-5)



Hub: CNR
PI: Marco Conti

Spoke 1: ***Human-Centered AI***
UniPi + Normale, CNR

Spoke 2: ***Integrative AI***
FBK + UniTn

Spoke 3: ***Resilient AI***
UniNa + Campus Biom., CNR

Spoke 4: ***Adaptive AI***
PoliMi + Bocconi

Spoke 5: ***High-Quality AI***
Sapienza + CNR

Spoke 6: ***Symbiotic AI***
UniBa + INFN

Spoke 7: ***Edge/Exascale AI***
PoliTo + SISSA

Spoke 8: ***Pervasive AI***
UniBo + INFN, CNR

Spoke 9: ***Green-Aware AI***
UniCal + CNR

Spoke 10: ***Bio-Socio Cognitive AI***
IIT + UniCt, INFN, CNR

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Artificial Intelligence Research and Innovation Center

AIRIC: mission, structure, and service

Giovanni Miragliotta

Agenda

- *Visione e Missione*
- *Struttura*
- *Servizi*
- *Metodologia*
- *Unicità*

«Il segreto è porsi sempre “un po’ oltre la frontiera della ricerca“ per mantenere vivo il vantaggio competitivo»

Francesco Timpone

Vision and Mission

La Missione di AIRIC è incarnare il legame tra ricerca e applicazione, per tutte le imprese che pongono l'Intelligenza Artificiale al centro della loro Digital Strategy

Structure

- *Joint Research Center: horizontal, for applications of AI*
- *<u>Full time</u> professors and researchers*

Structure

- *Joint Research Center: horizontal, for applications of AI*
- *Full time professors and researchers*
- *Technical and management expertise*
- *Access to every asset of Politecnico di Milano*

Services

AI Envisioning

Comprendi le potenzialità dell'uso dell'AI nel tuo contesto aziendale.

AI Joint Research

Sviluppa progetti congiunti di ricerca industriale capaci di portare innovazione nella tua azienda.

AI Advanced Education

Sviluppa le competenze tecniche della tua azienda tramite strumenti formativi avanzati.

Services

AI Envisioning

Comprendi le potenzialità dell'uso dell'AI nel tuo contesto aziendale.

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AI Advanced Education

Sviluppa le competenze tecniche della tua azienda tramite strumenti formativi avanzati.

Methodology: Joint Research Project

Induction & Exploration	POC in test environment	POC in real environment	Deployment directions

Metodologia: Joint Research Project

Induction & Exploration

- Goal(s)
- Processo attuale
- Patrimonio dati
- Scelta delle metodologie AI più promettenti

POC in test environment

- Scelta dei processi di test, scelta dei KPI
- Data engineering / data augmentation
- Costruzione del simulatore
- Implementazione dell'algoritmo
- Test e validazione
- Asintoto KPI, stima del business value

POC in real environment

- Scelta del processo di test
- Integrazioni
- Messa online degli algoritmi
- Calibrazione e ottimizzazione
- Finalizzazione del Business case

Deployment directions

- Bottleneck tecnologici e organizzativi
- Impatti interni ed esterni
- Attività di formazione
- Collegamento con la Digital Strategy

Uniqueness

- *Co-change*
  - *Lavoro comune di analisi e comprensione delle variabili progettuali*
  - *No imposizione di metodi o strumenti precedentemente sviluppati*
  - *Affiancamento all'azienda, innovazione a misura del contesto*
- *Orientamento all'autonomia del committente*
  - *Forte coinvolgimento di persone (alto potenziale) dell'azienda*
  - *Sessioni di formazione on-the-run sui metodi applicati o sviluppati nel progetto*
  - *Cessione e training sugli strumenti sviluppati*
- *Accesso ad una rete di competenze di eccellenza*
- *Totalmente scevro da conflitti di interesse*

Panel with AIRIC Clients

Luca Tremolada
Il Sole 24 Ore

Alberto Baccari
Laya

Bruno Battista
Snaitech

Tommaso Bianchi
AIRIC

Lucio Machetti
Terranova

Vittorio Piccinini
ATOS Italy

Use Case 1

AI for Hotellerie Advertising

Luca Tremolada
Il Sole 24 Ore

Luca Alessandrelli
AIRIC

Filippo Fasolo
CloudBeds

Use Case 2
AI for Manufactoring

Luca Tremolada
Il Sole 24 Ore

Luca Alessandrelli
AIRIC

Andrea Sala
Agrati Group