

# InnoTech Report 2026: Harnessing Innovation in the Global Scenario



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**InnoTech Report 2026:  
Harnessing Innovation  
in the Global Scenario**



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# PREFACE

# Preface by Valerio De Molli

***“The best way to predict the future is to create it.”***

Peter Drucker (Economist and author)

The world we operate in today is one of growing complexity. Shifting geopolitical balances, evolving trade dynamics, and the tensions that continue to characterise both Eastern Europe and the Middle East are reshaping the environment in which economies compete and societies progress. Against this backdrop, a common question has emerged for advanced economies: how do you sustain resilience and competitiveness in a world where technological capability has become an increasingly decisive factor of long-term strategic strength?

For Europe, and for Italy more so, this moment calls for clear thinking and deliberate action. The technological trajectories of the United States and China, each backed by substantial and consistent investment in research, industrial capacity, and strategic infrastructures, serve as a reminder that standing still is itself a choice, and one with consequences. Innovation and technology remain powerful drivers of economic growth, but their role has expanded: they have become central to how nations build resilience, strengthen their industrial base, and create the conditions for sustainable long-term prosperity.

It is in this scenario that the 2026 Technology Forum, now in its fifteenth edition, examines the technological shifts that are reshaping the foundations of economic competition. Agentic AI and advanced automation, robotics, space economy, digital infrastructure, and energy transition are not simply sectoral developments, they are converging forces that will define the next chapter of industrial and social progress.

The TEHA-Global Innosystem Index (TEHA-GII) 2026 provides the empirical foundation against which these opportunities must be read. Among the 49 countries assessed, Italy ranks 31st with an overall score of 2.79, with no change in ranking compared to the previous year. Singapore, Israel, and the United Kingdom lead the ranking with scores above 4.5. Italy’s position remains stable, in a global landscape that continues to evolve.

The dimensional breakdown points to two areas that are particularly concerning. In Human Capital, Italy ranks 33rd reflecting the need to build a stronger pipeline of scientific and technical talent. In Innovative Ecosystems, it ranks 34th. On the other side, the 6th place in Effectiveness of the Innovation Ecosystem is a notable exception: it signals a strong capacity to generate quality outputs despite structural constraints, and points to a foundation on which Italy can build.

The data on skills and technology transfer are particularly telling. Italy currently faces a shortfall of approximately 4.5 million workers with advanced digital competencies, a gap that could affect over 10 million people by 2030. On technology transfer, the country produces a volume and quality of research that places it among Europe's strongest scientific systems yet transforms only 3% of its scientific publications into patents, compared to 14% in Germany and 12% in France. These and other insights can be found throughout the InnoTech Community 2026 report, together with concrete proposals to strengthen the Italian innovation ecosystem.

I wish to express my deepest gratitude to all the Partners whose continued support and shared conviction that science, research, and innovation are the essential foundations of a society that aspires to both prosperity and equity, make this work possible: HPE, RINA, Agrati, Bloom Energy, Cisco, DNV, Eurotherm by Watlow, Exprivia, Hydac, ION, Mutti, NHOA Energy, NTT Data, Pirelli, SeSa Research Hub, SIR Industriale, Smart Industry, and Invest in Trentino. I am also honoured to acknowledge the honourable patronage of the European Space Agency.

A heartfelt thank you to the InnoTech Hub team of TEHA Group, led by Corrado Panzeri (Partner and Head of InnoTech Hub), Alessandro Viviani (Associate Partner) and Paola Pedretti (Head of the InnoTech Community and Technology Forum), and composed of Roberta Braccio, Stella Chen, Silvia Della Giovanna, Laura Dibenedetto, Giulia Ercole, Noemi Lattanzi, Filippo Minisini, Matteo Mistretta, Gherardo Montemagni, Sofia Odolini, Matteo Polistina, Matteo Radice, Davide Skenderi, who have once again worked with dedication to deliver a report full of insights and concrete guidance for the future.

**Valerio De Molli**

*Managing Partner & CEO,*

*The European House - Ambrosetti and TEHA Group*



# INTRODUCTION

## THE INNOTECH COMMUNITY

The Innovation and Technology Community (“InnoTech”) is the platform of TEHA Group established in 2011 within TEHA Club, and has become the benchmark for in-depth analysis and discussion around issues related to the new frontiers of technology and innovation, with the mission to:

**Understand and embrace the major transformative challenges arising from new and emerging technologies in order to build sustainable competitive advantages for territories and businesses and to improve people’s quality of life**

To achieve this mission, the InnoTech Community’s activities are developed along an annual path with the purpose of:

- ▶ deepening future scenarios arising from new and emerging technologies, over the short, medium and long term, with particular reference to technological mega-trends and the consequent major social and economic changes;
- ▶ understanding how Italian excellence in research and technological innovation context can play a leading role on a global stage, comparing it with international best practices;
- ▶ connecting the actors of the Italian ecosystem (Institutions, Research, Industry and Finance) with their counterparts in the main innovation ecosystem worldwide, to strengthen existing competitive advantages and/or build new ones, and to appropriately position Italy’s excellence in the world;
- ▶ promoting, enabling, and supporting synergies and opportunities among the main stakeholders of the Italian and European research and innovation ecosystem, through the leading representatives of Institutions, Research, Academia, Industry and Finance;
- ▶ promoting an entrepreneurial culture and the idea that innovation and technology constitute structural sources of sustainable competitive advantage;
- ▶ supporting top management in making appropriate strategic decisions regarding innovation and technology;
- ▶ identifying concrete actions that policy makers can implement to stimulate and support the various players in the Italian innovation ecosystem, as well as create the conditions for enriching human capital.



More precisely, the InnoTech Community's activities are structured on multiple interconnected levels and involve the implementation of:

- ▶ **Innovation Meetings:** physical or digital meetings dedicated to a small group of selected business leaders and focused on deepening and debating specific topics of interest related to innovation and technology. Innovation Meetings are opportunities to present and discuss national and international success stories, provide in-depth updates on best practices to take cues from and stimulate the formulation of concrete proposals for policymakers.
- ▶ **One-to-one Meetings:** confidential meetings organized among the Community Partners or other companies belonging to the Community's network, with the aim of identifying opportunities of collaboration and engaging with industry leading companies. These strictly confidential meetings, lasting 1.5 to 2 hours, are aimed at identifying collaboration hypothesis from which concrete projects can emerge.
- ▶ **Position Paper:** annual report with high-level insights on technological trends in the topics addressed by the innovation meetings and one-to-one meetings. In addition to thematic insights, the Paper also provides an overview on the Italian research and innovation ecosystem and guidance for policymakers.
- ▶ **Technology Forum:** the main annual event of the InnoTech Community, now in its 15<sup>th</sup> edition. The Technology Forum brings together the main players of the global innovation scene and is considered one of the reference events in Europe on the topic of innovation and new technologies.



The InnoTech Hub of TEHA Group is part of the scope of activities of TEHA Club, established in 1999 and reserved for top managers of national and multinational groups and companies operating in Italy (today it has more than 400 members), which operates with the objectives of:

- ▶ contributing concretely to Italy's civil and economic progress;
- ▶ offering a contribution to the excellence and optimization of institutions and businesses;
- ▶ promoting a system of favourable relations among members.

TEHA Working Group is led by Corrado Panzeri (Partner and Head of InnoTech Hub), Alessandro Viviani (Associate Partner) and Paola Pedretti (Head of the InnoTech Community and Technology Forum) and composed of: Stella Chen, Laura Dibenedetto, Noemi Lattanzi, Filippo Minisini, Matteo Mistretta, Gherardo Montemagni, Sofia Odolini, Matteo Polistina, Matteo Radice, Davide Skenderi, and supported by the project assistants Roberta Braccio, Giulia Ercole, Silvia Della Giovanna.

The Working Group is supervised by Valerio De Molli (Managing Partner & CEO, The European House – Ambrosetti and TEHA Group).



## THE INNOTECH COMMUNITY 2026 PARTNERS

The InnoTech activity path is designed and implemented in collaboration with leading players in the national and international innovation scene. The Partners who joined the InnoTech Community 2026 are listed in the figure below. A heartfelt thank you goes to them for supporting and stimulating the different lines of activity of the InnoTech Community, providing their contribution to analyse in an ecosystemic and highly innovative logic, the different verticals of deepening. Also, we would like to acknowledge and thank the European Space Agency (ESA) for its honourable patronage.

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## THE STRUCTURE OF THE REPORT

This document aims to give a precise representation of the Italian innovation ecosystem with a global, European and regional perspective. Its primary goal is to serve as a valuable resource for policymakers, enabling them to assess and make informed decisions aimed at promoting innovation both at a national and, more specifically, regional level. Additionally, it acts as a strategic tool for business leaders by offering valuable insights in support of decision-making in a rapidly evolving market. The Report is structured as follows:

### **CHAPTER 1. TECHNOLOGICAL AND INNOVATION TRENDS**

The first chapter of this paper offers a concise overview of the main technological and innovation trends shaping the current industrial and economic landscape: including Agentive AI, The new industrial paradigm, Space Economy, AI infrastructure, Nuclear energy and Corporate innovation leaders. It provides strategic insights into these domains, outlining key challenges and opportunities for Italy and Europe. The different topics are presented in the same order as they will be presented during the two days of the technology forum.

### **CHAPTER 2. THE STATE OF INNOVATION AS MEASURED BY THE TEHA – GLOBAL INNOVATION INDEX 2026 (TEHA – GII 2026) FOR A VIEW OF NATIONAL ECOSYSTEMS**

The second chapter of this paper is dedicated to the analysis of innovation ecosystems with a global view. The analysis revolves around two macro-sets of indicators. On the one hand, Input variables, selected to assess each country's endowment with respect to the determinants of overall innovation performance; four subgroups were considered: human capital, financial resources to support innovation, innovation ecosystem and attractiveness of the ecosystem. On the other hand, Output variables, aimed at 'capturing' at the highest level of synthesis the results of innovative effectiveness in terms of the production of innovations and their economic impact; three subgroups were considered: results of basic research activity, outcomes of applied research and ability to generate reference technology solutions. Based on these components, an index aimed at measuring and structurally comparing the innovation performance of innovation ecosystems around the world has been developed, which allows for measuring the status of different innovation ecosystems globally by comparing different countries.

**CHAPTER 3.****THE TEHA – REGIONAL INNOSYSTEM INDEX 2026 (TEHA – RII 2026)**

The third chapter of this paper is dedicated to the analysis of innovation ecosystems narrowing the analysis to the European and Italian context with a regional detail. The analysis revolves around 11 variables grouped into 4 categories: Economic Development, Human Capital, Talent for Innovation and Digital Infrastructures and Technologies. Based on these components, an index aimed at mapping out and structurally comparing the innovation landscape across European regions has been developed.

**CHAPTER 4.****FROM RESEARCH TO MARKET: TECHNOLOGY TRANSFER AND VENTURE CAPITAL**

The fourth chapter of this paper examines the gap between Italy's scientific performance and its capacity to generate marketable innovation. Despite a strong and internationally recognised research base, Italy faces persistent structural challenges in translating scientific excellence into economic value. The chapter analyses the institutional infrastructure responsible for bridging research and market, assesses the maturity and depth of the venture capital ecosystem, and identifies the key structural bottlenecks that still limit the translation of research output into commercial impact.

**CHAPTER 5.****TEHA PROPOSALS FOR ITALY**

The final chapter of this document presents 10 strategic proposals developed by TEHA to strengthen Italy's innovation ecosystem and enhance its long-term competitiveness. Building on the evidence and analysis presented in the preceding chapters, the proposals are organised around three strategic areas and address both the systemic conditions needed to foster innovation and the specific levers that policymakers, institutions, and businesses can activate to unlock Italy's full innovation potential.



# 1

## TECHNOLOGY AND INNOVATION TRENDS

## 1.1 The Ubiquity AI Era | from AI to Generative AI, Agentic and Embedded AI

The shift toward agentic artificial intelligence marks a turning point in the relationship between people, processes, and technology. While the first wave of AI enabled task automation and content generation, the new phase focuses on operational autonomy: **systems capable of analyzing contexts, planning actions, and acting on behalf of the user.**

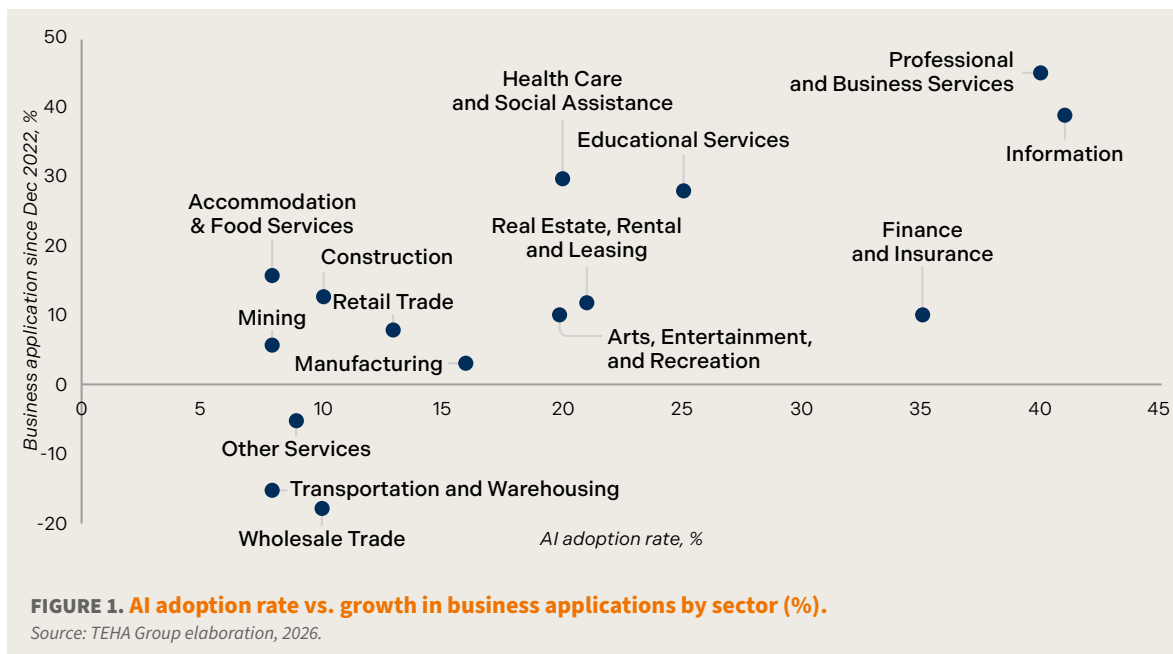
Intelligent agents represent a significant evolution: they are designed to gather and interpret information, retain contextual memory, and manage complex processes with an increasing degree of autonomy, adapting to dynamic situations and learning from experience. Looking ahead, many functions currently supported by digital assistants will evolve into true co-pilots, capable of learning and acting with growing independence.

This evolution marks the entry into what many analysts define as **the Ubiquity AI Era**: a time when artificial intelligence becomes pervasive, from agentic AI, which plans and decides, to embedded AI, which operates within machines, sensors, and systems. Together, they transform technology into the cognitive fabric of the enterprise, enabling distributed autonomy.

The agentic AI market is still at an early stage, but it is experiencing exceptional growth rates (with an estimated CAGR of around +40% between 2024 and 2034), signaling increasing demand for tools capable of autonomously managing complex decision-making processes.

The correlation between AI adoption and new business creation further underscores this dynamic. Sectors with higher AI adoption rates consistently show stronger growth in business applications, suggesting that artificial intelligence is not only transforming existing operations but actively enabling the emergence of new ventures and market players (**Figure 1**). This pattern is particularly evident in knowledge-intensive industries, such as professional services and information, where AI acts as a catalyst for entrepreneurial activity, lowering barriers to entry and accelerating the pace of innovation.





The main driver comes from “ready-to-use” applications, which are more accessible than custom-built platforms and therefore quicker to scale. Demand is concentrated on tools that combine orchestration capabilities, cross-functional automation, and adaptation to specific contexts.

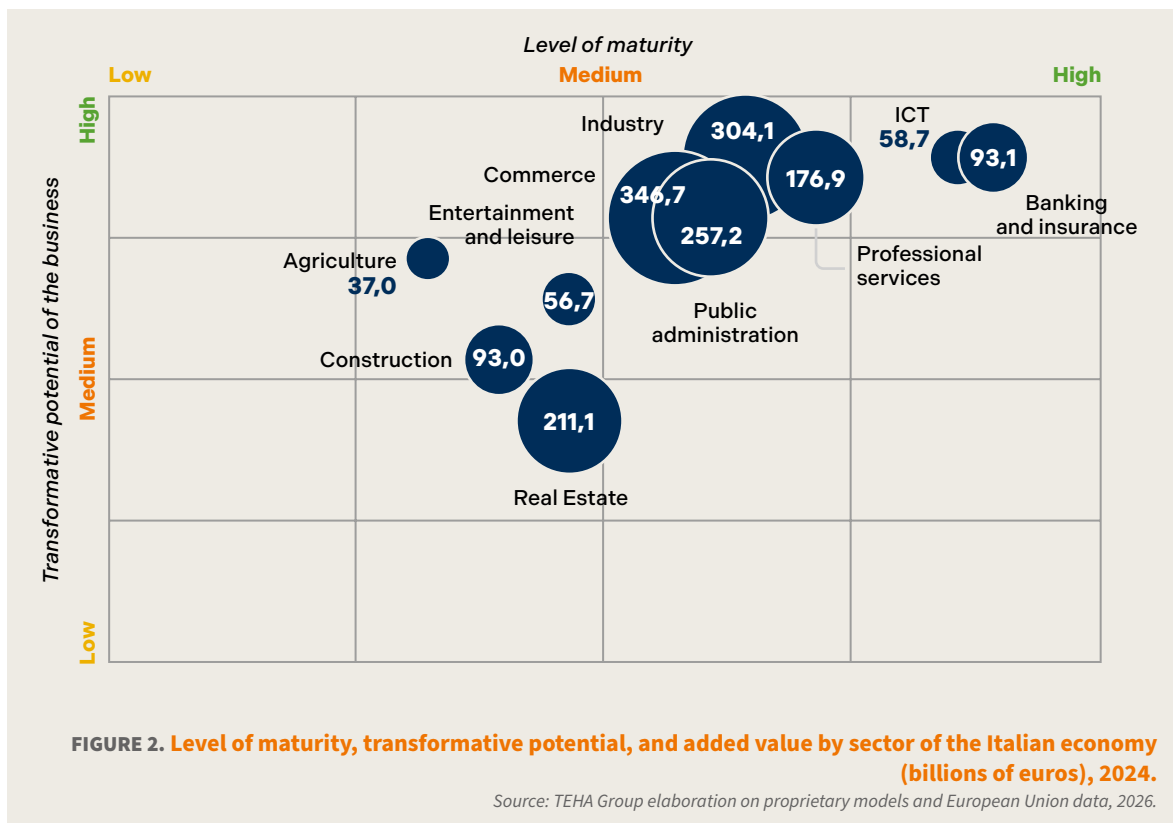
From a competitive standpoint, the **United States leads the race** thanks to the combined strength of research, capital, and Big Tech, while Europe shows a more cautious approach, often slowed by infrastructure limitations, a shortage of skills, and the lack of AI champions comparable to those in the United States and China, capable of driving large-scale innovation and attracting investment, talent, and technological development. The continent is at a crucial turning point in determining whether it can remain competitive.

**Italy**, in particular, **faces a significant lag in digital and AI-related skills**. Today, only 26.9% of the workforce possesses advanced digital skills, while demand accounts for 45.5% of job postings, resulting in a 18.6% mismatch and a shortage of over 4.5 million qualified workers. As companies intensify their search for advanced skill profiles, the vocational training system struggles to respond with the necessary speed, worsening a gap that risks becoming a structural barrier to growth, innovation, and national competitiveness.

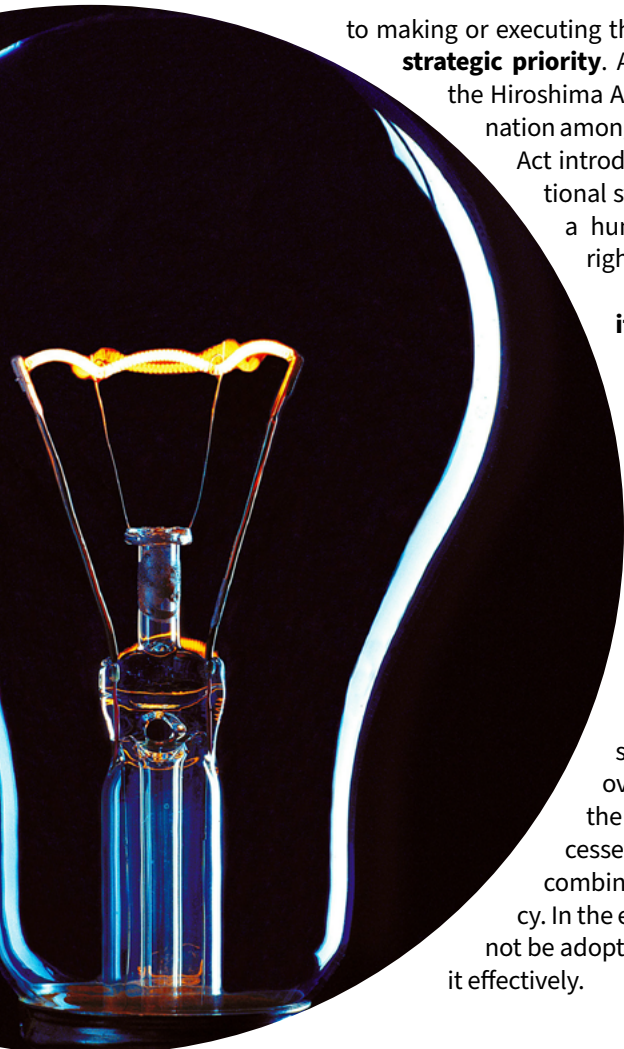
In Italy, the expected impact varies by sector, but some industries are already well positioned to capitalize on the agentic shift:

- **Financial Services**, already digitally advanced but with room for further automation in middle and back-office processes;

- ▶ **Manufacturing**, especially in high value-added segments, where intelligent process orchestration can improve productivity and quality. Moreover, as demonstrated by several international case studies, advanced AI can revolutionize product design and engineering processes;
- ▶ **Public Administration**, where intelligent agents can improve administrative efficiency, service accessibility, and ensure operational continuity in a context where a negative net balance between workforce inflows and outflows is expected in the coming years;
- ▶ **ICT and Software**, which can benefit from agentic tools for development, debugging, and automated technical support.



The expected benefits are significant: increased productivity, streamlined business processes, and improved resource management. Yet as the technology matures, new challenges emerge: security and reliability of agentic models, skills shortages, and the excessive complexity of available solutions. Technology alone is not enough. Targeted investments in training, change management, and system integration are needed to drive sustainable adoption. When AI systems move beyond supporting decisions



to making or executing them autonomously, **governance becomes a strategic priority**. At the international level, initiatives such as the Hiroshima AI Process represent early attempts at coordination among advanced economies, while in Europe the AI Act introduces a risk-based regulatory framework. National strategies, meanwhile, are converging around a human-centric approach aimed at preserving rights, safety, and oversight.

A particularly delicate issue is **explainability**. Advanced models, often based on probabilistic logic, produce variable and difficult-to-interpret results. Organizations must therefore invest in robust auditability: decision logs that trace the reasoning adopted, and clearly defined guardrails within which agents can operate. Because agentic systems evolve over time, and even reliable models may drift following changes in data, objectives, or context, continuous monitoring and periodic validation are equally essential.

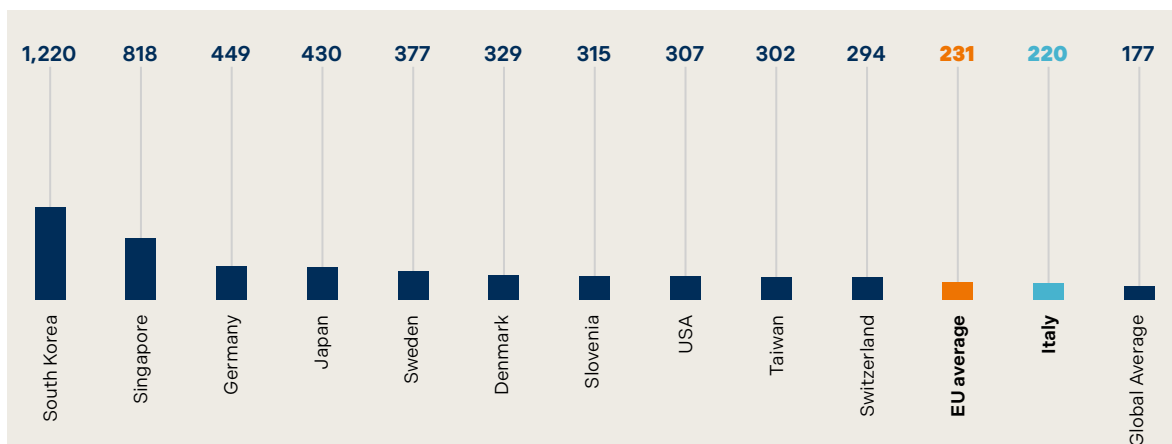
This transformation also reshapes leadership. Leaders must take on a role of strategic oversight, while middle management becomes the bridge between technology, people, and processes. Demand is growing for hybrid profiles that combine managerial vision with technological literacy. In the era of ubiquitous AI, the real differentiator will not be adopting more artificial intelligence, but governing it effectively.

## 1.2 The New Industrial Paradigm | Towards a Human-Robot Ecosystem?

We are living through an extraordinary moment of hype around both AI and advanced robotics.

Their convergence in physical AI is doing more than just making factories more efficient: it is reshaping the very logic of industrial production. In this sense, **Industry 5.0**, as defined by the European Commission, marks a discontinuity: the transition from a technological model focused on automating tasks traditionally performed by humans to one based on the complementarity between operator and machine. The competitive challenge of this decade is therefore how these two technologies can **unlock human productive potential** within industrial contexts.

The global stock of industrial robots exceeded **4.6 million units in 2024**, double the figure of 2014, with annual installations exceeding 500,000 units for the fourth consecutive year. Global robot density now stands on average at **177 robots per 10,000 employees (Figure 3)**. The geographic landscape, however, is heavily concentrated: Asia accounts for nearly three quarters of global annual deployments, with China alone representing over half of annual demand and installed capacity. Europe presents a more complex picture. While it ranks second globally and has benefited from nearshoring dynamics, the near-term outlook is under pressure. **European installations fell below 79,000 units in 2025**, as weakness in the automotive sector deepens, high costs weigh on competitiveness, and the escalation of US tariff policy creates additional uncertainty.



**FIGURE 3. Number of industrial robots per 10,000 workers in the top 10 countries in the world, compared with EU average, Italy, and global average, 2025.**

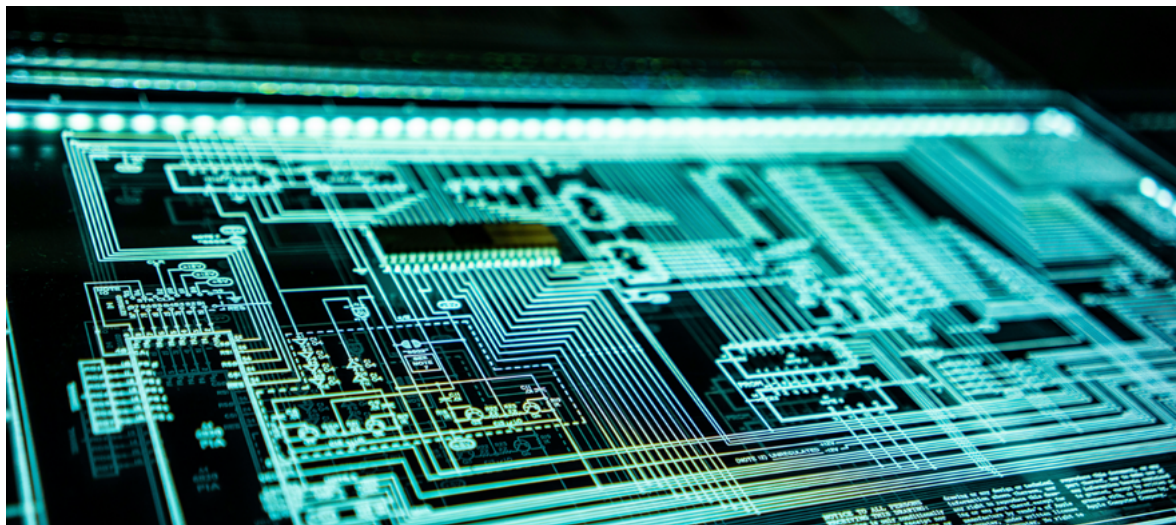
Source: TEHA Group elaboration on International Federation of Robotics' data, 2026

## The competitive challenge of this decade is **understanding how AI and advanced robotics can genuinely support people within industrial contexts.**

The opportunity, however, is becoming increasingly compelling from an economic standpoint. The cost-performance curve of robotics is improving rapidly: **the average payback period for industrial robotics projects has fallen to 1.3 years in 2024**, down from approximately two years just four years ago, with sub-12-month returns now within reach as physical AI matures. This shift is expanding adoption beyond large enterprises, bringing SMEs into the market through more accessible solutions such as collaborative robots, which require limited upfront investment and infrastructure. In this context, countries like Italy, despite a 16% decline in installations in 2024, retain a strong industrial base with significant untapped automation potential.

However, the data exposes a paradox at the heart of the current wave of adoption: **nearly 90% of companies worldwide have invested in AI and robotics**, yet **fewer than 40% report measurable gains**. The issue lies less in the technology itself than in how organizations adopt and integrate it: existing workflows, designed for a pre-AI era, have yet to be rethought around how AI and robotics support human operators. As a result, deploying them into legacy processes leaves much of the value untapped. But, when done right, the most effective human-robot collaboration models demonstrate productivity gains ranging from **20% to 200%**; significant reduction in workplace injuries in physically intensive settings, by **assigning 3D tasks — Dirty, Dangerous, Dull — to machines**; and improved ergonomics and job quality for operators, with a positive impact on workforce retention and on making manufacturing attractive to younger generations.

The key question for industry 5.0, therefore, is: “**How can AI and robotics enhance the operator’s capabilities?**”. The concept of the **Operator 5.0**, the technologically augmented worker, defines the frontier of this paradigm: a cognitive agent who governs, corrects and enriches the output of the automated system. The latest research shows that training programmes integrating AI with human judgement produce more capable operators and more efficient systems than fully automated alternatives. This is a fundamentally different skill profile from both the traditional industrial operator and the IT specialist, it is a **hybrid competence** spanning mechanical understanding, software literacy and AI interaction.



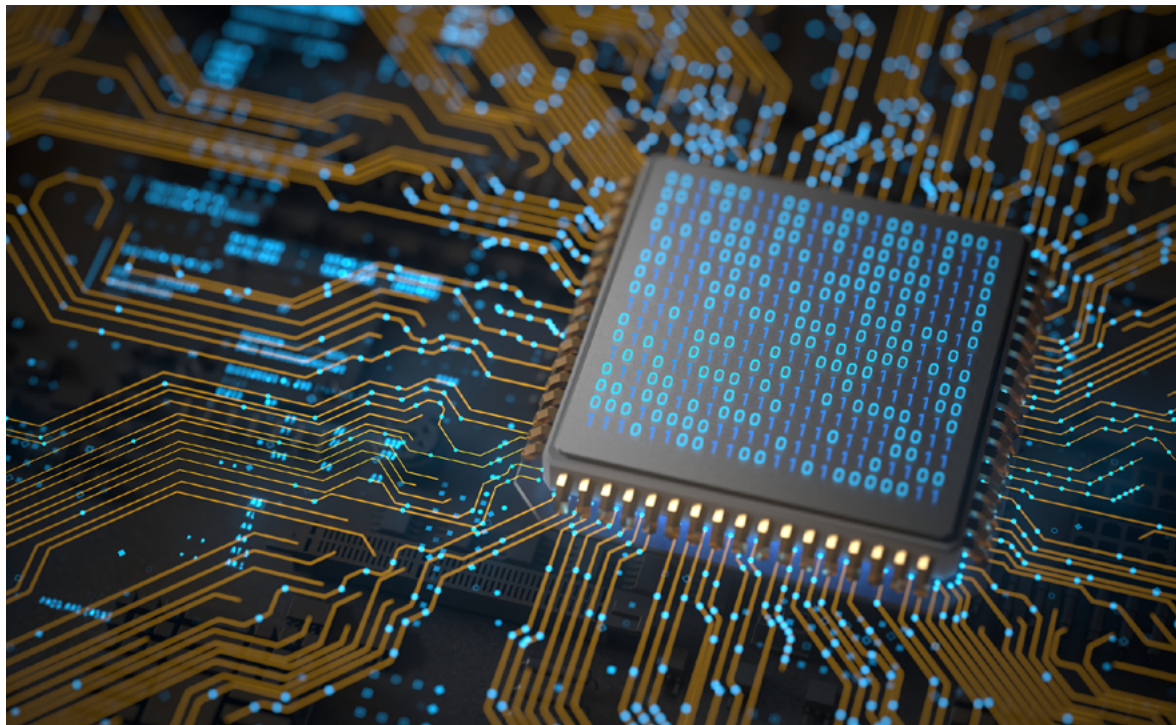
Bridging this vision to reality, the urgency is clear: at the global level, the manufacturing sector faces a growing skills gap, with up to **8 million unfilled jobs projected by 2030**. By then, 59% of workers will need training, while a portion risks being left behind. Already, 74% of companies report significant shortages, especially in key roles such as automation engineers and advanced technicians.

Advanced robotics is both a challenge and a solution: it improves safety and ergonomics by automating hazardous tasks, but also requires new hybrid skills that are currently scarce.

Against this backdrop, the real differentiator lies in how augmentation is concretely implemented. Augmentation operates across various dimensions, such as **skill augmentation**, with immersive AR/VR training environments that compress onboarding time and build hybrid competencies at scale; **cognitive augmentation**, with AI-assisted decision support, anomaly detection and predictive maintenance dashboards that amplify operator awareness; and **physical augmentation**, with exoskeletons and ecosystems of collaborative robots that extend physical capacity and reduce musculo-skeletal strain. These innovations are particularly critical in contexts where structural constraints make new human-machine paradigms not just beneficial, but necessary.

In Italy, for example:

- ▶ The working-age population is projected to decline by 3.5 million people by 2040;
- ▶ Only **14% of manufacturing companies** employ ICT specialists (vs. 21% in the EU);
- ▶ In 2025, **792 work-related fatalities** were recorded, averaging nearly two deaths per day;
- ▶ Labour productivity grew at an average of only **0.4% per year from 1995 to 2023**, compared to 1.5% across the EU.



The enabling conditions for scaling from innovation to industrial application are:

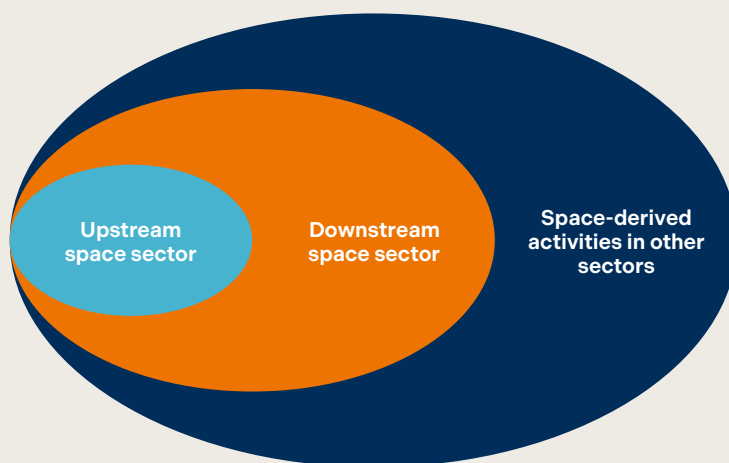
- ▶ **Treating training as a core investment rather than a cost:** structured reskilling programmes enabling operators to transition into hybrid roles embedding continuous learning into daily operations.
- ▶ **Make operators co-designers of automation:** the highest adoption rates come from involving frontline workers in defining use cases, interfaces, and workflows, turning resistance into ownership and dramatically reducing implementation friction.
- ▶ **Kill the pilot trap early:** any AI initiative that does not have a clear path to plant-wide deployment within 6–12 months is stopped or redesigned.
- ▶ **Redesign incentives, not just processes:** if KPIs still reward throughput over learning, or short-term output over system improvement, human–machine collaboration will underperform.

Advanced robotics and physical AI offer a strategic response to the demographic and productivity challenges facing Italian and European industry. Companies investing in these technologies today will not only secure a competitive edge but position themselves at the forefront of the next industrial transformation. The prerequisite is a systemic approach where **technology and operator strengthen each other**: technology, skills, regulation and governance must advance together.

## 1.3 Reinventing the Space Industry | Building the Infrastructures, Transportation and Markets of the New Space Era

The space ecosystem, defined as the network of activities, actors, and value chains directly related to the exploration, commercialization, and utilization of outer space and its resources, has undergone a structural transformation over the past decade. Space has been progressively integrated into society and economy, with space infrastructure and data providing services for citizens, P.A. and businesses. What was once a domain of states, defense contractors, and scientific institutions has become one of the most actively contested frontiers of private capital, industrial policy, and geopolitical competition. In this context of rapid expansion, the global space economy is expected to surpass 1 trillion \$ by 2032, rising from approximately 613 billion \$ in 2024, assuming an average annual growth rate of around 7.8%, consistent with the pace observed in recent years.

This evolution also means that the space sector is no longer a standalone domain, exclusively associated with scientific research and exploration. It is an ecosystem increasingly overlapping with adjacent industries. It can be represented in three key segments (**Figure 4**): the **upstream segment**, covering the traditional core of the industry, scientific and technological foundations of space programs, manufacturing and production of space infrastructure; the **downstream segment**, which includes all the operational use of space infrastructure and ‘down-to-earth’ activities that directly rely on the provision of a space capacity to exist and function; and the **wider space segment** capturing space-derived activities in adjacent industries, particularly defence, security, and telecommunications.



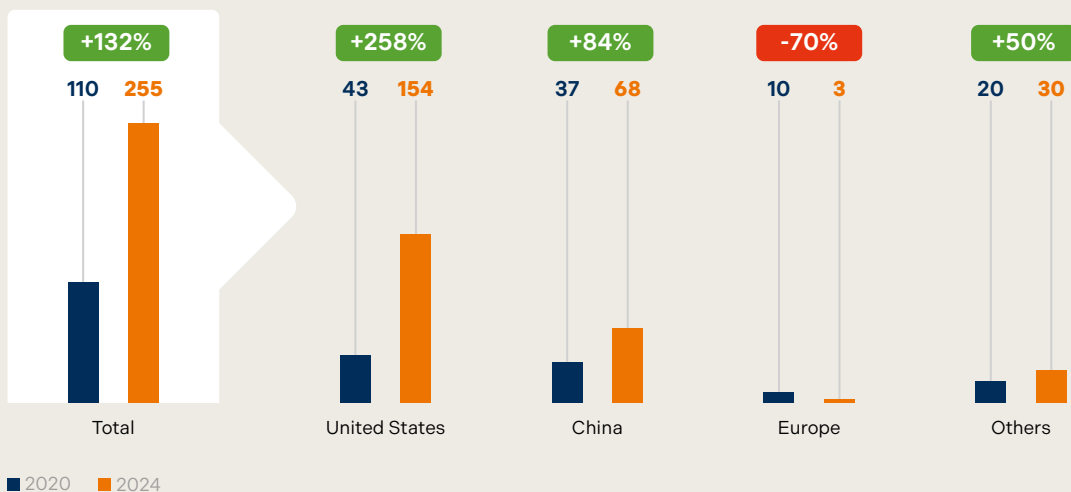
**FIGURE 4.**  
The main segments of the space ecosystem

At the core of this transformation lies a fundamental shift in the commercial space sector: the transition, over the past decade, from Geostationary Orbit (GEO) to Low Earth Orbit (LEO). This is not just a change in altitude, but it is a change in the fundamental economics and organizational model of the industry. The GEO model was built around highly customised, one-off missions costing hundreds of millions of euros and operated for fifteen years or more. The LEO model is the opposite, vertically integrated constellations, mass production, rapid iteration and continuous deployment. To get a sense of the scale: Ariane 5, Europe's flagship launcher, completed 117 launches across its entire 27-year operational life while SpaceX exceeded that figure in 2024 alone.

Europe's launch industry has struggled to capture the new volume created by the space economy's shift from GEO missions toward LEO constellations.

Of the **255 global orbital launches** in 2024, the **US conducted more than half**, accounting for 154, of which around 60% (90) conducted by SpaceX to launch Starlink. **Europe**, by contrast, **performed just three launches** (Figure 5). Ariane 6 flew its first commercial mission only in March 2025, five years behind schedule, and in 2024 ESA had to rely on SpaceX to orbit satellites for Galileo, the sovereign navigation system explicitly designed to reduce European dependence on US GPS.

The underlying causes are well understood. Europe's approach has been characterised by institutional fragmentation across 23 ESA member states, a weighted distribution of funding shaped by geo-return rules rather than industrial logic, and public investment calibrated for grant-based support of incumbents, rather than as long-term demand anchor as happening in the US with NASA programs. The gap is also visible in scale; ESA funding is equivalent to €15 per European citizen annually compared to nearly €220 per citizen in the United States.



**FIGURE 5. Number of launches by origin of Launch Service Provider (absolute values), 2020 – 2024.**

Source: TEHA Group elaboration on Novaspaces data, 2026.

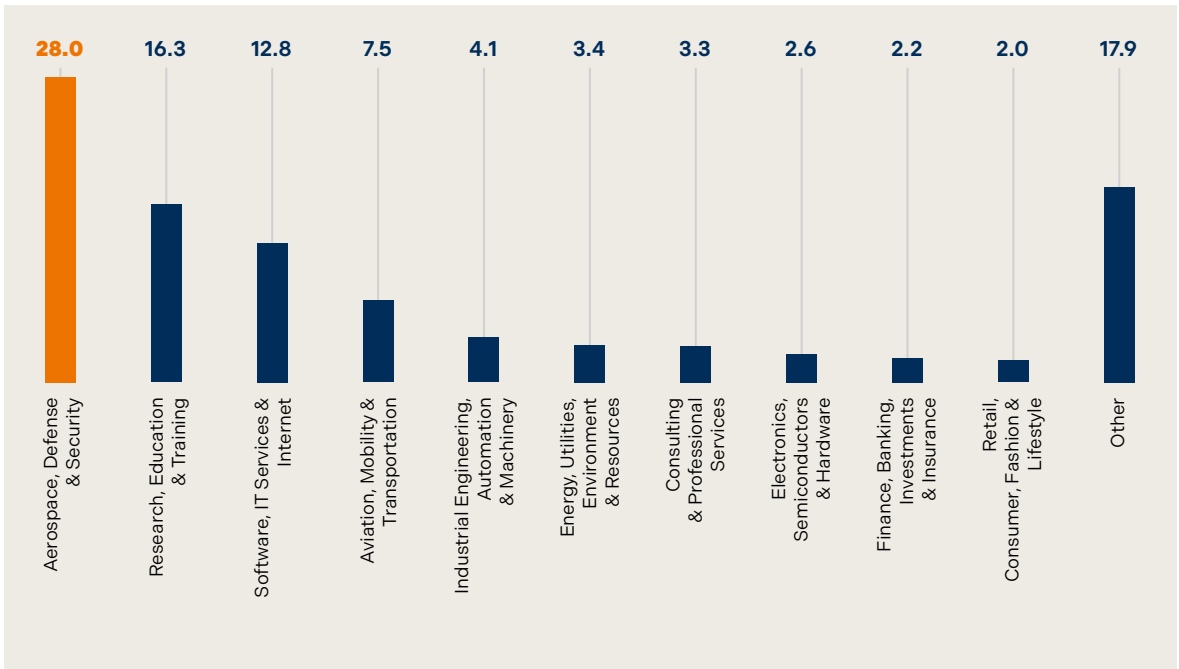
That model is finally being revised. Space is now explicitly recognised at European level as a strategic sector for sovereignty, autonomy, competitiveness and security, and the policy architecture is being rebuilt along two converging lines. On the capital side, the November 2025 Ministerial Council in Bremen approved a record €22.1 billion ESA budget for 2026–2028. This is combined with the European Commission’s planned €131 billion Competitiveness Fund envelope for defence and space from 2028, the new European Investment Bank Space TechEU facility, and a record €1.5 billion of European private space investment in 2024. On the demand side, sovereign constellations such as IRIS, Galileo Second Generation and the next-generation Copernicus are being deliberately designed as long-term anchor customers for European industry, procured through more competitive instruments such as the European Launcher Challenge. The logic is moving from grant-based support to incumbents towards the guaranteed-volume contracting that allowed the US new-space ecosystem to scale.

Capital and demand realignment is, however, necessary but not sufficient. The third dimension of European competitiveness in space is the talent base required to execute at the pace and scale of the LEO economy, and on this front the sector is structurally underperforming.





Europe space sector is facing a conversion challenge. Only 28% of aerospace engineering graduates from European universities is currently working in the sector. It takes 10 graduates to obtain 3 workers (**Figure 6**).



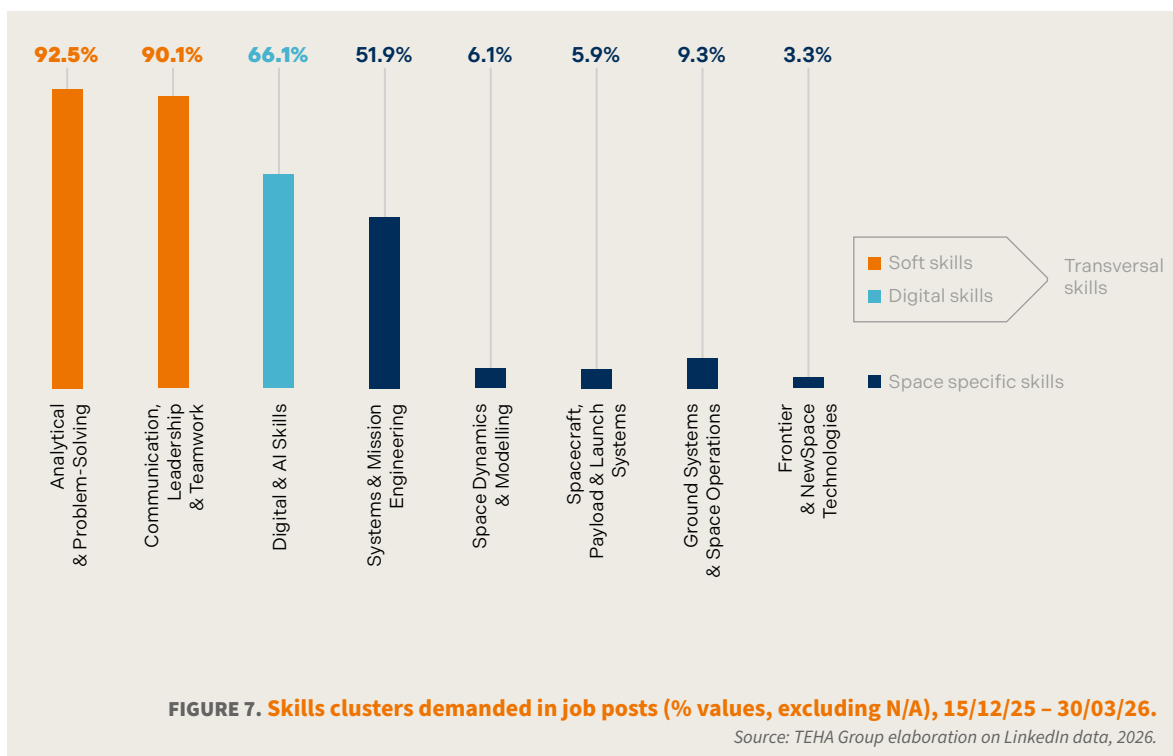
**FIGURE 6. Current industry clusters aerospace profiles work in (% values), 2026.**

Source: TEHA Group elaboration on LinkedIn data, 2026.

The remaining is absorbed by adjacent industries competing for the same profiles, particularly, research and education, software and IT and mobility, which together attract 36.6% of the aerospace engineering talent.

Furthermore, competition for talent and brain drain is intensifying as the space value chain transforms. Value creation is increasingly dominated by software, algorithms, and data used across missions and domains, following the trajectory of many other sectors. This shift is already visible in hiring patterns. 66.1% of job postings from space companies now requires digital & AI skills, placing the sector in direct competition with tech, finance and advanced manufacturing (**Figure 7**). The more space hybridizes, the more its talent becomes substitutable across sectors, and the harder it is to retain.

Taken together, these dynamics reframe the European competitiveness questions. For the first time in a decade, **the policy architecture, the capital and the industrial logic are aligned**. The binding constraint is no longer ambition but execution speed and whether 23 member states can act as a single market and whether Europe can build the talent base fast enough before the terms of competition are set by others.



## 1.4 AI Infrastructure as a Strategic Asset | Competitiveness, Sovereignty and European Security

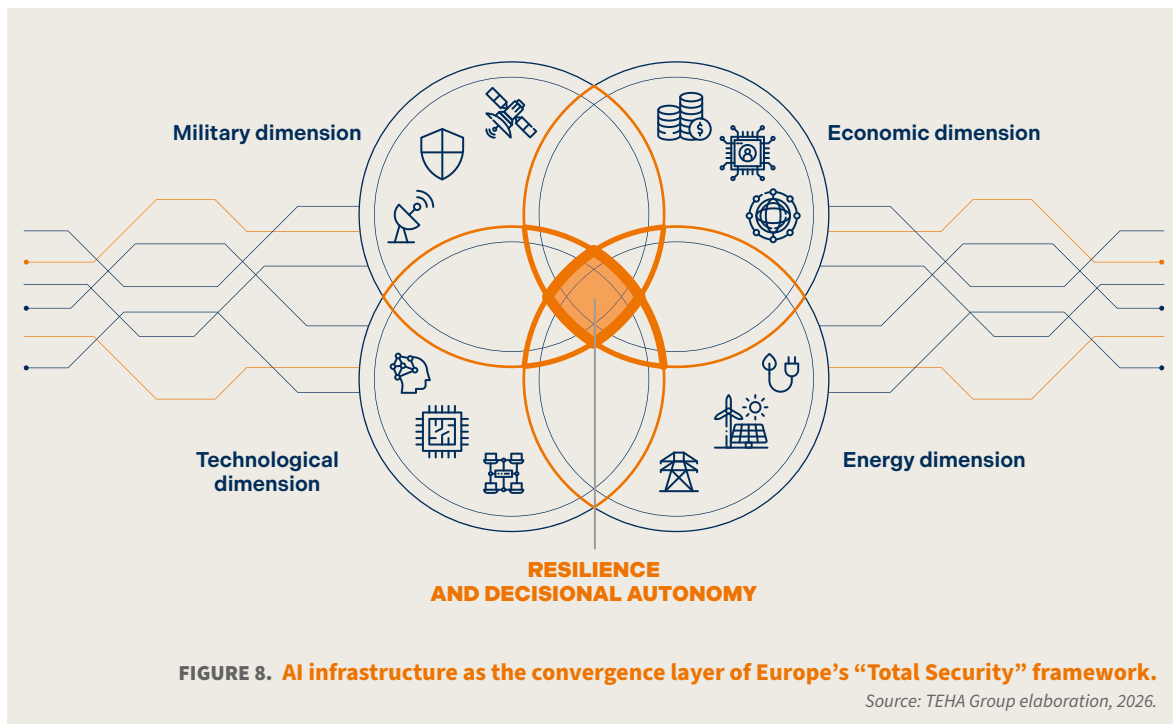
In the contemporary geopolitical landscape, **AI infrastructure** is no longer a purely technological domain: it has become a critical layer of **sovereignty and security**, on par with energy systems, financial networks, and defense capabilities. For the European Union, building a sovereign and integrated AI infrastructure ecosystem is not optional. It is a prerequisite for maintaining strategic autonomy and ensuring long-term security.

This urgency is reflected in a widening structural gap. In 2025, **private AI investment in the United States reached \$285.9 billion, compared to \$20.9 billion in Europe**. Not only is the absolute value **14 times higher**, but growth dynamics diverge significantly, with **US investment increasing by +162.1%** year-on-year versus **+7.6% in Europe**. While the European Commission aims to mobilize €20 billion annually through 2030 – also leveraging the €134 billion allocated to digital transition under the Recovery and Resilience Facility – financial scale alone will not be sufficient without a clear strategic allocation.

**The core challenge is not just funding AI, but building the infrastructure stack that enables it.** This is reflected in the fact that today a significant share of the European cloud market is served by a small number of major global providers, creating a structural dependency that extends beyond data hosting to technological control and operational continuity. This concentration exposes Europe to systemic risks, undermining what can be defined as a **“Total Security” framework** – where military, economic, technological, and energy dimensions converge to guarantee resilience and autonomous decision-making.

In this perspective, AI infrastructure represents the point of convergence across these four core dimensions. As illustrated in **Figure 8**, economic, technological, energy, and military domains are no longer separable spheres, but increasingly interconnected systems whose functioning depends on the availability, control, and resilience of underlying digital infrastructures. **AI infrastructure acts as a unifying layer** across these domains: it enables industrial competitiveness and productivity (economic dimension), supports advanced capabilities and data-driven operations (military dimension), relies on and reinforces technological ecosystems (technological dimension), and depends critically on stable and scalable energy systems (energy dimension).





This convergence implies that **vulnerabilities or dependencies in AI infrastructure can have systemic implications**, propagating across multiple domains simultaneously. Conversely, strengthening AI infrastructure contributes not only to technological advancement, but to the overall resilience and strategic positioning of the European Union.

In this context, the emergence of **AI Gigafactories** – large-scale facilities focused on training advanced AI models within the framework of the European High-Performance Computing Joint Undertaking – represents a turning point. These infrastructures are not simply computing facilities: they are strategic industrial platforms designed to internalize the entire AI value chain, from data processing to model training and deployment. Without sovereign computing capacity, Europe risks losing not only control over data, but also its ability to compete industrially and innovate at scale.

AI Factories act as anchor points of a broader ecosystem, enabling access to high-performance computing for startups and SMEs, and **bridging the gap between research excellence and industrial deployment**. Initiatives such as the European Commission's Apply AI Strategy reinforce this trajectory by promoting an "AI-first" approach across sectors, aiming to translate technological capability into macroeconomic impact, with potential GDP gains estimated between 10% and 15% by 2030.

This infrastructure layer must be supported by a **resilient technological backbone**. The **European Chips Act** sets the objective of increasing **Europe's share of global semiconductor production from 10% to at least 20% by 2030**, addressing a

critical vulnerability in the hardware supply chain. At the same time, the development of a seamless continuum between cloud and edge computing is essential to enable scalable, distributed, and resilient AI systems, capable of operating closer to industrial processes and real-world environments.

However, the scalability of AI infrastructure is constrained by a fundamental factor: **energy**. Data centers alone are projected to account for approximately **3.2% of total EU electricity demand by 2030**, placing AI among the fastest-growing sources of energy consumption.

In the current geopolitical context, **energy is no longer just an input factor**, but a strategic resource subject to global competition, supply constraints, and increasing price volatility. The growing concentration of AI infrastructure in regions with access to abundant and low-cost energy sources – such as the United States and selected Middle Eastern countries – highlights a structural asymmetry that risks further widening Europe’s competitive gap.

This dynamic is further reinforced by the interdependencies between energy systems and critical infrastructures. AI data centers rely on stable, high-capacity power grids, advanced cooling systems, and increasingly on proximity to renewable generation or dedicated energy assets. As a result, the **location and scalability of AI infrastructure are becoming tightly coupled with energy security**, grid resilience, and the ability to deploy new generation capacity at speed. Reducing third-party dependencies, accelerating the deployment of renewable and dispatchable low-carbon energy, and integrating data centers into flexible and resilient energy systems are all essential conditions for enabling Europe to scale AI infrastructure while maintaining control over its technological future.

Ultimately, the consolidation of AI infrastructure as a strategic asset requires a **coherent governance and investment framework**. At the European level, a clear shift is emerging in the policy approach: from a purely price-driven logic toward a more strategic use of public instruments aimed at protecting and strengthening critical value chains. Several recent initiatives signal a change of pace among European legislators, increasingly oriented toward preserving autonomy, security, and industrial independence: the implementation of the **Net-Zero Industry Act** approved in 2024, alongside emerging initiatives such as the **Industrial Accelerator Act** proposed in March 2026, signal a broader shift toward embedding **“Made in Europe” principles** within strategic value chains to preserve industrial competitiveness and European autonomy. Instruments such as **InvestAI** can also play a catalytic role in mobilizing private capital, while initiatives like the **AI Skills Academy** ensure that European human capital evolves in parallel with infrastructure capabilities.

In conclusion, AI infrastructure is the backbone of Europe’s strategic autonomy. Its development cannot be approached as a collection of isolated initiatives but must be framed as a systemic project integrating **technology, industry, energy, and security**. Controlling this infrastructure means controlling the conditions under which innovation and economic growth unfold. In the emerging global order, sovereignty will increasingly depend on the ability to design, operate, and protect the infrastructures.

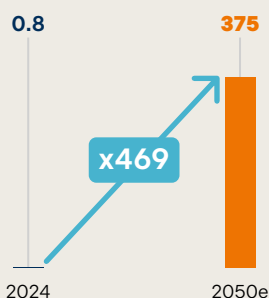
## 1.5 The Nuclear Frontier | Innovation and Competitiveness

Nuclear energy is undergoing a **structural renaissance**. After decades of stagnation shaped by cost overruns, safety concerns, and political opposition, a convergence of urgent energy needs, technological discontinuity, and geopolitical pressure is repositioning nuclear power as a strategic pillar of the global energy transition. Electricity demand in the European Union is projected to grow by a factor of **1.7 to 1.9 by 2050**, driven by the electrification of industrial and residential consumption and the exponential rise of energy-intensive digital infrastructure, from AI data centers to high-performance computing. At the same time, Italy's dependence on natural gas imports stands at **95%**, one of the highest in Europe, exposing both industry and households to price volatility and supply disruption. In this context, nuclear energy provides what renewables alone cannot: firm, dispatchable, **low-carbon baseload capacity** that stabilizes the grid, reduces Scope 2 emissions for hard-to-abate industries, and shields industrial competitiveness from the structural energy cost differentials that already disadvantage European manufacturers in global markets.

The technological discontinuity enabling this shift is the emergence of **Small Modular Reactors (SMRs)** and, in a subsequent phase, Advanced Modular Reactors (AMRs). Unlike the large-scale reactors of previous generations, which were characterized by decade-long construction timelines, bespoke engineering, and capital costs running into tens of billions of dollars, SMRs operate in the **100 to 450 MW range**, rely on passive safety systems, and are designed for factory manufacturing and serial deployment at a substantially reduced financial risk profile. They also unlock new industrial applications, including co-generation of electricity and process heat for energy-intensive sectors, low-carbon hydrogen production, and flexible integration with existing grid in-



frastructure. Yet their economic case remains conditional: cost advantages depend on design convergence and serial production at scale, conditions that have yet to materialize, and first-of-a-kind cost overruns in all operational cases to date have been substantial. Global demand is nonetheless forecast to reach **375 GW by 2050**, a **469-fold increase** from today's installed base (**Figure 9**).

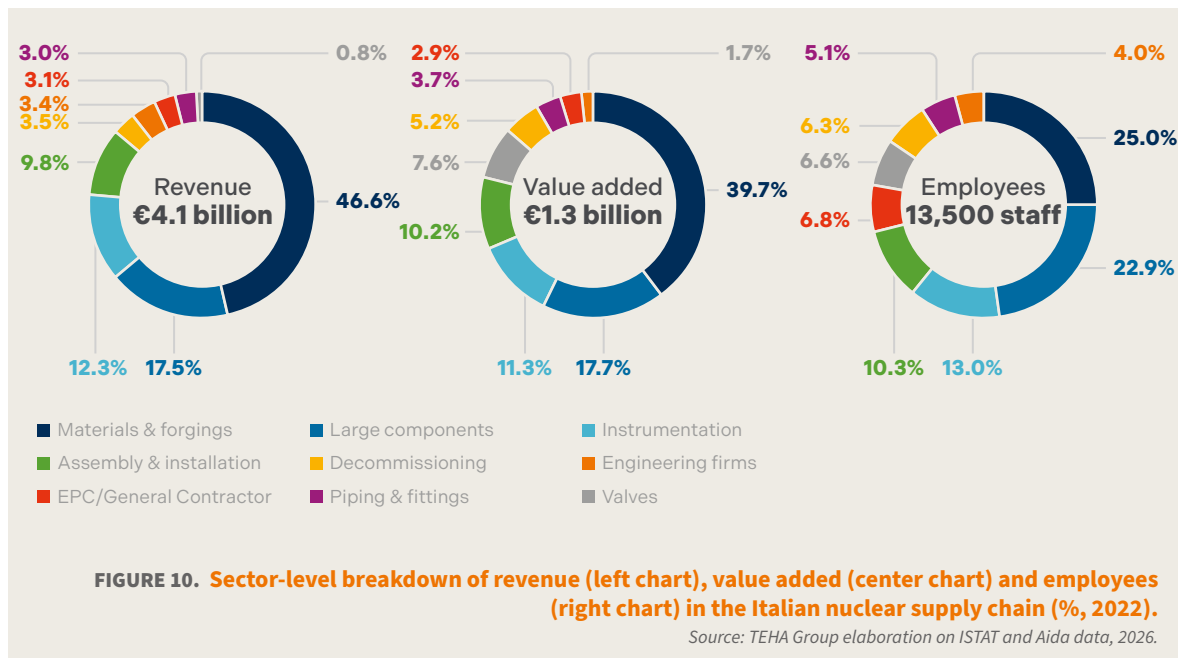


**FIGURE 9. Evolution of global SMR demand (GW), 2024–2050.**

Source: TEHA Group elaboration, 2026.

The global SMR market, already valued at approximately \$6 billion in 2026, is projected to expand substantially as first-of-a-kind projects come online around 2030. The race to define the technology standards, supply chains, and export relationships of this emerging market is already underway, led by the United States, China, Russia, South Korea, and the United Kingdom, each of which is actively pursuing domestic deployment alongside international export programs. Europe's position in the emerging **nuclear value chain** remains structurally ambiguous. The continent retains significant industrial and scientific assets: France operates the largest nuclear fleet in the EU, Ansaldo Nucleare leads one of the nine SMR projects selected by the European Industrial Alliance on SMRs, and European nuclear research ranks among the most cited globally by citation impact. Yet decades of political ambivalence following post-Fukushima phase-outs have eroded skills, fragmented supply chains, and left Europe without the coherent industrial architecture needed to compete at scale. The critical barriers to deployment are no longer primarily technical in nature; they are **regulatory, financial, and structural**. Licensing remains fragmented across more than **20 national frameworks**, with duplicative reviews across member states directly undermining the economies of scale on which SMR economics depend. Financing models are equally misaligned, as most public instruments address electricity price risk rather than the construction risk and multi-vector revenue streams that SMR developers actually face. Workforce availability and **nuclear-grade manufacturing capacity** represent a third binding constraint. Addressing these barriers requires a coordinated European response: the EU's SMR Strategy, published in early 2026, outlines a fleet-based approach to licensing harmonization, mutual recognition of regulatory approvals, and an additional €200 million InvestEU top-up by 2028 to accelerate first-of-a-kind deployments.

Italy's case illustrates both the scale of the opportunity and the cost of **delayed action**. The country's nuclear supply chain currently comprises approximately 70 active companies, concentrated in large components, engineering services, instrumentation, and materials. The core nuclear value, revenues and employment directly attributable to nuclear activities, stands at **€457 million** and **2,800 direct employees**; when considering the full industrial base of companies active in the sector, the extended value reaches **€4.1 billion in revenues, €1.3 billion in value added**, and approximately **13,500 employees** (Figure 10). TEHA Group estimates that deploying up to 20 SMR units between 2035 and 2050 could generate approximately **€46 billion** in addressable market for Italian industry, translating into roughly **€50 billion** in total value added by 2050, equivalent to approximately **2.5% of current GDP**, through a multiplier effect of 3.4. Translating this potential into industrial positioning requires a deliberate strategy: participation in European IPCEIs, a fleet-based procurement approach enabling serial production and learning-curve cost reductions, and structured technology partnerships with leading vendors before market standards are set. The legislative foundations are progressively being established, the Legge Delega approved in October 2025, the establishment of Nuclitalia, and Italy's accession to the European Nuclear Alliance — but framework conditions alone are insufficient. The first SMR deployments globally are targeted for the **early 2030s**, and the window to shape supply chains, secure technology partnerships, and develop competitive competences is measured in **years rather than decades**. For Europe and Italy, the binding constraint is no longer ambition; it is the **speed and coordination of execution** across policy, industry, and research, before the terms of the global nuclear market are set by others.



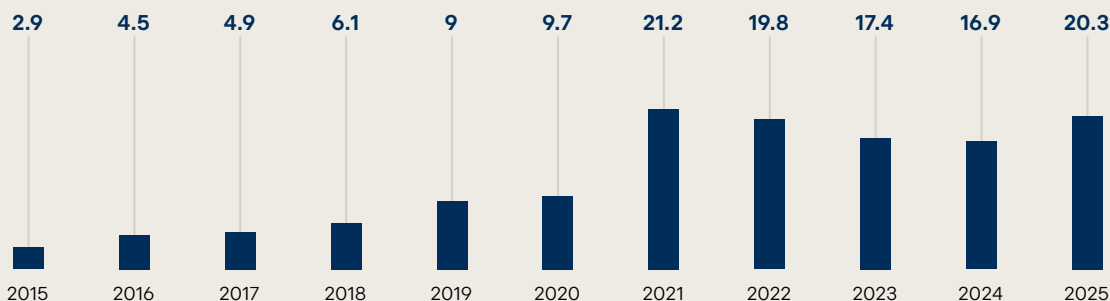
## 1.6 Corporate Innovation Leaders | Shaping Strategies and Investments in the Deep Tech Era

Deep technologies are emerging as a powerful force reshaping the competitive position of large corporations. Once a niche domain, Deep Tech now accounts for **\$20.3bn in VC funding in Europe alone (Figure 11)**, making up an all time high of 32% of all VC investment in the region, more than double the 15% of 2015 (Figure 12). Encompassing Artificial Intelligence, synthetic biology, quantum technologies, advanced materials, and next-generation energy systems, studies generally identify three defining features of deep-tech ventures: they are grounded in cutting-edge technological inventions and research, they often originate from scientific institutions, and they are centered on physical assets. What makes them distinctive, therefore, is not only their scientific intensity, but also the scale of uncertainty, capital commitment, and execution required to translate discovery into commercial and industrial impact.

These characteristics make deep-tech ventures strategically relevant for corporate innovators for three main reasons:

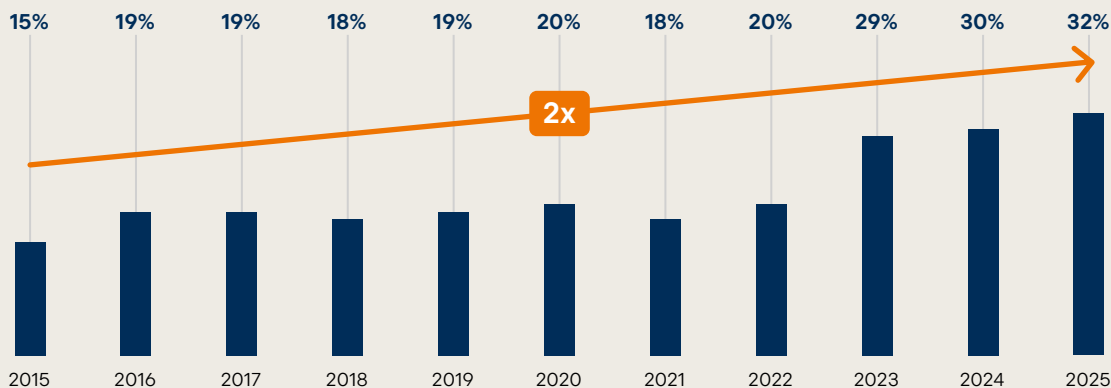
- ▶ First, they can create competitive advantage by enabling radical rather than incremental innovation.
- ▶ Second, they can drive operational efficiency and productivity.
- ▶ Third, they can support sustainability goals by opening new pathways to improve environmental performance.

Italy's deep-tech ecosystem still trails other European countries: in 2024, **it ranked tenth by total investment, with just \$300 million versus \$1 billion in smaller economies like Sweden**. Still, Italy can build on its strengths in manufacturing, design, and engineering to turn university innovation into scalable startups.



**FIGURE 11. VC funding in European Deep Tech startups, (\$ bln), 2015-2025.**

Source: TEHA Group elaboration on Dealroom data, 2026.



**FIGURE 12. Deep Tech share of total VC funding in Europe, 2015-2025.**

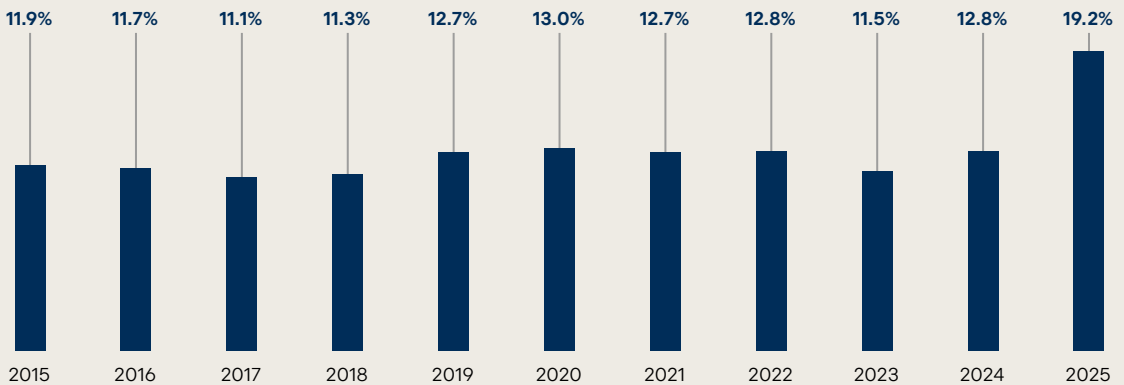
Source: TEHA Group elaboration on Dealroom data, 2026.

Unfortunately, the same features that make deep tech strategically attractive also make it difficult to scale. **Deep-tech ventures are particularly exposed to technological and market risks**, while the extended timelines required for product development and validation remain difficult to sustain for most startups and investors. This is precisely where the corporate role becomes strategic: large companies are especially well positioned to shape innovation outcomes because they combine market knowledge, financial resources, industrial assets, and the networks needed to move emerging technologies toward application.

As a result, corporate innovation strategy is evolving beyond traditional, internally driven R&D models: corporates need the energy of deep-tech ventures as much as ventures need corporate capabilities, but capturing that complementarity requires strategic direction. Firms must decide which technologies matter, how they relate to long-term industrial priorities, and where external engagement can strengthen internal capabilities. This is why technology roadmaps are becoming more central: they help connect frontier experimentation with longer-term choices on products, processes, supply chains, and business models, reducing the risk that innovation remains fragmented across disconnected initiatives. At the same time, they strengthen strategic alignment, improve decision-making, and simplify the internal communication of innovation choices that may otherwise appear overly disruptive within the organization.



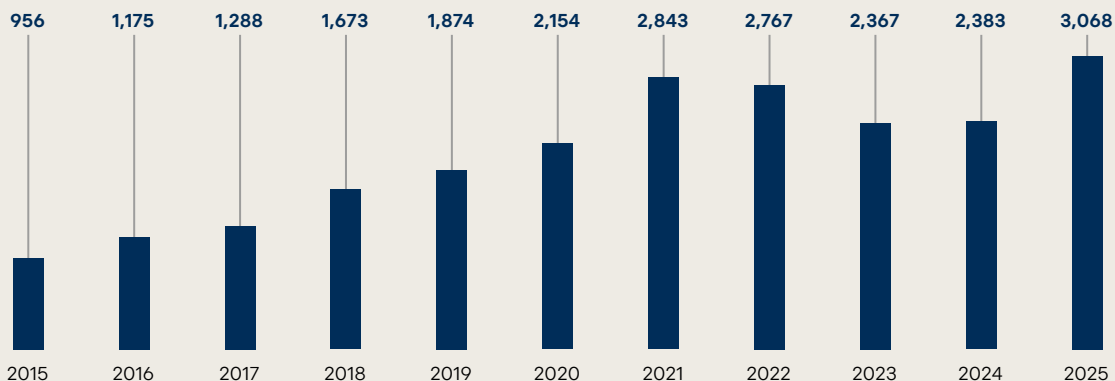
Within this broader architecture, **corporate venture capital (CVC) has emerged as one of the most prominent and structured mechanisms through which firms can operationalize external innovation.** It allows large companies to extend their innovation perimeter beyond internal boundaries while remaining aligned with longer-term technological and industrial strategic priorities. By 2025, roughly one in five startup funding rounds involved a corporate investor, and more than half of all startup funding dollars were raised in rounds that included a corporate backer, while corporate participation accounted for as much as 68% of total AI deal value. These trends suggest that CVC is becoming an increasingly important interface between corporate strategy and the external innovation ecosystem. Its relevance lies in the functions it performs. CVC gives firms earlier visibility on technological trajectories that may become strategically relevant before they are mature enough for internal development or full acquisition. It creates access to entrepreneurial capabilities, specialized talent, and new business models emerging outside established corporate structures. It also allows firms to widen and activate their innovation networks selectively, using minority investments to strengthen relationships with startups, research actors, suppliers, and potential industrial partners while preserving flexibility. In this sense, CVC functions as a strategic instrument through which firms can translate technology roadmaps into external engagement, learning, and optionality.



**FIGURE 13. Global share of VC deals participated by corporate investors, 2015-2025.**

Source: TEHA Group elaboration on GCV data, 2026.

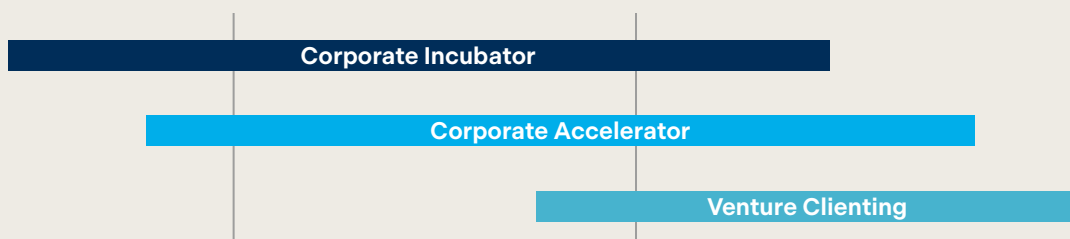
Corporate venture capital is one important mechanism through which firms can engage with external innovation, but it sits alongside a wider set of partnership arrangements. Together, these relationships allow companies to connect technological exploration with industrial and commercial objectives across a broader ecosystem of startups, universities, and research institutions. Their effectiveness depends on how they are structured.



**FIGURE 14. Global number of active corporate investors, 2015-2025.**

Source: TEHA Group elaboration GCV data, 2026.

In conclusion, successful deep-tech innovation depends on a strong scientific and technological foundation, interdisciplinary teams that combine research and commercial capabilities, patient capital and governance suited to long development cycles, and an ecosystem able to provide validation, infrastructure, and industrial access. Taken together, these elements show that deep tech should not be treated as an isolated investment theme or as a peripheral experiment in corporate venturing. It is a strategic domain that links technology choice, industrial direction, capital allocation, and ecosystem orchestration. The implication for corporate innovation leaders is therefore clear: competitive advantage in the deep-tech era will depend less on isolated bets than on the ability to connect roadmaps, investment instruments, and partnerships into a coherent system for turning frontier science into industrial and commercial outcomes.



**FIGURE 15. Trends and emerging models of corporate-startup collaboration.**

Source: TEHA Group elaboration on EIC data, 2026.

# 2

THE STATE OF INNOVATION  
AS MEASURED BY THE TEHA -  
GLOBAL INNOSYSTEM INDEX  
2026

## 2.1 Foreword: Sustainability and Resilience of Ecosystems

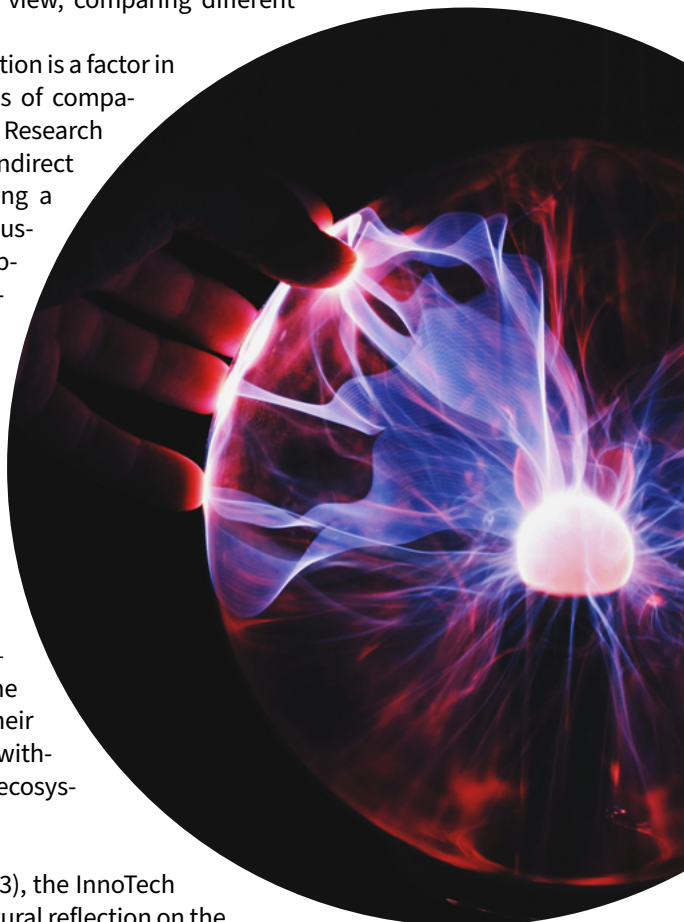
The second chapter of this paper is dedicated to the analysis of innovation ecosystems, with a focus on a global view, comparing different countries around the world.

The ability to produce innovation is a factor in the growth and competitiveness of companies and of a country-system. Research and innovation are also an indirect component of prosperity, making a fundamental contribution to sustainable and durable development. Given its complex and pervasive nature, it is necessary to consider multiple areas in order to understand its scope and the components on which to intervene to stimulate and support innovation processes in different fields.

The success and results of innovation are determined by the quality and intensity of interactions between key players – academia, policy makers and the business community – and on their ability to collaborate effectively within an interconnected innovation ecosystem.

Since its inception (2012-2013), the InnoTech Community has initiated a structural reflection on the topic and proposed its own definition of an innovation ecosystem:

**“... a highly dynamic territorial area from the economic-entrepreneurial point of view, characterized by high cultural, scientific and technological progress, attractiveness and social mobility, with effective reward mechanisms and guarantee of equity in access to opportunities”.**



Against this definition, among the necessary components for an innovation ecosystem to flourish, the InnoTech Community recognizes the following:

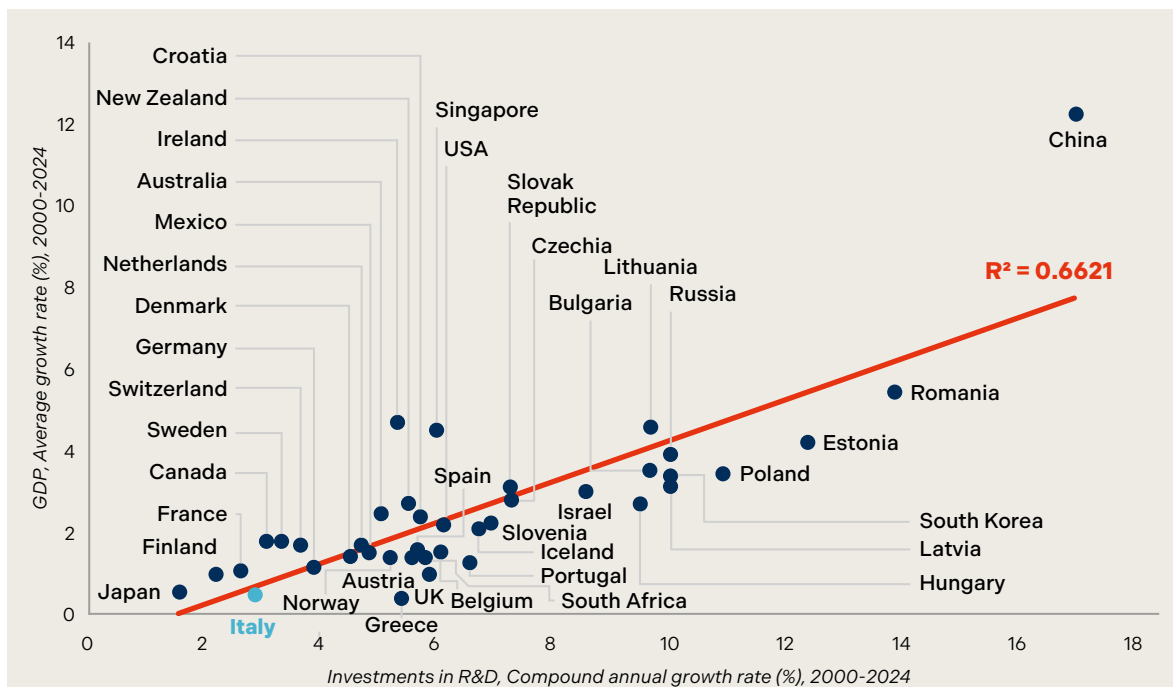
- ▶ ability to attract new intellectual forces;
- ▶ ability to enhance existing skills;
- ▶ ability to attract new financial capital;
- ▶ production of substantial innovations and discontinuities;
- ▶ ability to create new markets and/or anticipate relevant trends and to generate widespread entrepreneurship;
- ▶ propensity to 'risk' to innovate and widespread culture of innovation;
- ▶ concentration of ecosystem research and development infrastructure at international level.

This conceptual modelling made it possible to devise an index aimed at measuring and structurally comparing the performance of innovation ecosystems around the world: the TEHA-Global Innosystem Index (TEHA-GII). The TEHA-GII makes it possible to compare and assess the innovation landscape from a global point of view with a particular focus on Italy.

This chapter examines the structures, activities and dynamics of the different components of the innovation system, analysing the interactivity and relationships that determine the power and effectiveness of networks, in order to understand the criteria for a viable and successful innovation system.



## 2.2 The TEHA-Global Innosystem Index (TEHA-GII): Overview, Structure and Methodology



**FIGURE 1. Relationship between R&D investment and GDP (compound annual growth rate and average annual growth rate), 2000-2024.**

Source: TEHA Group elaboration on OECD and World Bank data, 2026.

**R&D investment** is a key component and an important predictor of a country's economic growth and development. There is a positive correlation between the two variables, as can be seen from the figure above: countries that invest the most in R&D are also those with the highest growth rates.

According to the latest available data, China is confirmed as the leading country in both R&D investment growth and GDP trends (**Figure 1**).

The allocation of resources for research and development is one of the most influential variables on a country's ability and readiness to innovate: however, several factors affect the ability to 'produce' innovation.

This is another reason why the TEHA-Global Innosystem Index (TEHA-GII) is an information and decision guidance tool that starts with a clear identification of the overall performance of each country, according to uniform and comparable values over time, and measures the results achieved by each innovation ecosystem on relevant key factors.

In the analysis, the selection of the reference sample followed four orders of variables:

1. **International literature on global innovation centers**, considering major databases such as the World Bank, Eurostat, OECD (Organization for Economic Co-Operation and Development), Scimago and WIPO (World Intellectual Property Organization);
2. **Production of innovation** – in-depth studies were carried out on each country to assess the actual production of innovation worldwide (scientific publications on a global scale, success of patenting activities, etc.);
3. **Investment in education** pertaining to STEM (science, technology, engineering, and mathematics) subjects as promoters of innovation enablement and the development of efficient ecosystems with the capability to attract prosperity to countries;
4. **Comparability and coverage** – the countries were compared by assessing their relative size, socio-economic conditions and the availability of data on the chosen indicators.



FIGURE 2. Flags of the 49 selected countries.

On the basis of these criteria, 49 countries were identified (Figure 2).

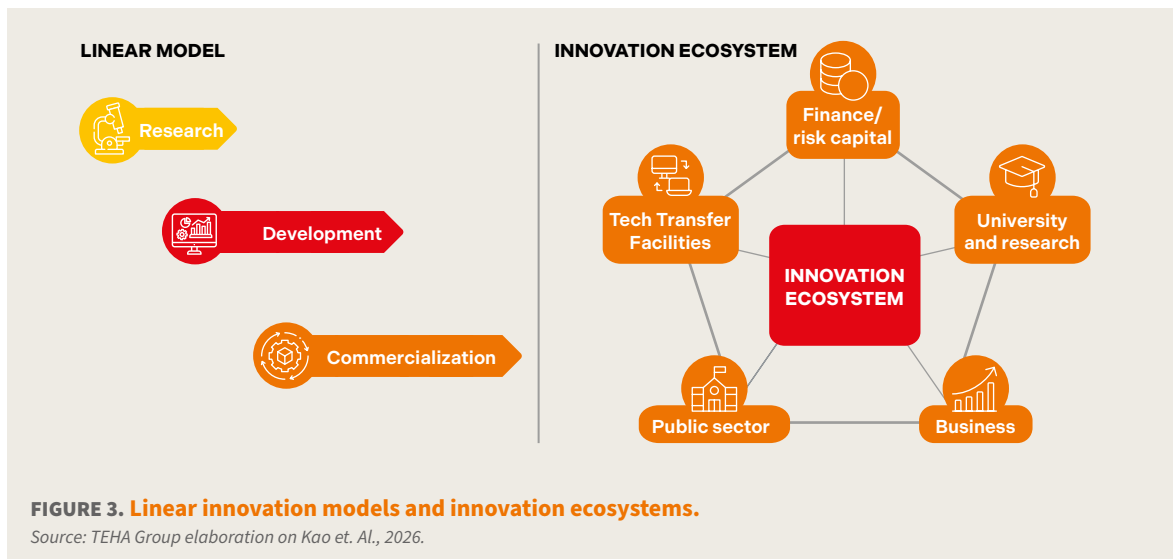
The results of the top-performing countries in each category were compared with those of Italy to quantify any existing gaps and to understand what the hindering factors and possible areas for action are.

The results of each ecosystem were then represented at the level of two macro-sets of indicators.

- A. Input variables**, selected to assess each country's endowment with respect to the determinants of overall innovation performance; four sub-groups were considered:
- ▶ **Human capital**, to measure the predisposition of each countries' population in embarking on a career path in line with R&D activities (personnel employed in R&D functions per 1,000 inhabitants) as well as the predisposition of younger age groups to study and learn science subjects (tertiary education) and their aptitude for these subjects (PISA scores)\*;
  - ▶ **Financial resources for innovation**, to map the availability of funds at all relevant levels of investment/financing (total R&D investment, component of public and private R&D investment, deployment of venture capital, indirect public support through R&D tax incentives);
  - ▶ **Innovative ecosystem**, considered as the set of indicators to identify the capacity of each ecosystem to provide protection to innovation actors and transform innovation into new business ideas;
  - ▶ **Attractiveness of the ecosystem**, understood as a set of variables designed to measure the capacity of each country to develop an environment capable of attracting investment and new talent, being capable of stimulating collaborative synergies between universities and the private sector.

(\*) The PISA (Programme for International Student Assessment) assessment aims to investigate the educational attainment of adolescents in industrialised countries. The assessment is conducted by the OECD every three years.





**B. Output variables**, aimed at ‘capturing’ at the highest level of synthesis the results of innovative effectiveness in terms of the production of innovations and their economic impact:

- ▶ **Results of basic research activity**, to measure the amount of ‘new knowledge’ that is generated in each innovation ecosystem (e.g. number of publications and number of citations), additionally with respect to high technology applications to gauge the real innovation context of research activities;
- ▶ **Outcomes of applied research**, i.e. the transfer of knowledge from basic research to the market, assessed e.g. by the number of patent applications;
- ▶ **Ability to generate reference technology solutions**, measured by the share of R&D-intensive sectors’ exports in relation to total manufacturing exports and the commercial export-import balance of R&D intensive activities.

It should be noted that, compared to the indicator developed in 2025, a new variable has been included in the 2026 edition, which is the R&D Expenditure by Top 2000 Global Companies as % of GDP (**Figure 4**).

For each variable of the TEHA-GII 2026, a database was constructed over the time span 2013-2025 (or the latest available data), reconstructing a homogeneous and comparable dataset and using information available from international statistical sources.

In the development of the composite indicator, each proxy indicator was calculated through the average value of the last 3 years, in order to handle any missing values or outliers. The TEHA-Global Innosystem Index 2026 is thus a composite indicator based on a total of over 20,384 observations.\*

(\*) The total number of observations was calculated by multiplying the 32 indicators analysed, the 49 countries identified and the reference time frame of 13 years (entire database).

	Dimensions	Indicators	Source
<b>Human Capital</b>	1.1	R&D personnel / 1000 employees	OECD
	1.2	STEM Graduates / Total Graduates	OECD
	1.3	Number of universities in top 200 global / total number of universities ranked in QS world rank	QS World University Rankings
	1.4	PISA score	OECD
	1.5	ICT access	OECD
	1.6	Education Budget / GDP	World Bank
	1.7	Participation in tertiary education (% of people aged 25-34)	OECD
<b>Financial resources for innovation</b>	2.1	Business Expenditure in R&D / GDP (BERD)	OECD
	2.2	Gross Domestic Expenditure in R&D / GDP (GERD)	OECD
	2.3	Indirect government support through R&D tax incentives (GTARD) / GDP	OECD
	2.4	VC investment by country / GDP	OECD
	2.5	<b>R&amp;D Expenditure by Top 2000 Global Companies (% of GDP)</b>	JRC
<b>Innovative ecosystem</b>	3.1	New businesses creation per capita	World Bank
	3.2	Intellectual Property Right Index	WIPO
	3.3	Government AI Readiness	Oxford University
	3.4	Tech unicorns per capita	CB Insights
	3.5	Unicorn valuation as % of GDP	CB Insights
	3.6	Developers per capita	Github
	3.7	Supercomputer processing power per capita	top500
<b>Attractiveness ecosystem</b>	4.1	Higher Education R&D supported by industry	OECD
	4.2	Gross Expenditure on R&D financed by abroad	OECD
	4.3	Inbound mobility rate of students	UNESCO
	4.4	FDI inflows / GDP	World Bank
	4.5	Global Attractiveness Index	TEHA
<b>Effectiveness of innovative ecosystem</b>	5.1	Number of citations / 1000 researchers	Scimago
	5.2	Number of publication / 1000 researchers	Scimago
	5.3	H-index / 1000 researchers	Scimago
	5.4	Patent applications / 1 mln inhabitants	WIPO
	5.5	Patents in force / 1000 inhabitants	WIPO
	5.6	High tech exports / manufacturing total export	World Bank
	5.7	Trade Balance on R&D services	UNCTADSTAT
	5.8	Trade Balance on high tech products	UNCTADSTAT

**FIGURE 4. Synoptic table of the key variables of the TEHA-GII 2026 (in green the new KPI compared to the indicator developed in 2025).**

Source: TEHA Group elaboration on data from OECD, WIPO, CB Insights, Github, JRC, Oxford University, QS, Scimago, Top500, UNCTADSTAT, UNESCO and World Bank, 2026.

## 2.3 The results of the TEHA-Global Innosystem Index 2026 (TEHA-GII 2026)

The TEHA-GII 2026 was constructed by processing data from the last 3 available years, i.e. from 2023 to 2025. With the aim of analyzing its evolution over time, the 2023 indicator (based on the 2020-2021-2022 data) was also recalculated, taking into account the additions of the variable described above.

It should be noted that, in light of the addition of the new variable and countries, it is not possible to compare the TEHA-GII 2026 with the indicator developed in the 2025 report “InnoTech Report 2025: Harnessing Innovation in the Global Scenario”.

The results of the TEHA-GII 2026 shows Singapore in first place with a score of 4.94 followed by Israel with 4.78 points and UK with a score of 4.51 (Figure 5). In terms of ranking, Australia and India are the countries that gained the most positions, rising 4 positions from the TEHA-GII 2023 to the TEHA-GII 2026.

Italy ranks 31<sup>st</sup>, with no change in position compared to the 2023 ranking. Its score has slightly increased to 2.79, marking a 0.06-point increase compared to the previous index.

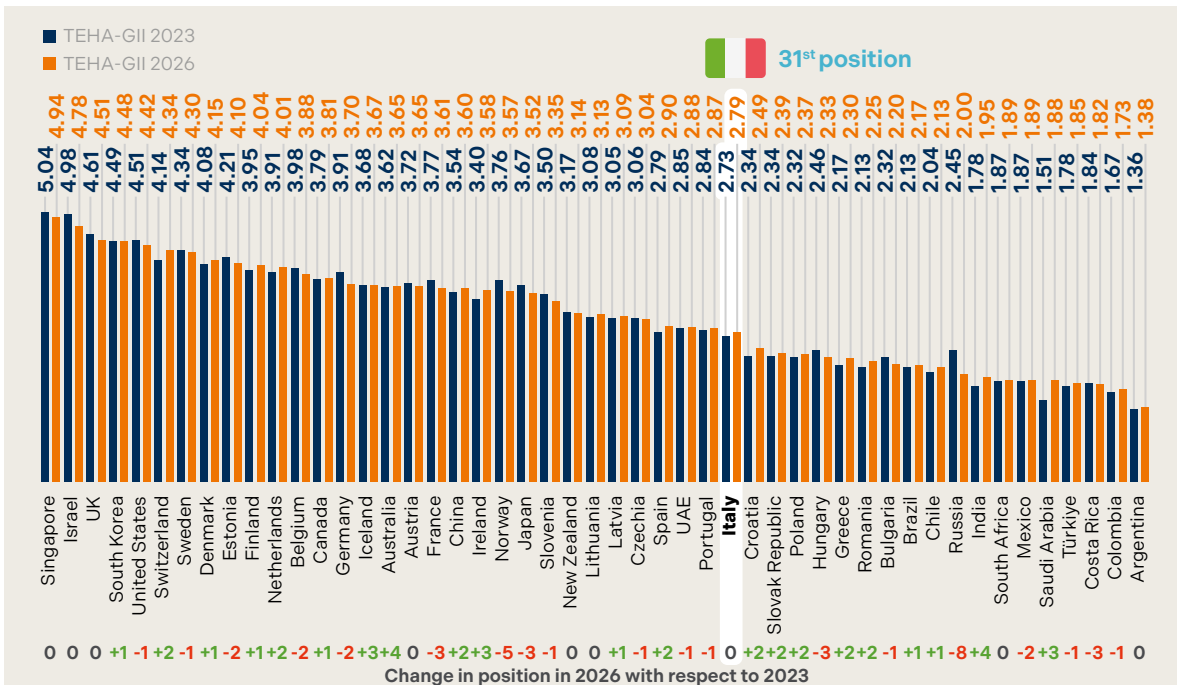
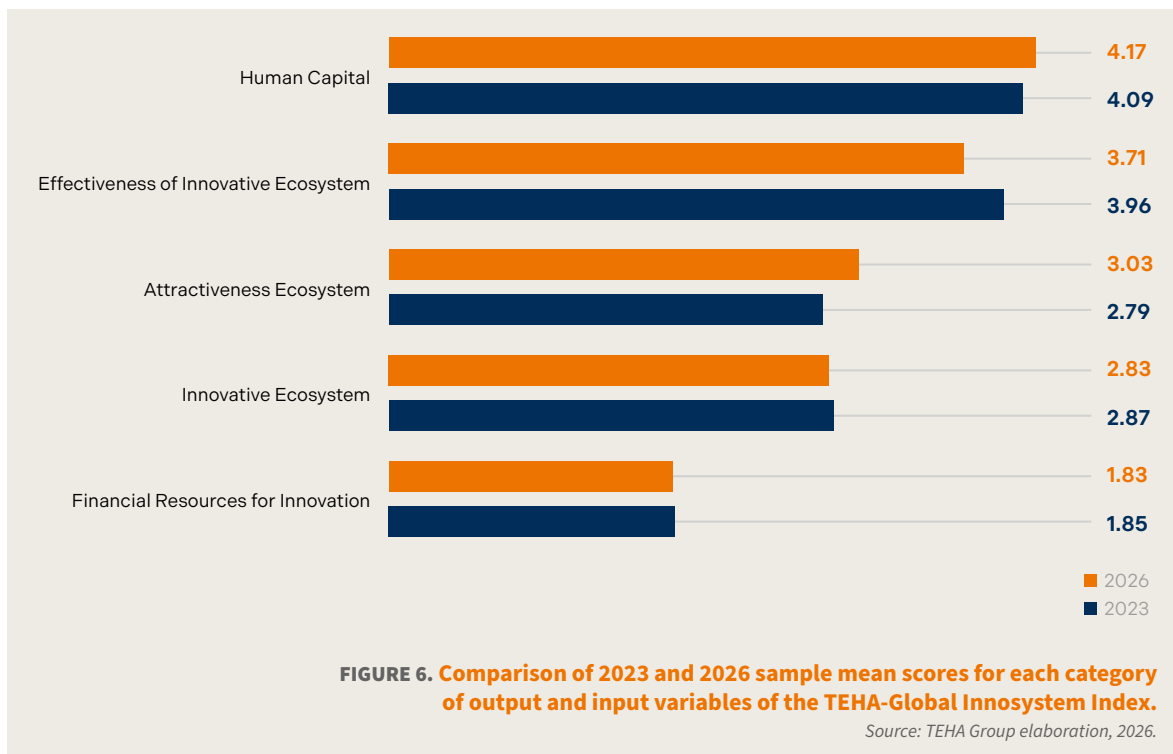


FIGURE 5. TEHA-Global Innosystem Index 2026.

Source: TEHA Group elaboration, 2026.



Overall, the changes in the TEHA-GII recorded compared to the previous period of analysis are the result of the trends in each macro-category, both output and input (**Figure 6**). Compared to the average of the three-year period 2020-2022 (represented by the 2023 index), the TEHA-GII 2026 showed improvement in “Human Capital” and “Attractiveness of the Ecosystem” and a deterioration in the three other areas.

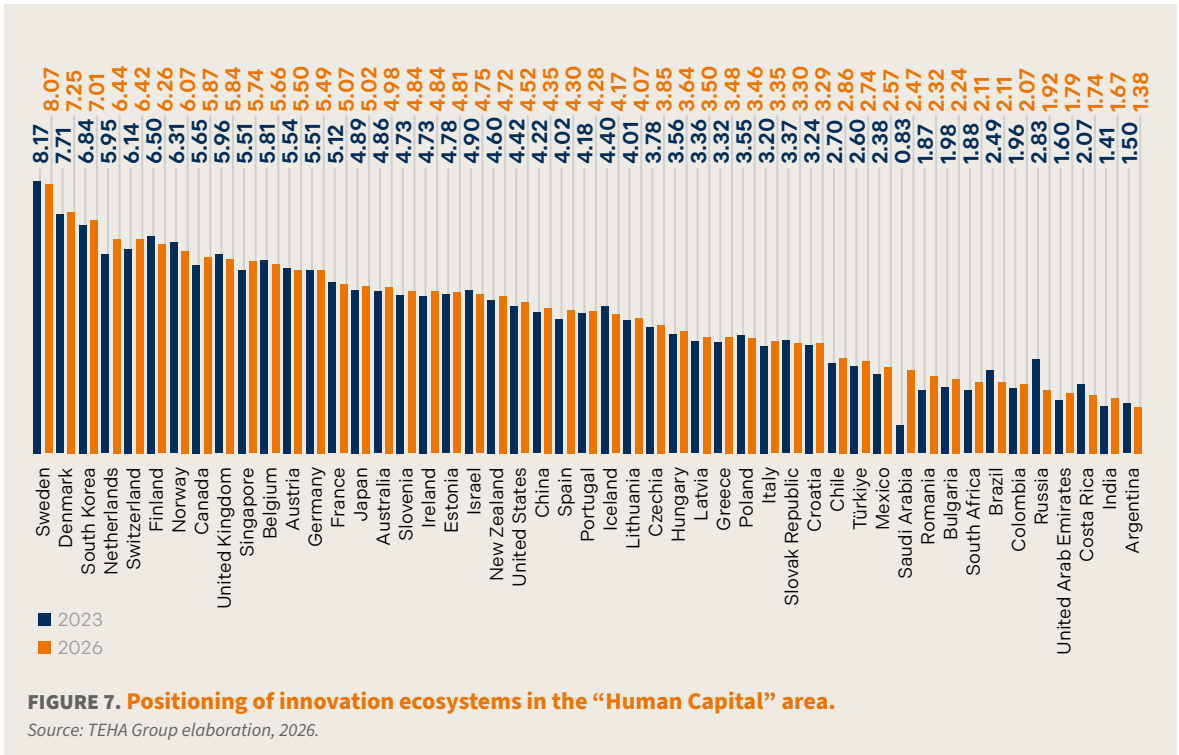
In the remainder of the chapter, the results of each sub-indicator are described and depicted.



### 2.3.1 HUMAN CAPITAL

The first area of analysis of the TEHA-Global Innosystem Index relates to Human Capital. This indicator measures the endowment of qualified resources to carry out R&D at present and in perspective.

Overall, Sweden ranks first with a score of 8.07 – down 0.1 points from the 2023 indicator. This is followed by Denmark (7.25) and South Korea with 7.01. Within this framework, Italy ranks 33<sup>rd</sup> with a score of 3.35 (Figure 7).



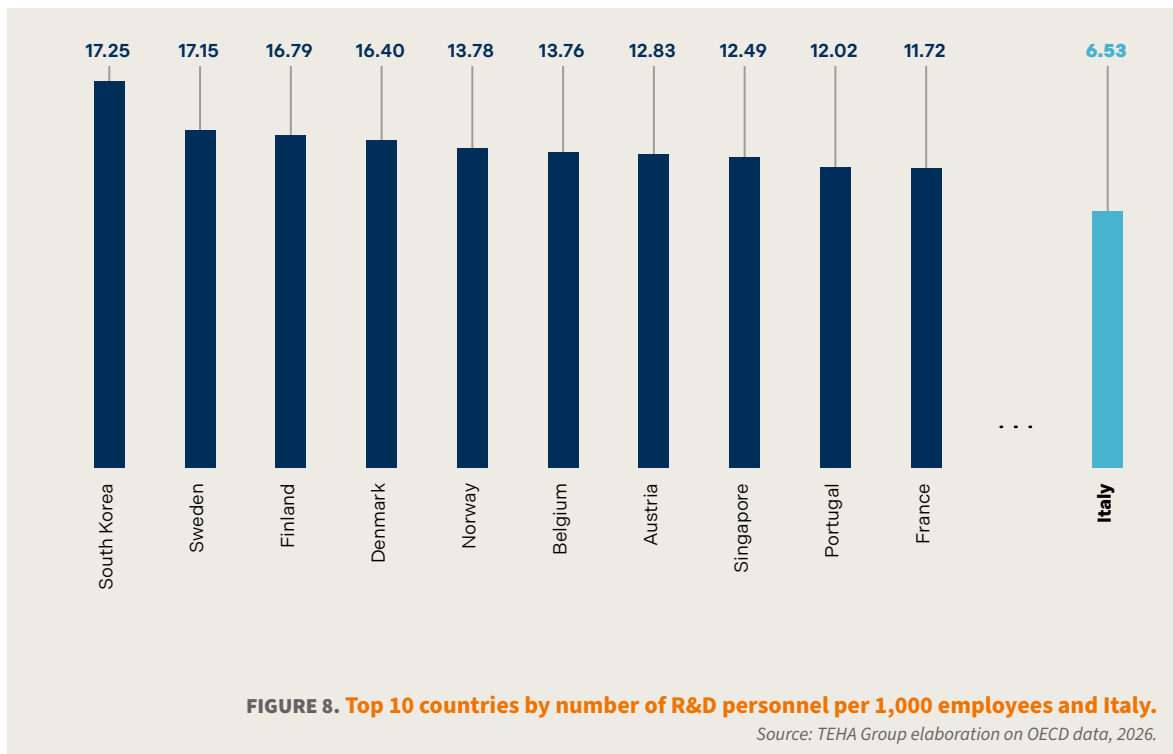
**FIGURE 7. Positioning of innovation ecosystems in the “Human Capital” area.**

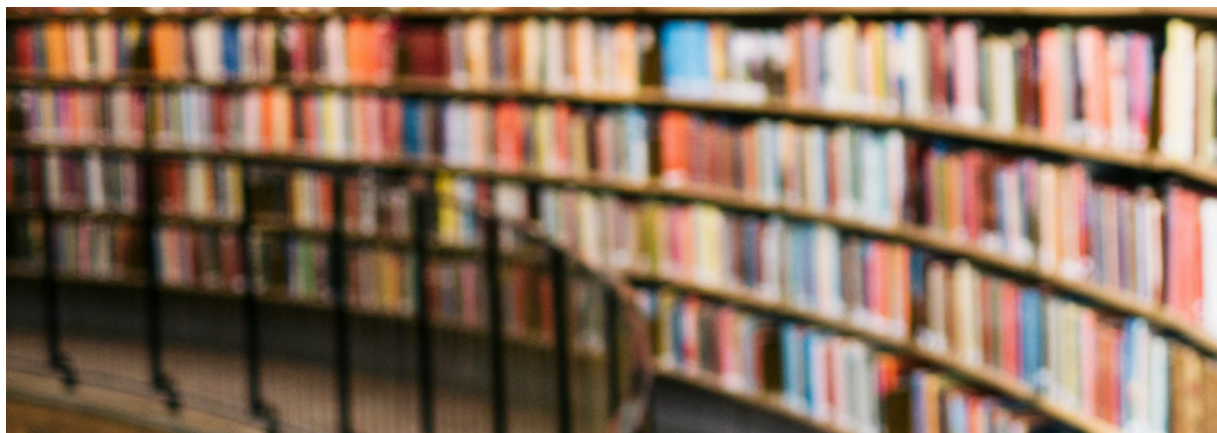
Source: TEHA Group elaboration, 2026.



In the following, the seven variables that make up the Human Capital macro category are analysed individually: R&D personnel, graduates in STEM, universities ranked top 200, PISA scores in the areas of Mathematics and Science, ICT access, education budget and tertiary education.

South Korea ranks first with 17.25 people dedicated to R&D per thousand employees – higher than Sweden (17.15) and Finland (16.79). Italy ranks 30<sup>th</sup> with a value of 6.53 (Figure 8). This indicator is crucial as it reflects the intensity of human capital investment in research and innovation activities across the workforce.





## The density of researchers as a driver of South Korea's competitiveness

South Korea records one of the highest levels of researcher intensity in the world, with approximately 17.25 researchers per 1,000 employed people, versus 6.66 in Italy. This figure reflects an economic model structurally oriented toward scientific and technological innovation, as well as the country's ability to concentrate highly skilled talent within its productive ecosystem.

This performance is closely linked to the continuity of investments in research and development (R&D). Sustained R&D expenditure has generated stable demand for scientific and technical skills, supporting the expansion of a highly qualified workforce and strengthening the country's human capital base.

The role of firms is central. More than 70% of researchers in South Korea are employed in the industrial sector — a share above the OECD average (66%) and indicative of the strong integration between research and industry. This is consistent with the structure

of the Korean economy, which is highly specialized in technology-intensive sectors such as semiconductors, advanced electronics, automotive, and ICT, where R&D activities are deeply embedded in production processes and corporate competitive strategies.

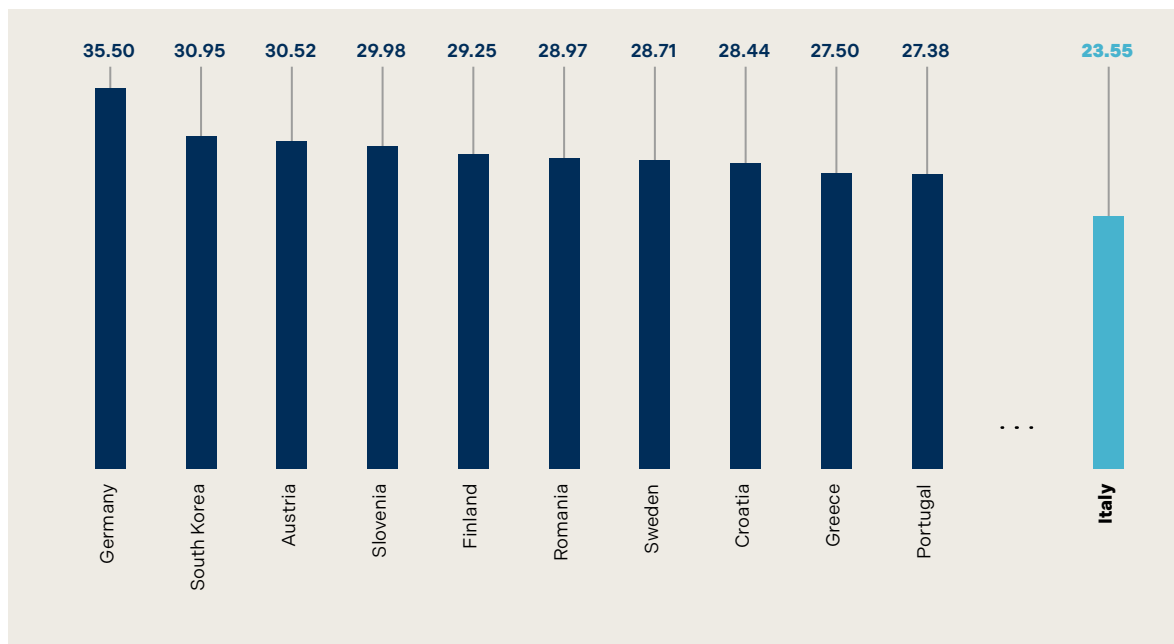
The growth of the scientific workforce further confirms this trajectory. Between 2013 and 2023, the number of researchers increased by over 50%, highlighting the country's capacity to progressively expand its talent base in alignment with national industrial and technological priorities.

Overall, the high density of researchers in South Korea is not an isolated phenomenon, but rather the outcome of a coherent model built on sustained investment in R&D, strong private-sector participation, and the continuous development of highly skilled human capital. This remains a key asset underpinning the country's technological competitiveness at the global level.

*Source: TEHA Group elaboration on OECD Data and various sources, 2026*



Considering the share of STEM (Science, Technology, Engineering and Mathematics) graduates in the total number of tertiary graduates, Germany comes first with a value of 35.50% – followed by South Korea (30.95%) and Austria (30.52%). In this respect, Italy ranks 21<sup>st</sup> worldwide with 23.55% of STEM graduates (**Figure 9**). This KPI matters because a strong STEM talent pipeline is essential to support technological advancement and sustain innovation-driven economic growth.



**FIGURE 9. Top 10 countries plus Italy by number of STEM graduates (in % of total graduates), 2023.**

Source: TEHA Group elaboration on OECD data, 2026.



## Why do so many students choose STEM subjects in Germany?

Germany stands out in Europe for the high share of students enrolled in STEM fields, estimated at 35.50%. This reflects an education and innovation ecosystem that introduces pupils early to mathematics, science, and technology, then reinforces these skills through extracurricular activities, vocational pathways, and national initiatives.

A key role is played by the MINT Action Plan 2.0, promoted by Germany's Federal Ministry of Education and Research. The strategy aims to strengthen STEM education, known in German as MINT, across the full learning journey, from early childhood and school education to higher education and vocational training. Its goal is to equip young people with

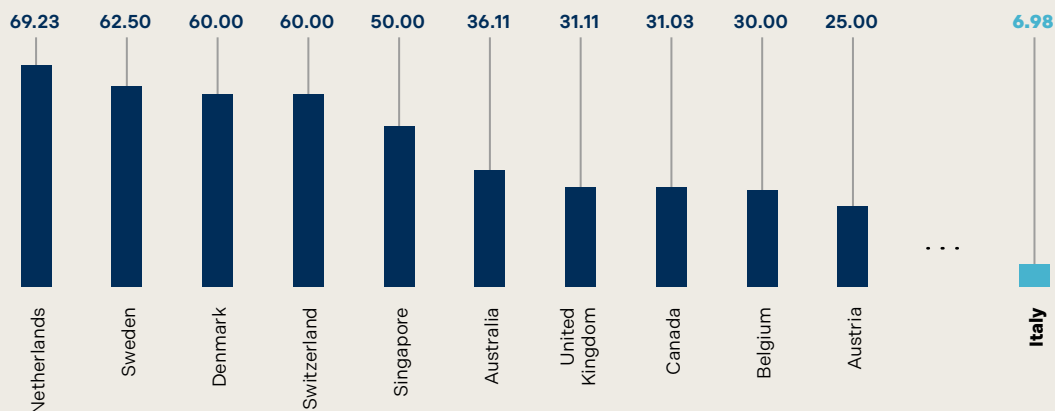
the skills needed to face major societal challenges such as climate change, digitalization, and health crises.

The plan builds on the previous 2019 strategy and brings together existing initiatives with new ones under five key areas: cooperation, quality, family engagement, early education, and research. It supports thousands of out-of-school learning opportunities through local STEM clusters and platforms like MINTvernetzt and MINT Campus, which offer free digital resources and training. It also promotes gender equality by encouraging more girls and women to pursue STEM careers.

Source: TEHA Group elaboration on German Federal Ministry of Education and Research, 2026.



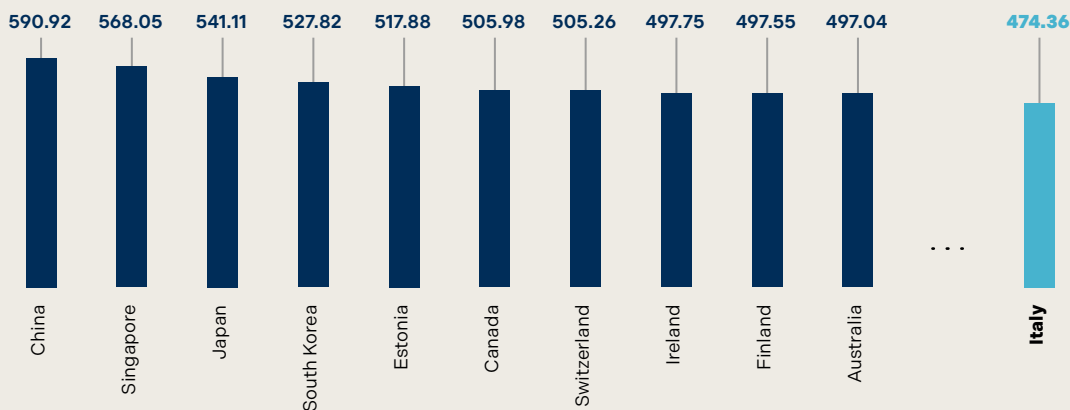
With respect to the proportion of top 200 universities to all ranked universities, Netherlands comes first with 69.23% of universities in the top 200, followed by Sweden with 62.50% of institutions in the top 200, and Denmark with 60.00%. Italy ranks 27<sup>th</sup> overall with 6.98% of universities in the top 200 (**Figure 10**). This indicator is important as it reflects the global competitiveness and research excellence of a country's higher education system, which plays a key role in nurturing talent and driving innovation.



**FIGURE 10. Top 10 countries plus Italy by number of universities in top 200 QS world ranking (in % of total universities ranked), 2026.**

Source: TEHA Group elaboration on QS World Ranking data, 2026.

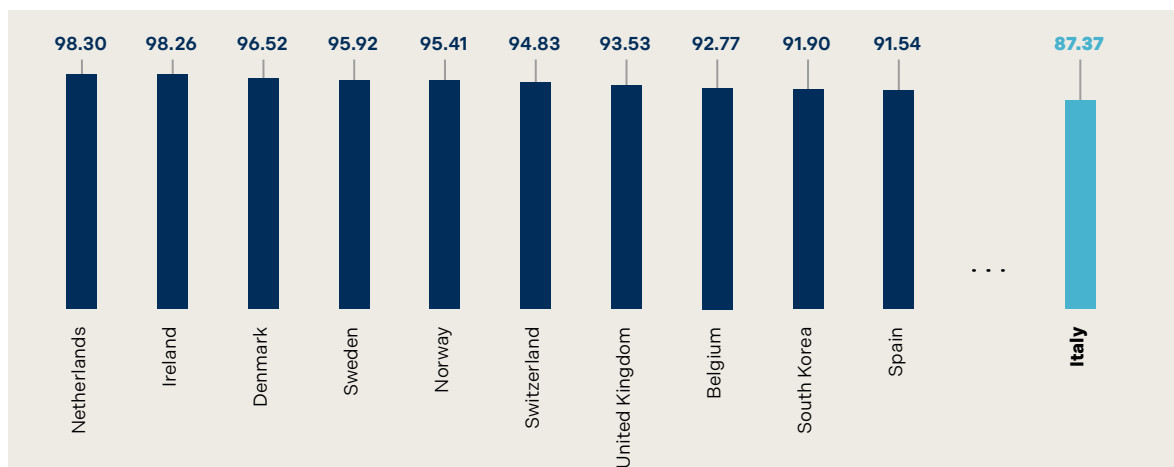
The PISA Score was analysed with the aim of understanding how the preparation of young students may, in the future, influence the innovative performance of individual countries. In particular, the analysis considered the cumulative score in the math and science subjects. This KPI is relevant because strong foundational skills in science and mathematics are critical for developing a future workforce capable of contributing to research, technology, and innovation. In these areas, the highest scoring country is China (590.92), followed by Singapore (568.05) and Japan (541.11). Italy is in 29<sup>th</sup> place with a score of 474.36 (Figure 11).



**FIGURE 11. Top 10 countries plus Italy by average PISA score in math and science, latest available data.**

Source: TEHA Group elaboration on OECD data, 2026.

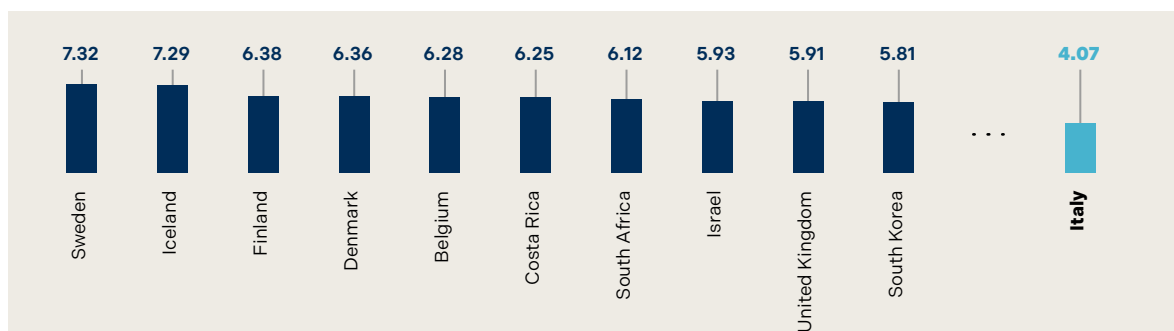
In terms of ICT access, measured as the percentage of population accessing internet daily, the rankings are as follows: Netherlands (98.30%), Ireland (98.26%), Denmark (96.52%). Italy placed 19th with a score of 87.37 (**Figure 12**). This indicator is significant as widespread and consistent access to the internet is a fundamental enabler for digital innovation, knowledge sharing, and participation in the digital economy.



**FIGURE 12. Top 10 countries plus Italy by ICT daily access (percentage of population accessing internet daily), 2024.**

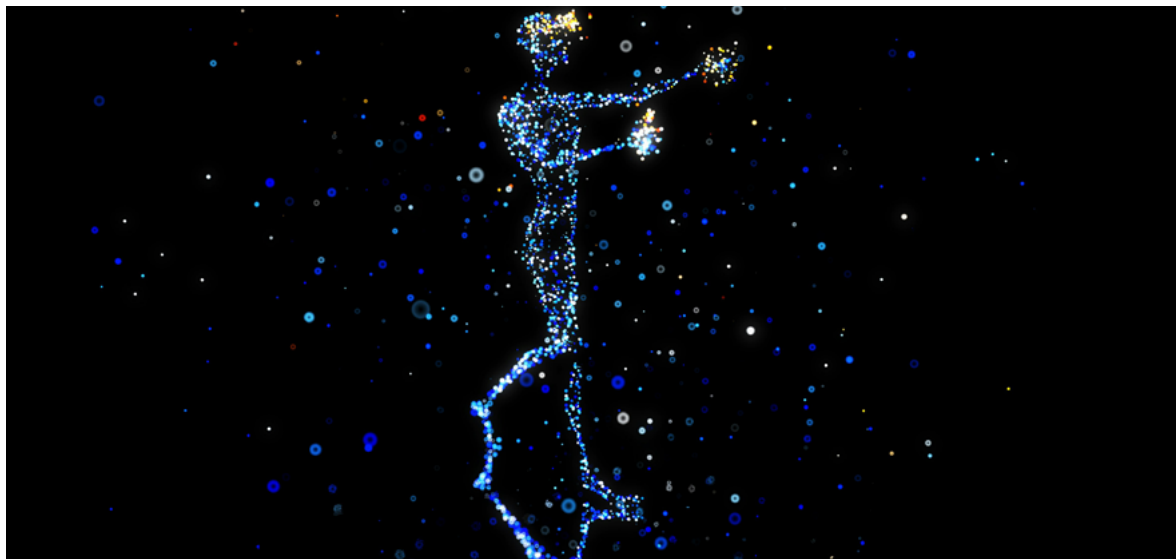
Source: TEHA Group elaboration on OECD data, 2026.

Considering education budget as a percentage of the GDP, Sweden ranks first with 7.32%, followed by Iceland (7.29%) and Finland (6.38%) with Italy ranked 37<sup>th</sup> with 4.07% (**Figure 13**). The level of public investment in education reflects a country's long-term commitment to developing human capital, which is essential for fostering innovation and sustaining economic competitiveness.

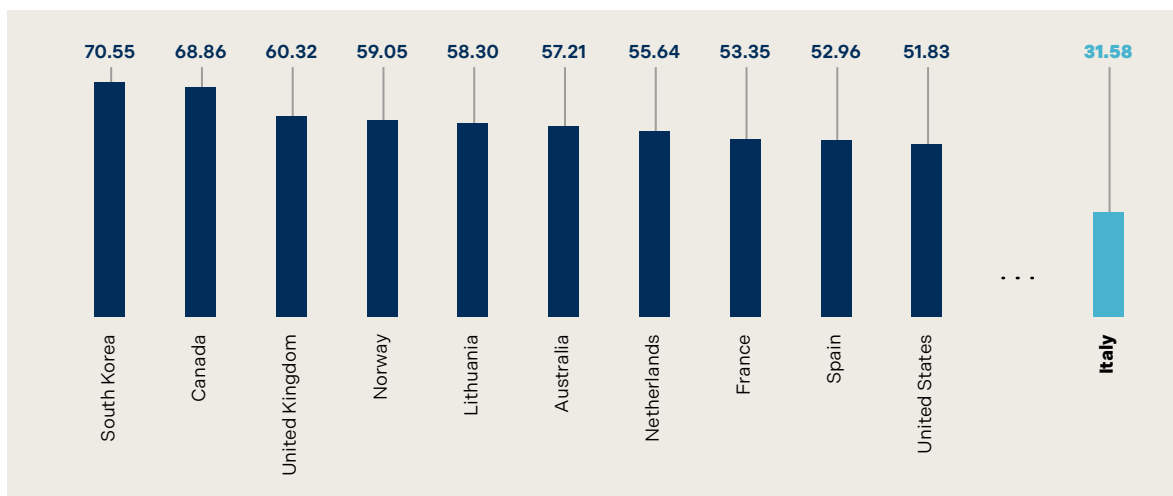


**FIGURE 13. Government expenditure on education (as % of GDP), latest available data.**

Source: TEHA Group elaboration on World Bank data, 2026.



Finally, measuring the percentage of population with at least tertiary education, South Korea ranks first, with 70.55% of the population having at least tertiary education, followed by Canada (68.86%) and United Kingdom (60.32%). Italy ranks 35<sup>th</sup>, with 31.58% (**Figure 14**). This indicator matters because a highly educated population provides the advanced skills and knowledge base necessary to support innovation, research, and high-value economic activities.



**FIGURE 14. Top 10 countries plus Italy by population (25-34 years) with at least tertiary education (in % of total population as same age), 2024.**

Source: TEHA Group elaboration on OECD data, 2026.



## A case study on how Sweden has built a long-term advantage in human capital

In 2026, Sweden confirmed its leading position in the human capital dimension, with a score of 8.07, further consolidating its status as an international benchmark for the effectiveness of education and skills development policies. This result is primarily attributable to the strength of the country's education system, which combines academic quality, structural investment in education, and a long-term strategy aimed at strengthening scientific and technological skills.

The country invests significantly in education, allocating 7.32% of GDP to the sector, a share 3.25 percentage points higher than that of Italy. This commitment is also reflected in the presence of five Swedish universities among the world's top 200, compared to three Italian universities, despite Sweden's population being only 10.6 million versus Italy's 58.9 million.

The central role of education in the development of human capital is further reflected in the continuity of Sweden's policy approach. As early as the 1994 curriculum reform, Sweden introduced technology as a standalone subject within the education system. Subsequently, in 2012, the government published the national innovation strategy, "Innovationsstrategi för Sverige", which included the objective of strengthening human capital in scientific and technological fields. This direction was further reinforced in February 2025 with the launch of the country's first comprehensive national STEM strategy, covering the entire education pipeline – from preschool to doctoral studies – and supported by a 12-member STEM delegation tasked with promoting its implementation through the involvement of industry, universities, and civil society.

The STEM strategy sets ambitious national targets: achieving by 2033 a share of at least 15% of students with high performance levels in mathematics in PISA assessments; increasing by 2035 the share of students enrolled in STEM programmes to 25%; and exceeding 90,000 university STEM students, compared to the current 80,000. These targets reflect the country's intention to strengthen, in a structural way, the skills base needed to sustain its technological and innovation leadership.

In this context, Swedish Minister for Education Johan Pehrson stated: "Efforts to strengthen Sweden's position as a leading technology nation begin in schools. We need more people with strong STEM skills, and we must spark their interest from an early age."

Another distinctive feature of the Swedish model is its strong focus on inclusion. As of February 2026, Sweden ranked first in Europe for female representation in STEM: women accounted for 51.3% of the STEM workforce and 41% of tertiary-educated STEM professionals.

The fundamental principle underpinning the Swedish education system is that of "a school for all": ensuring equal access to high-quality education for every student, regardless of social background, previous academic performance, or individual needs. All students are entitled to personalised support, guidance, and tailored educational adaptations based on their specific needs.

Overall, the Swedish case demonstrates how the combination of investment, quality education, STEM-oriented policies, and inclusion can generate a long-lasting competitive advantage in the development of human capital.

*Source: TEHA Group elaboration on Government Offices of Sweden and OECD data, 2026.*



## How Denmark is strengthening IT and digital skills

Denmark ranks 2<sup>nd</sup> in the Human Capital dimension, with a score of 7.25, confirming its position among the most advanced ecosystems in Europe in terms of human capital quality and the digital readiness of its workforce.

The strength of Danish human capital stems from an integrated approach that combines education, lifelong learning, and public policies focused on digitalization. In this context, the National Strategy for Digitalization 2022–2026, adopted by the Danish Government in May 2022, represents the country's main strategic framework for the development of digital skills and technological transformation. The strategy includes public investments amounting to approximately DKK 2 billion (USD 314 million) and is structured around 61 initiatives aimed at strengthening competitiveness, innovation, the green transition, and the population's digital preparedness.

Among the strategy's key objectives are strengthening cybersecurity, fostering the growth of digital SMEs, advancing digital healthcare, and building a population prepared for an increasingly digital future. Particular emphasis is placed on the development of human capital through the enhancement of digital skills across the entire educational and professional pathway.

In line with these objectives, in November 2023 the Danish Government introduced new strategic initiatives to strengthen IT and digital skills, with a specific focus on technological

education, workforce upskilling, and the retention of international ICT students. To address the growing demand for digital and IT specialists, the government announced dedicated investments in ICT specialist upskilling and retention through funding for higher education institutions, the digital enhancement of university education via the development of digital teaching content and training programs for educators, as well as the integration of technology understanding as a new disciplinary area within teacher education programs.

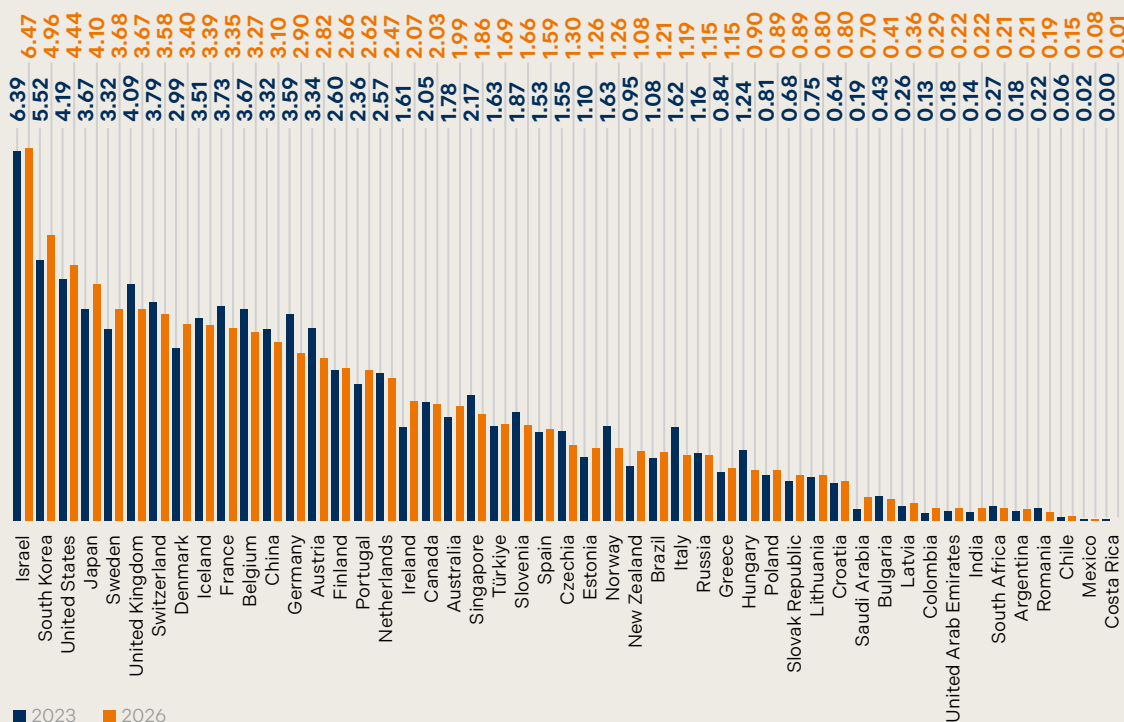
*Source: TEHA Group elaboration on Government Offices of Denmark, 2026.*



## 2.3.2 FINANCIAL RESOURCES TO SUPPORT INNOVATION

The second area of the TEHA-GII considers financial resources to support innovation, analyzing public investment in support of R&D and the availability of private capital to support the development of innovations.

Israel has the best score of 6.47 – gaining 0.08 points from the 2023 indicator; it is followed by South Korea (4.96) and the United States (4.44). Italy is in the 30<sup>th</sup> position with a score of 1.15 – down from the value recorded in the 2023 index (1.62) (**Figure 15**).

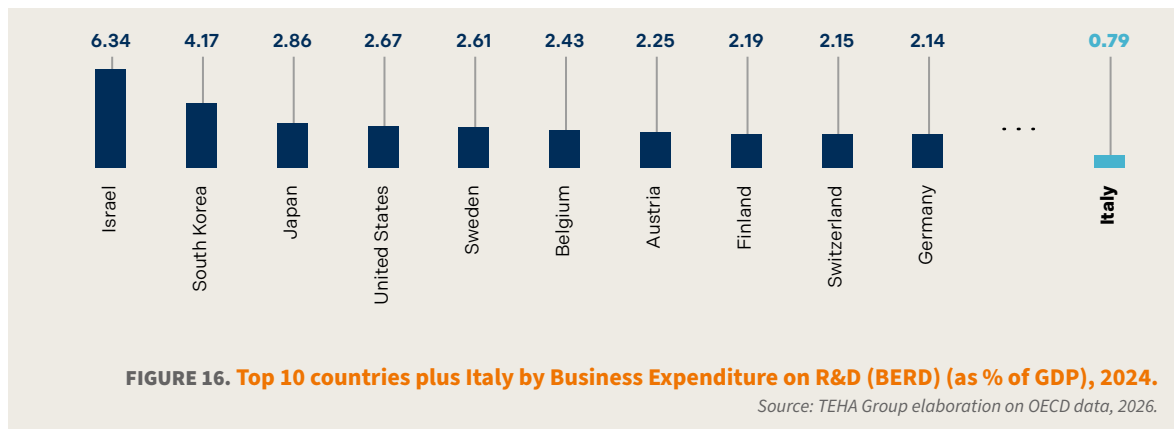


**FIGURE 15. Positioning of innovation ecosystems in the area “Financial resources to support innovation”.**

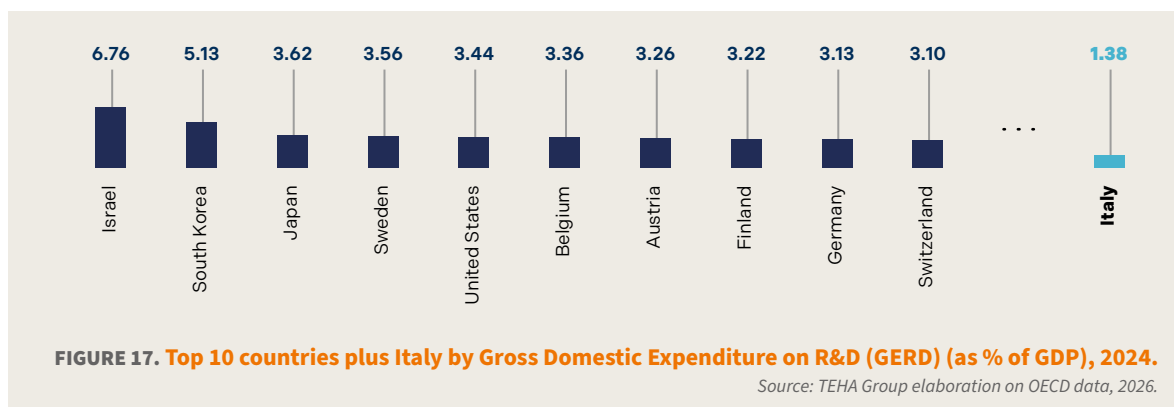
Source: TEHA Group elaboration, 2026.

In the following, the individual sub-indicators that make up the category “Financial Resources to Support Innovation” are analyzed, namely business investment in R&D (BERD) as a percentage of GDP, the total amount of R&D investment as a percentage of GDP (GERD), indirect public support through R&D tax incentives, venture capital investments as a percentage of GDP, and finally R&D Expenditure by top 2000 Global Companies as a percentage of GDP.

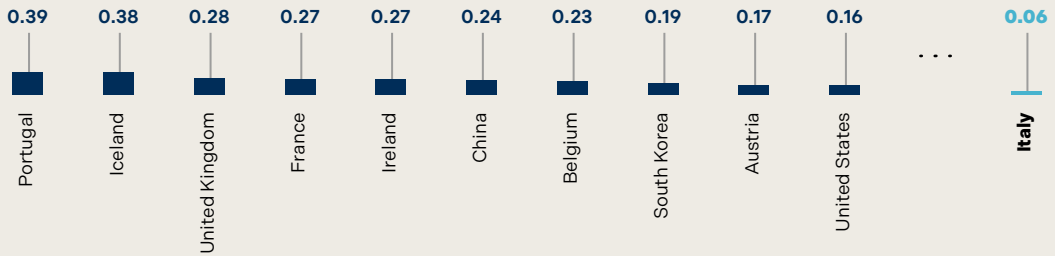
Considering private R&D investment as a percentage of GDP, i.e. BERD (Business Expenditure on Research and Development), Israel ranks first (6.34%), followed by South Korea (4.17%) and Japan (2.86%). Italy ranks 30<sup>th</sup>, with private investment in R&D amounting to 0.79% of national GDP (**Figure 16**). This indicator is key to understanding how much the business sector contributes to innovation, as higher private R&D spending often signals a dynamic industrial landscape focused on developing new technologies and maintaining global competitiveness.



Analysing the value of the share of GERD (Gross Domestic Expenditures on Research and Development), Israel ranks first again with 6.76%, followed by South Korea (5.13%) and Japan (3.62%). Italy is in 28<sup>th</sup> position in this ranking with 1.38% (**Figure 17**). This KPI provides a comprehensive measure of a country's effort in research and development, a fundamental aspect for sustaining a robust and forward-looking innovation system.



Government tax incentives to invest in R&D score 0.39% in Portugal; next with almost no gap is Iceland with 0.38%, followed by the United Kingdom with 0.28%. Italy ranks 22nd with a score of 0.06% (**Figure 18**). This indicator sheds light on the extent to which governments actively encourage innovation through fiscal policy, strong incentives can significantly boost private sector engagement in R&D activities.



**FIGURE 18. Top 10 countries plus Italy by Indirect government support through R&D tax incentives (GTARD) (as % of GDP), 2023.**

Source: TEHA Group elaboration on OECD data, 2026.

The venture capital investment as a percentage of GDP is particularly relevant as it highlights the availability of risk capital to support startups and innovative enterprises, an essential driver for fostering entrepreneurial ecosystems and scaling breakthrough ideas. In this regard, Israel stands out with a leading value of 1.81%, followed by the United States (0.53%) and Canada (0.20%). Italy ranks 20<sup>th</sup>, with just 0.03% of GDP allocated to venture capital (**Figure 19**).



**FIGURE 19. Top 10 countries plus Italy by value of VC investments (as % of GDP), 2024.**

Source: TEHA Group elaboration on OECD data, 2026.



## The US State Small Business Credit Initiative (SSBCI)

The State Small Business Credit Initiative (SSBCI) is a nearly USD 10 billion program aimed at supporting small businesses and entrepreneurship in the United States by providing both capital and technical assistance to foster long-term stability, growth, and success.

Reauthorized and expanded through the American Rescue Plan Act (ARPA), the initiative provides funding to states, the District of Columbia, territories, and Tribal governments, enabling them to develop

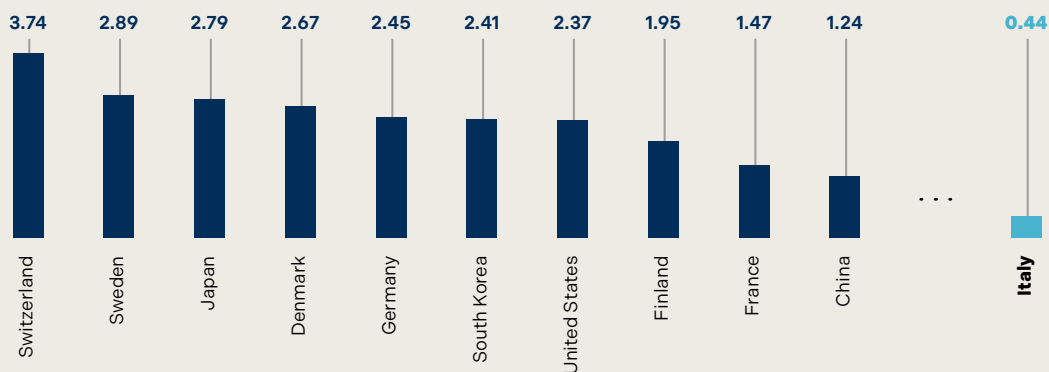
programs tailored to the specific needs of their communities.

SSBCI also aims to catalyze up to USD 10 in private investment for every USD 1 of public funding, thereby expanding access to capital for small businesses and entrepreneurs, including those from underserved communities.

Eligible programs include equity and venture capital investments, loan participation programs, loan guarantees, collateral support, and capital access programs.

Source: TEHA Group elaboration on U.S. Department of the Treasury, 2026.

Finally, R&D expenditure by top 2000 global companies as a percentage of GDP scored 3.74% in Switzerland; followed by Sweden with 2.89% and Japan with 2.79%. Italy ranks 16<sup>th</sup> with 0.44% (**Figure 20**). This indicator reflects the presence of major industrial players capable of mobilizing substantial resources for technological innovation and international competitiveness.



**FIGURE 20. Top 10 countries plus Italy by R&D Expenditure by top 2000 global companies (as % of GDP), 2024.**

Source: TEHA Group elaboration on JRC data, 2026.

Note: The figures are not directly comparable with BERD data because the indicator also considers the R&D activities of multinational enterprises, potentially aggregating research and development expenditures across different countries.



## A case study on how Israel has emerged as a leader in innovation financing

In 2026, Israel confirms its position as the leading country in terms of financial resources supporting innovation, with a score of 6.47, standing out as a global benchmark for its ability to mobilize public and private investments in support of the technological ecosystem. This leadership stems from a highly dynamic model based on intensive research and development activity and one of the most advanced venture capital markets in the world.

A key element of Israel's performance is the high level of business investment in R&D. In 2024, Business Expenditure on R&D (BERD) reached 6.34% of GDP, a figure eight times higher than the share recorded by Italian firms. Moreover, with 1.81% of GDP allocated to venture capital investments in 2024, Israel ranked first globally, investing 60 times more than Italy in VC financing.

A crucial role in supporting this ecosystem is played by the Israel Innovation Authority, the public body responsible for the national innovation policy. The Authority actively supports the development of the technological ecosystem through targeted funding programs and policy instruments,

operating across several areas, including startup support, advanced industrial growth, technological infrastructure, and international collaboration.

Among its main initiatives is the R&D Fund Program, which supports companies in developing new products and technologies by covering between 20% and 50% of R&D expenses, with additional incentives for specific geographic areas and categories of firms. This is complemented by the Yozma 2.0 VC Catalyst Fund, aimed at fostering the participation of institutional investors in the venture capital market through public-private co-investment mechanisms. Within this framework, approximately \$450 million was mobilized during 2024–2025, followed by an additional \$300 million round launched in 2026, focused on deep-tech sectors such as artificial intelligence, semiconductors, and life sciences.

Overall, the Israeli case highlights how the combination of high private R&D investments, a highly developed venture capital market, and strong strategic public support contributes to strengthening the country's leadership in innovation financing.

*Source: TEHA Group elaboration on Israel Innovation Authority, 2026.*



## Why South Korea is a leader in Innovation Investments

In 2026, South Korea ranks among the global leaders in the dimension of financial resources supporting innovation, positioning itself among the top countries worldwide thanks to a model strongly centered on investments in research and development. The country's ability to combine public and private R&D investments represents the main driver of its technological and innovation competitiveness.

A distinctive feature of the Korean model is its high level of overall expenditure on research and development. In 2024, Gross Domestic Expenditure on R&D (GERD) reached 5.13% of GDP, placing the country second globally, for a total of \$95.9 billion. This figure is 192.4% higher than Italy's expenditure, which amounted to \$32.8 billion, highlighting a significant gap in innovation investment capacity. This performance is driven in particular by the contribution of the private sector. Business Expenditure on R&D (BERD) reached 4.17% of GDP in 2024, also among the highest levels globally, amounting to \$78.0 billion. This level of investment is approximately 4.15 times higher than that of Italian firms, which stands at \$18.8 billion, confirming the central role of the Korean industrial

system in technological development.

The strengthening of the country's leadership is supported by an ambitious long-term national strategy. In March 2023, the Ministry of Science and ICT (MSIT) introduced the first Mid- and Long-Term National R&D Investment Strategy (2023–2027), aimed at positioning South Korea among the world's top five scientific and technological powers by 2030. The strategy envisages an increase in investments, with the objective of raising R&D expenditure above 5.2% of GDP and is structured around four sub-strategies and 23 objectives, ranging from strengthening public-private collaborations to improving the allocation and evaluation mechanisms of innovation funding.

Building on this approach, in March 2026 the government launched the K-Moonshot initiative, a program defining 12 strategic national missions – including artificial intelligence, fusion energy, humanoid robotics, and quantum computing – with the objective of achieving concrete results by 2035. The initiative is supported by a dedicated \$6.8 billion investment in artificial intelligence and by the involvement of a broad coalition of 161 companies, including Samsung, SK Group, Hyundai, and Naver.

*Source: TEHA Group elaboration on Korean Ministry of Science and ICT, 2026.*



## Why Japan Stands Out in Innovation Financing

Japan stands out globally for the strength of its financial ecosystem supporting innovation. In the 2026 edition of the indicator, the country ranks 4<sup>th</sup> worldwide in the Financial Resources to Support Innovation dimension, with a score of 4.10. Japan confirms its role as one of the world’s leading investors in research and development, ranking 3<sup>rd</sup> globally for both Gross Expenditure on R&D (GERD) and Business Expenditure on R&D (BERD), with investments amounting to 3.62% and 2.86% of GDP, respectively. These results reflect the presence of a highly technological industrial system and a private sector strongly oriented toward research and development.

Japan’s ability to mobilize financial resources for innovation is supported by the strong presence of large industrial groups operating in technology-intensive sectors – including automotive, electronics, robotics, advanced materials, and pharmaceuticals – which continue to invest steadily in research, development, and industrial innovation.

The centrality of innovation in the country’s economic strategy was further strengthened by the 6th Science, Technology and Innovation Basic Plan, covering the period 2021–2025. The Plan assigns a central role to transformative innovation, technological competitiveness, and the ability to address major social challenges through research, technology, and industrial policy.

Despite its solid financial and technological base, Japanese authorities consider it necessary to further strengthen domestic investment in order to support the

country’s long-term growth potential. In this context, the initiatives announced in Prime Minister Takaichi’s 2026 policy speech outline the government’s intention to expand support for strategic investments through multi-year instruments and long-term funds. These initiatives cover 17 strategic areas – including quantum technologies, aerospace, and pharmaceuticals – and include measures to promote investment, support internationalization, develop skills, foster industry–university collaboration, leverage public procurement, and advance regulatory reforms.

This strategic direction was further consolidated on March 27, 2026, when the government approved the 7th Basic Plan for Science, Technology and Innovation. The new Plan reorients policies toward greater interdisciplinary collaboration. It is structured around three main pillars: the “revitalization of science” as the foundation of knowledge, a strategic focus on key technological areas, and the organic integration of science and technology with national security. As an investment target for the next five-year period, the Plan aims to mobilize 180 trillion yen (approximately USD 1.15 trillion), combining a public R&D investment target of 60 trillion yen (approximately USD 381 billion) – of which around 45 trillion yen (approximately USD 286 billion) is allocated to science- and technology-related budgets – with investments from the private sector.

Supporting this strategic framework, Japan relies on a broad network of public institutions, research agencies, and financial

bodies that contribute to the implementation of innovation policies and the strengthening of R&D investment. These include the National Institute of Advanced Industrial Science and Technology (AIST), one of the country's leading public research organizations engaged in the development and industrial application of advanced technologies, and the National Institute for Materials Science (NIMS), the national agency specialized in research and development in the field of materials science.

A central role is also played by the Council for Science, Technology and Innovation (CSTI), which is responsible for defining strategic guidelines and coordinating initiatives across different ministries. The CSTI is chaired by Prime Minister Takaichi and includes, in addition to the relevant ministers, expert members from academia and industry.

At the same time, Japan is modernizing its financial architecture to facilitate access to capital for startups and innovative firms. In this direction, the country has developed the “Japanese version of the U.S. Rule 506,” introduced to facilitate the private placement of unlisted securities among professional investors. The reform has expanded fundraising channels, including digital ones, clarified the requirements for qualifying as a professional investor, and aims to initiate a review of restrictions on the

promotion of unlisted shares. The goal is to strengthen the venture capital market and create a more dynamic financing ecosystem for innovative companies, while maintaining adequate investor protection standards.

Overall, Japan's high R&D investment intensity, the strong innovation orientation of its private sector, and recent financial market reforms explain the country's leadership in mobilizing financial resources to support innovation.

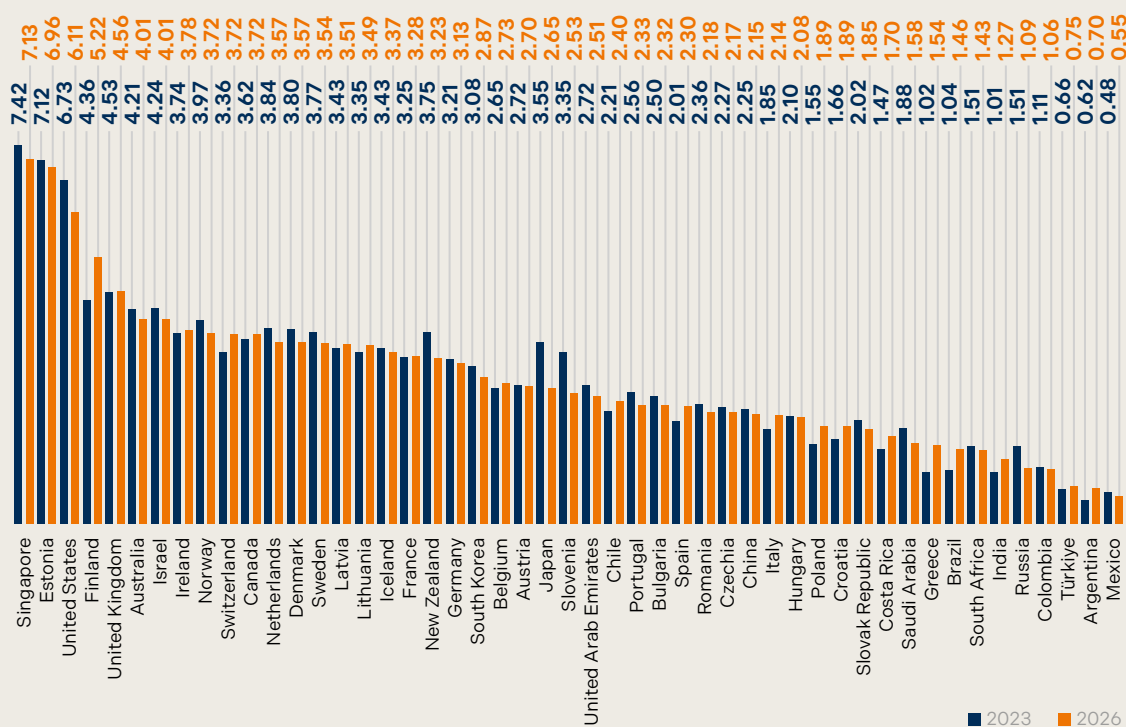


Source: TEHA Group elaboration on various sources, 2026.

### 2.3.3 INNOVATIVE ECOSYSTEM

The third section of the TEHA-GII, Innovative Ecosystem, measures the capacity of an ecosystem to protect the innovation produced and to transform innovative ideas into new business realities.

In 2026, Singapore takes first place with an overall score of 7.13 – down from the 2023 index by -0.29 points. This is followed by Estonia in second place with 6.96 points. In third position is the United States with a score of 6.11. Italy is in 34<sup>th</sup> position with a score of 2.14 (Figure 21).

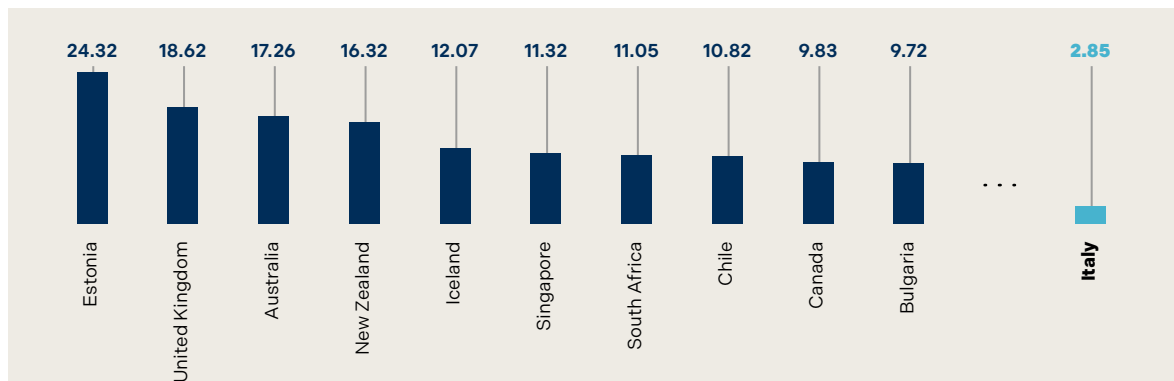


**FIGURE 21. Positioning of innovation ecosystems in the “Innovative Ecosystem” area.**

Source: TEHA Group elaboration, 2026.

The category of the Innovative Ecosystem consists of seven sub-indicators: the new business registration rate, the Intellectual Property Rights Index, the Government AI Readiness Index, tech unicorns per million inhabitants, unicorn valuation as a share of GDP, developers per capita, and supercomputer cores per capita.

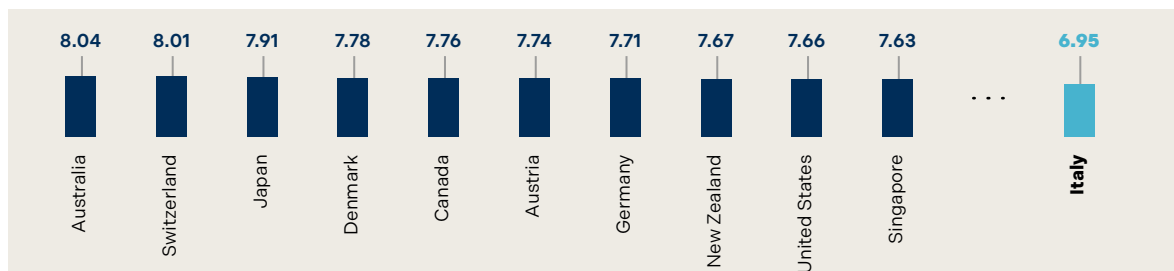
Turning to the analysis of registrations of new enterprises per thousand inhabitants, Estonia leads the way with 24.32 new enterprises created per 1,000 inhabitants of working age (15–64). This is followed by the United Kingdom with a score of 18.62 and Australia with 17.26. Italy ranks 32<sup>nd</sup> with approximately 2.85 new registered enterprises per 1,000 inhabitants (**Figure 22**). This indicator is vital as it reflects the dynamism of a country’s entrepreneurial environment – higher rates of new business creation often signal a healthy ecosystem that encourages innovation, risk-taking, and economic renewal.



**FIGURE 22. Top 10 countries plus Italy by new business creation (per 1,000 people aged 15-64), latest available data.**

Source: TEHA Group elaboration on World Bank data, 2026.

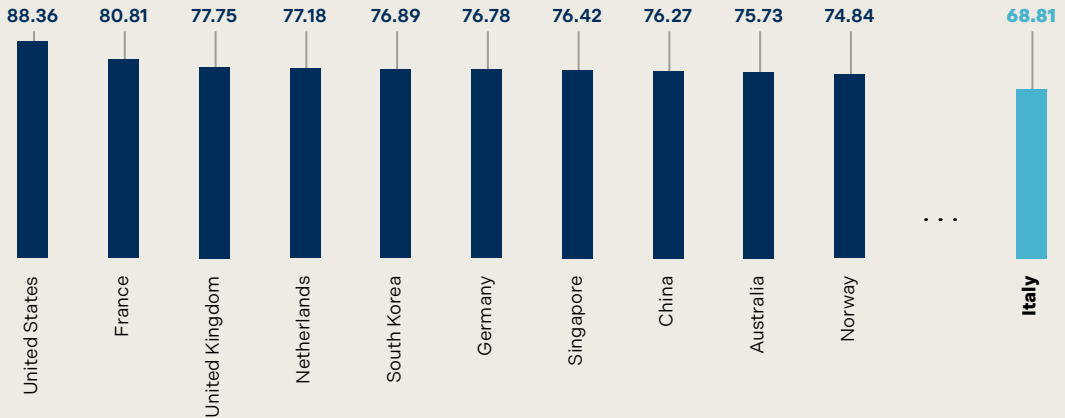
The second indicator is the Intellectual Property Right Index which evaluates a country’s ability to protect intellectual property. This KPI is particularly important as strong IP protection frameworks foster innovation by ensuring that creators and companies can safely commercialise their ideas and retain the benefits of their inventions. Australia takes first place with a score of 8.04, followed by Switzerland with 8.01. In third place is Japan with a score of 7.91. Italy ranks 24<sup>th</sup> with 6.95 points (**Figure 23**).



**FIGURE 23. Top 10 countries plus Italy by Intellectual Property Right Index value, 2025.**

Source: TEHA Group elaboration on WIPO, 2026.

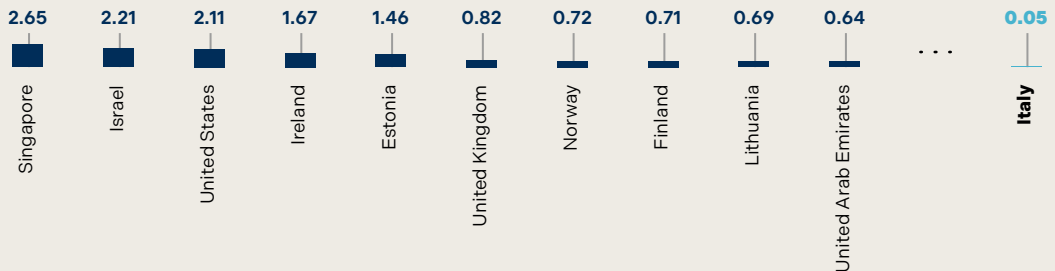
The third indicator evaluates the government AI readiness. This metric is increasingly relevant, as it measures a government's capacity to implement and support AI technologies in public services and policy, an essential factor in fostering a digital innovation environment and ensuring long-term competitiveness. United States ranks first, with a value of index of 88.36, followed by France (80.81) and the United Kingdom (77.75). Italy ranks 25<sup>th</sup> with a score of 68.81 (**Figure 24**).



**FIGURE 24. Top 10 countries plus Italy by Government AI Index score, 2025.**

Source: TEHA Group elaboration on Oxford university data, 2026.

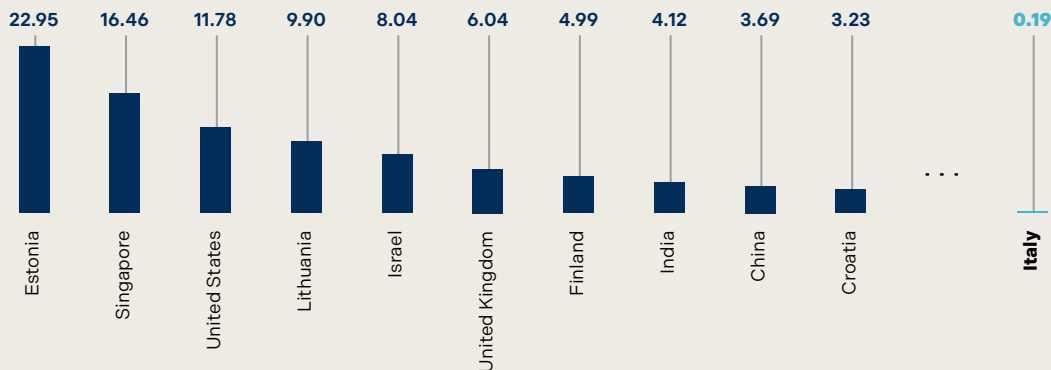
The number of tech unicorns per 1 million inhabitants evaluates the number of tech startups that have achieved unicorn status – i.e. when attaining a valuation over \$1 billion. Singapore (2.65), Israel (2.21), and the United States (2.11) are leaders within this category. Italy ranks 34<sup>th</sup> with 0.05 unicorns per 1 million inhabitants (**Figure 25**). This indicator serves as a proxy for the maturity and success of a country's innovation ecosystem, highlighting its ability to scale high-potential startups into globally competitive tech companies.



**FIGURE 25. Top 10 countries plus Italy by number of unicorns (per 1 mln of inhabitants), 2025.**

Source: TEHA Group elaboration on CB Insights data, 2026.

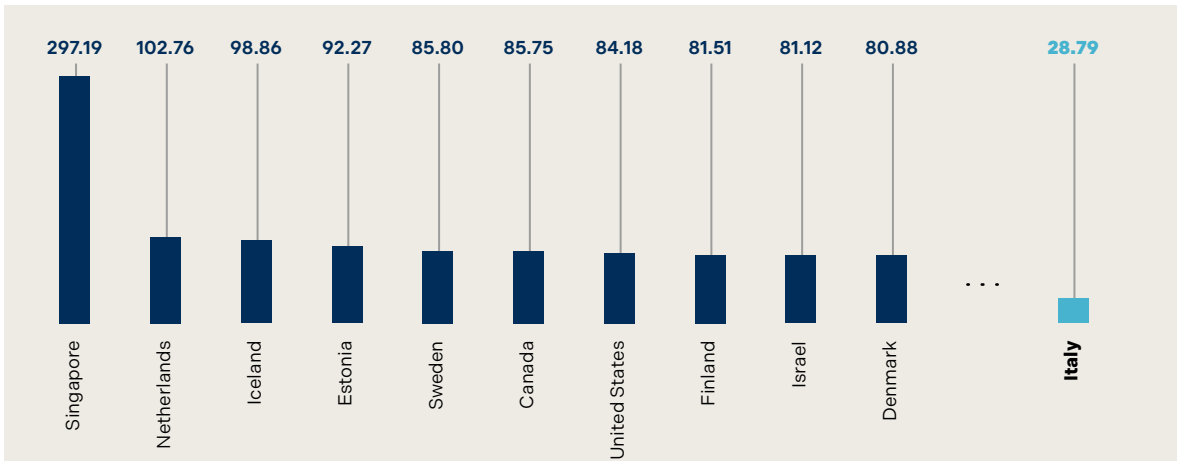
Moreover, the unicorn valuation as a percentage of GDP shows the contribution of successful, innovative startups towards the economy. The rankings are as follows: Estonia (22.95%), Singapore (16.46%), and the United States (11.78%). Italy ranks 37<sup>th</sup> with 0.19% of the GDP (**Figure 26**). This KPI is significant as it illustrates the economic impact of high-growth startups and the extent to which innovation-driven enterprises contribute to national wealth and competitiveness.



**FIGURE 26. Top 10 countries plus Italy by unicorns' valuation (as % of GDP), 2025.**

Source: TEHA Group elaboration on CB Insights data, 2026.

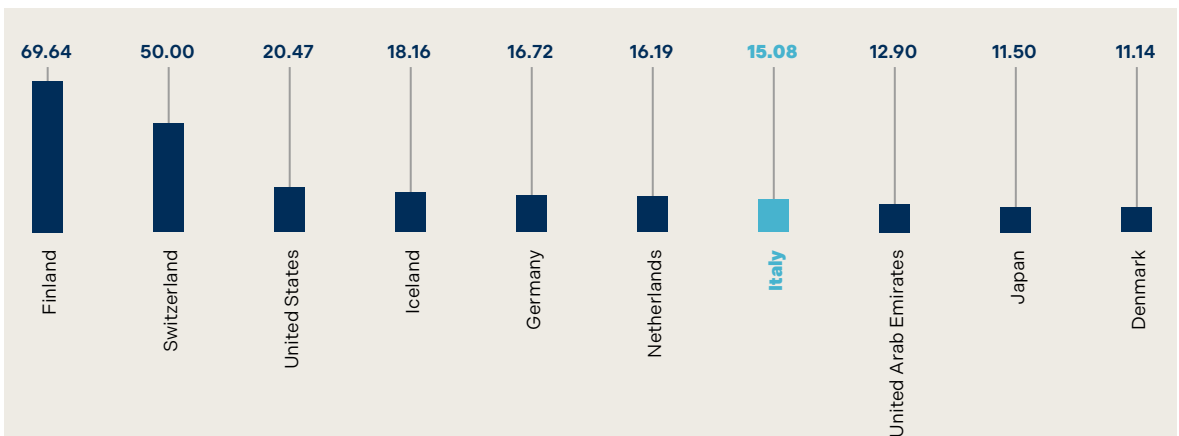
Developers per capita looks at the number of individuals with a GitHub account, used as a proxy for people pursuing professions or activities where coding skills are beneficial. This indicator is crucial, as a high concentration of developers reflects a country's capacity to build and maintain digital infrastructure, drive software-based innovation, and support the growth of technology-intensive industries. Singapore leads the way with 297.19 developers per 1,000 inhabitants, followed by the Netherlands (102.76) and Iceland (98.86). Italy ranks 42<sup>nd</sup> with 28.79 developers per 1,000 inhabitants (**Figure 27**).



**FIGURE 27. Top 10 countries plus Italy by number of developers (per 1,000 inhabitants), 2024.**

Source: TEHA Group elaboration on Github data, 2026.

Finally, we look at supercomputer processing power per capita, measured by Rmax, to gauge the effective computing performance of high-performance computing facilities in each country. This metric is particularly relevant as access to high-performance computing is critical for advanced research, big data analysis, and complex simulations – key enablers of cutting-edge innovation across sectors. Finland ranks first with 69.64 of supercomputer processing power per 1,000 inhabitants, followed by Switzerland (50.00) and the United States (20.47). Italy shows a strong ranking, placing 7<sup>th</sup> with a score of 15.08 (Figure 28).



**FIGURE 28. Top 10 countries by supercomputer processing power (per 1,000 inhabitants), 2025.**

Source: TEHA Group elaboration on top500 data, 2026.



## Finland's Green Superpower

Finland has established itself as a global frontrunner in high-performance computing (HPC), supported by long-term strategic investments in digital infrastructure and research capabilities. A central pillar of this ecosystem is LUMI, currently among the world's ten most powerful supercomputers, which contributes not only to advanced scientific research but also to industrial innovation, digital transformation, and the green transition.

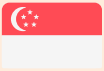
Finland's strength lies in its ability to combine cutting-edge computing power with

sustainability. LUMI is powered entirely by renewable hydropower, while the heat generated by the system is reused to supply part of Kajaani's district heating network. This makes the infrastructure a leading example of how advanced digital technologies can be deployed in an environmentally responsible way.

By integrating world-class HPC capacity with renewable energy and circular heat recovery, Finland is helping shape a model of digital innovation that is both technologically advanced and sustainable.

*Source: TEHA Group elaboration on Euro CC Finland data, 2026.*





## How Singapore built a world-class AI and Innovation Ecosystem

Singapore continues to rank among the world's most advanced innovation ecosystems, thanks to its high density of software developers, its ability to generate high-growth startups, and strong public coordination in support of technological innovation.

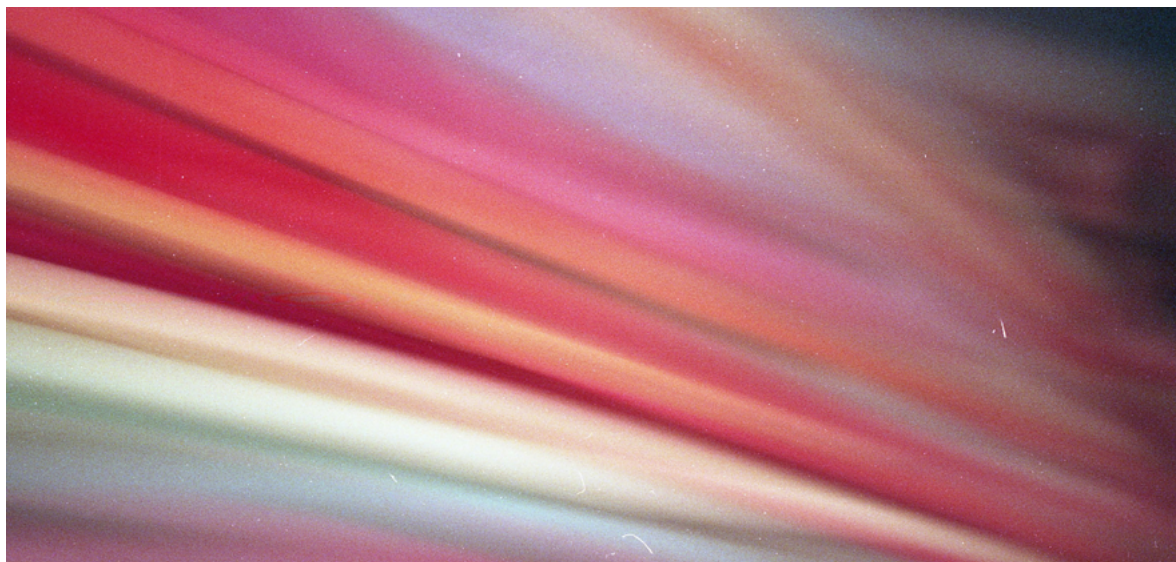
A central element of the Singaporean model is public support for the startup ecosystem through funding and co-investment programs. Innovative companies can access government instruments such as the Enterprise Development Grant (EDG), which covers up to 50% of eligible costs for business expansion, innovation, and international development. This is complemented by the Startup SG and Startup SG Equity initiatives, through which the government provides direct grants to startups and co-invests alongside private venture capital firms in high-potential technology companies. As part of the 2026 Budget, the government also announced a strengthening of Startup SG Equity, with an additional allocation of approximately USD 785 million to support high-tech startups.

Singapore's strategy also assigns a priority role to the development of artificial intelligence as a driver of economic competitiveness and industrial

transformation. In 2023, the country launched its second National AI Strategy (NAIS 2.0), accompanied by investments of approximately USD 780 million under the National AI Research and Development Plan 2025–2030. The strategy outlines 15 action areas aimed at accelerating AI adoption across the economy and public services. Among the key initiatives are the establishment of more than 60 AI Centers of Excellence by major international companies, including Google and Microsoft, as well as the development of Kampong AI, a new artificial intelligence hub scheduled to open by 2026 in the One-North district. The project aims to bring together startups, research centers, multinational corporations, and investors within an integrated hub dedicated to AI innovation.

In 2026, Prime Minister Lawrence Wong also established the National AI Council, with the goal of coordinating the National AI Missions across priority sectors of the Singaporean economy, including advanced manufacturing, connectivity, finance, and healthcare. Singapore's approach is focused not only on developing advanced AI models, but above all on the rapid deployment of practical applications with high economic and social impact.

*Sources: TEHA Group elaboration on various sources, 2026.*



## Estonia's DeepTech Ecosystem

Estonia is rapidly establishing itself as a leading DeepTech hub in Europe, thanks to its strong emphasis on research-based innovation and forward-looking government strategies. As of the end of 2024, Estonia hosted 166 DeepTech startups, generating more than €325 million in revenue and making a significant contribution to the national economy through tax payments. The sector attracted €206 million in investment in 2024, representing 63% of total startup funding, with standout companies such as Skeleton Technologies and Stargate Hydrogen leading the way.

To sustain this momentum, Estonia launched the DeepTech Action Plan 2023–2027, focused on talent development, investment, ecosystem capabilities, collaboration, and the creation of a supportive

business environment. The measures included in the plan are expected to support the country's objective of reaching 500 DeepTech startups by 2030.

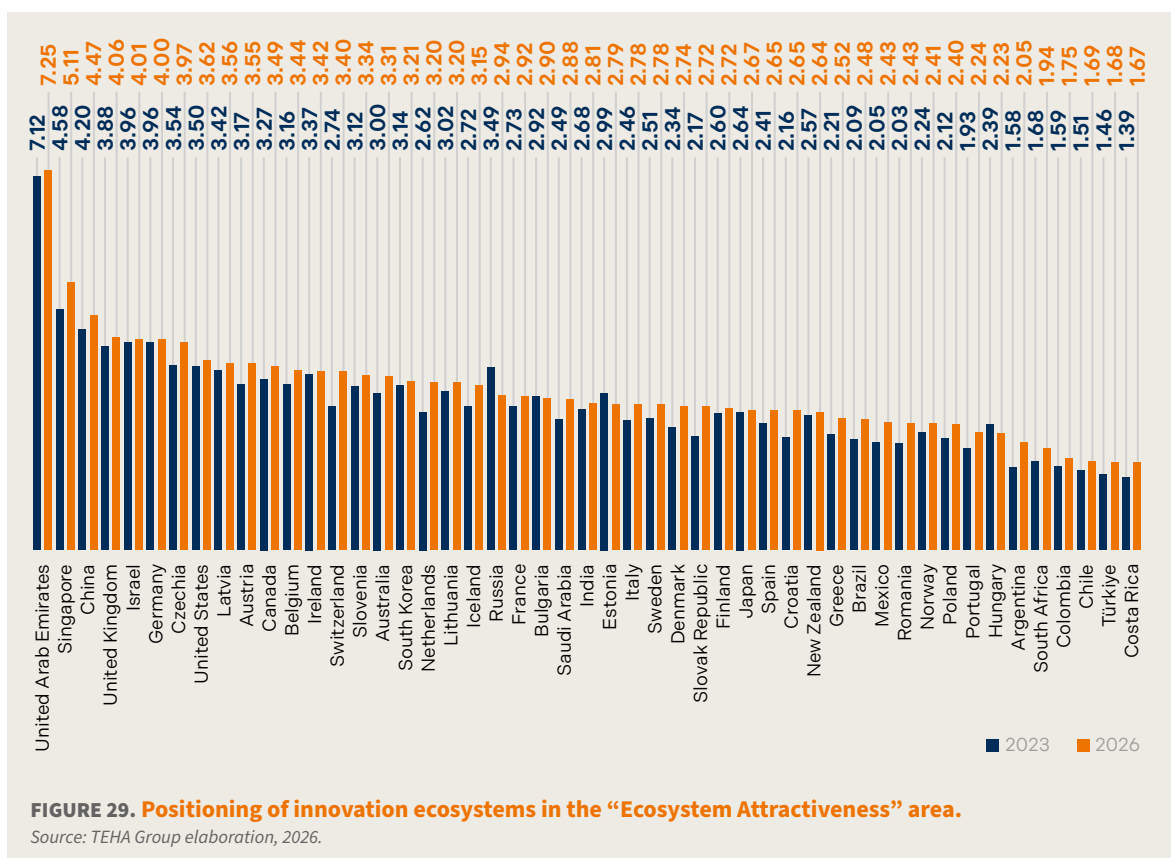
These initiatives are aligned with the broader goals of the Estonian Business and Innovation Agency Strategy 2025, which sets ambitious targets to strengthen national competitiveness. Key objectives include surpassing the EU-27 average in labour productivity (targeting 92% by 2025 and 110% by 2035), increasing private-sector R&D expenditure to 1.5% of GDP (and 2% by 2035), and improving Estonia's position in the European Innovation Scoreboard from a “moderate innovator” to a “strong innovator”, with the longer-term ambition of becoming an “innovation leader” by 2035.

*Source: TEHA Group elaboration on Startup Estonia, 2026.*

### 2.3.4 ATTRACTIVENESS ECOSYSTEM

The fourth area of the TEHA-GII measures a country's ability to develop an attractive environment for investment and new talent and to stimulate collaborative synergies between universities and businesses.

The United Arab Emirates take the first place with an overall score of 7.25 (+0.13 points vs. 2023). It is followed by Singapore with 5.11 points and China with 4.47 points. Italy is in 27<sup>th</sup> position with 2.78 points, slightly more than its 2023 value (2.46) (Figure 29).



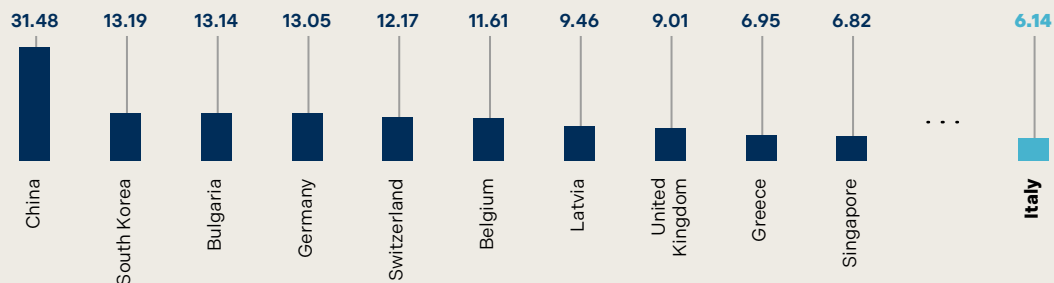
**FIGURE 29. Positioning of innovation ecosystems in the “Ecosystem Attractiveness” area.**

Source: TEHA Group elaboration, 2026.

The following analysis examines the main sub-indicators composing the Ecosystem Attractiveness category, namely the share of higher education expenditure devoted to research and development (HERD – Higher Education Expenditure on R&D), the amount of R&D investment financed from abroad, net university student mobility, FDI inflows as a percentage of GDP, and the Global Attractiveness Index.



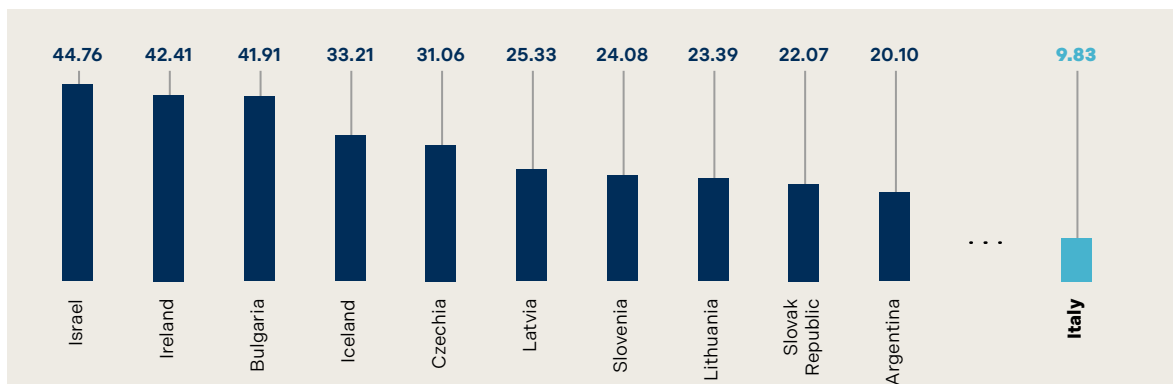
With respect to the first evaluated element (HERD), China ranks first with 31.48% of university system expenditure invested in R&D. South Korea follows with a share of 13.19%. Bulgaria concludes the podium with 13.14% of university expenditure invested in research. In this area, Italy is in 14<sup>th</sup> place with a value of 6.14% (**Figure 30**). This indicator is important as it highlights the role of higher education institutions in generating research outputs and contributing to the national innovation system through knowledge creation and technology transfer.



**FIGURE 30. Top 10 countries plus Italy by Higher Education Expenditure on R&D financed by the private sector (HERD) (as % of GDP),**

2023. Source: TEHA Group elaboration on OECD data, 2026.

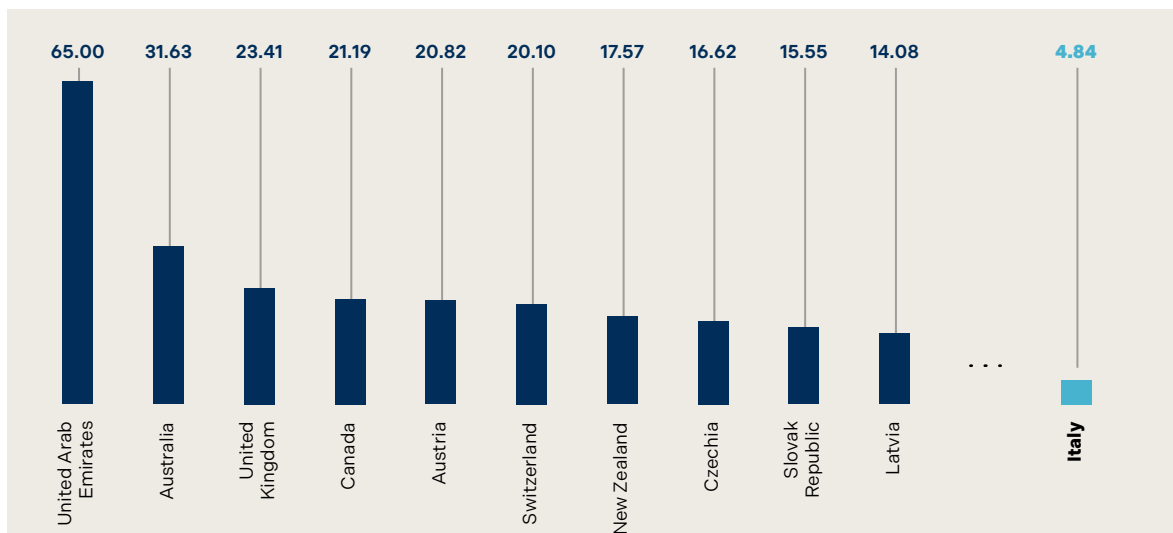
The second indicator analysed considers the share of research expenditure that is financed from abroad. Israel ranks first with 44.76% of expenditure financed from abroad – followed by Ireland (42.41%) and Bulgaria (41.91%). Here, Italy is in 25<sup>th</sup> place (9.83%) (**Figure 31**). This metric is relevant as it reflects the international attractiveness and integration of a country's research ecosystem, indicating its ability to collaborate across borders and attract foreign funding for scientific and technological advancement.



**FIGURE 31. Top 10 countries plus Italy by Gross Expenditure on R&D (GERD) financed by the rest of the world (as % of GERD), 2023.**

Source: TEHA Group elaboration on OECD data, 2026.

Next, the net student mobility rate was analysed, i.e. the inbound mobility rate of students moving during their studies. This indicator is meaningful as it captures a country's capacity to attract international students, which contributes to academic diversity, global knowledge exchange, and the internationalization of the research and innovation environment. Here, United Arab Emirates ranks first with a value of 65.00%, followed by Australia (31.63%) and the UK (23.41%). Italy ranks 30<sup>th</sup> with 4.84% (**Figure 32**).



**FIGURE 32. Top 10 countries plus Italy by inbound mobility rate of students (as % as total national students), 2024.**

Source: TEHA Group elaboration on UNESCO data, 2026.



## Australia's International Education Strategy

Australia's International Education Strategy 2021–2030 sets a long-term vision for sustainable growth in the sector, focusing on diversification, alignment with national skills needs, placing students at the center, and enhancing global competitiveness.

To support its implementation, the government has introduced key measures, including:

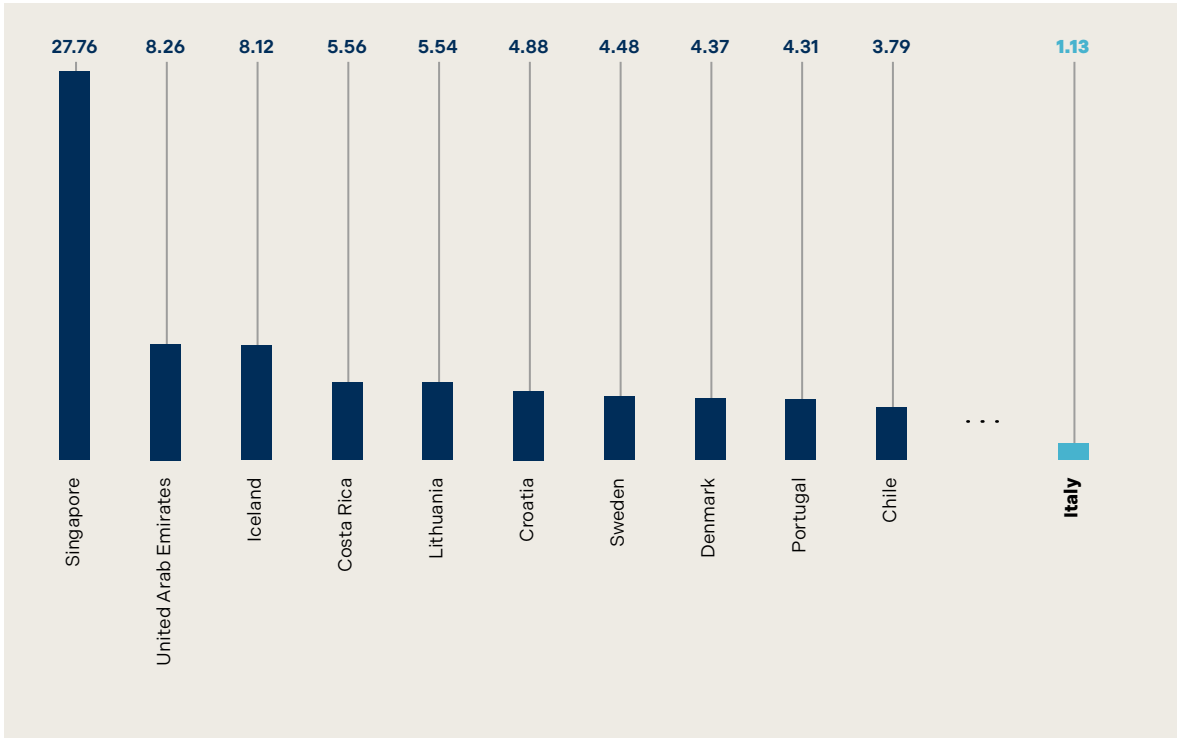
- ▶ \$8 million to help universities and institutions create up to 70 short, job-relevant courses (micro-credentials) that can be offered both in Australia and abroad.
- ▶ \$27.8 million in fee relief for education providers, to support their readiness to welcome international students.
- ▶ \$9.4 million to support English language schools, helping them develop online and overseas programs to reach more students globally.
- ▶ A discussion paper exploring the diversification of international student cohorts at public universities.

The Council for International Education oversees the strategy, reporting annually to the Prime Minister.

As a result of this strategic approach and the supporting measures introduced by the government, Australia continues to strengthen its attractiveness as an international education destination. Students benefit from a highly multicultural environment, with peers from more than 200 countries contributing to vibrant campus life across the country. Australian universities are also equipped with modern infrastructure, including advanced research laboratories, high-speed internet, and digital learning platforms that support both in-person and online education. In addition, programmes such as the Australia Awards Scholarships provide opportunities for individuals from developing countries, particularly across the Indo-Pacific region, to undertake funded undergraduate or postgraduate studies at participating Australian universities and technical and further education institutions.

*Source: TEHA Group elaboration on Australian Government – Department of Education, 2026.*

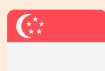
Net FDI inflows as a percentage of GDP shows us the level of new technologies, knowledge, and expertise brought in from foreign companies. This KPI is important because foreign direct investment not only brings capital, but also facilitates the transfer of innovation capabilities, managerial know-how, and access to international networks, all of which are critical for boosting national competitiveness. Singapore ranks first with 27.76%, followed by the United Arab Emirates (8.26%) and Iceland (8.12%).



**FIGURE 33. Top 10 countries plus Italy by Foreign Direct Investments (FDI) inflows (as % of GDP), 2024.**

Source: TEHA Group elaboration on World Bank data, 2026.





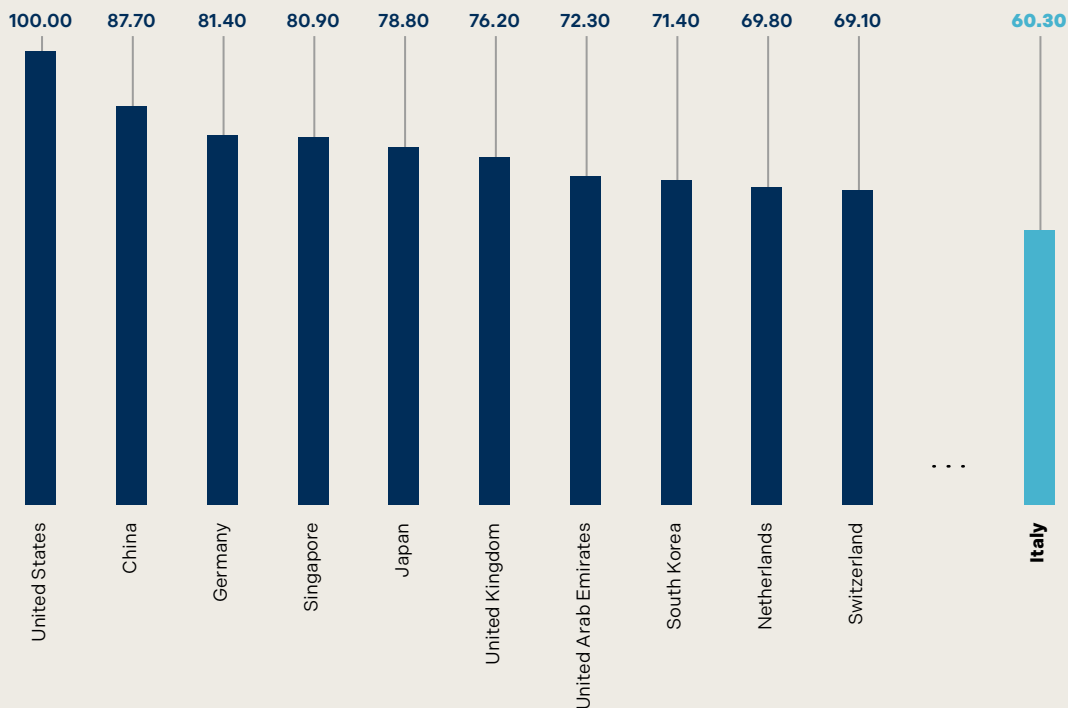
## Singapore's strength in attracting foreign investment

Singapore has become a global magnet for foreign investors thanks to a strategic mix of fiscal incentives, innovation policies, and access to capital. Here's why:

- ▶ **A competitive and predictable tax framework:** Singapore's attractiveness is supported by a corporate tax system that combines a standard Corporate Income Tax rate of 17% with targeted exemptions for companies at different stages of development. Newly incorporated firms that meet eligibility requirements can benefit from the Start-Up Tax Exemption (SUTE) scheme during their first three years, with a 75% exemption on the first S\$100,000 of chargeable income and a 50% exemption on the next S\$100,000 (approximately US\$78,000).
- ▶ **Strategic, sector-specific incentives:** Singapore actively supports industries that contribute to its economic development, offering tailored tax incentives through agencies such as the Economic Development Board (EDB) and Enterprise Singapore. Key sectors benefiting from these incentives include financial services, fund management, global trading, research and development, and e-commerce.
- ▶ **Strong innovation and R&D support:** The Enterprise Innovation Scheme, launched in 2023, offers up to 400% tax deductions on qualifying R&D expenses, intellectual property registration, and training programmes, encouraging both local and foreign businesses to invest in innovation. Singapore also supports AI adoption through enhanced tax deductions for qualifying AI-related expenses, as announced in Budget 2026. In addition, the Startup SG Tech programme provides grant funding from S\$400,000 to S\$800,000 (approximately from US\$77,000 to US\$312,000) for Proof-of-Concept and Proof-of-Value projects aimed at commercialising breakthrough technologies in areas such as AI, robotics, biotech, and sustainability-related innovation.
- ▶ **Generous access to business financing:** Through the Enterprise Financing Scheme, companies can secure loans of up to S\$50 million (approximately US\$39 million) for overseas projects, with the government covering up to 70% of the risk for young or innovative enterprises.

Source: TEHA Group elaboration on various sources, 2026.

Lastly, we look at the Global Attractiveness Index, an index developed by TEHA Group assessing the attractiveness and competitive sustainability of countries through four macro-areas of attractiveness (Openness, Innovation, Endowment, and Efficiency). This composite index is particularly valuable as it offers a multidimensional view of a country's capacity to attract talent, investment, and innovation – key pillars for long-term economic resilience and growth. The United States leads the way with a score of 100.00, followed by China (87.70) and Germany (81.40). Italy ranks 15<sup>th</sup> with a score of 60.30 (Figure 34).



**FIGURE 34. Top 10 countries plus Italy by Global Attractiveness Index (GAI) score, 2025.**

Source: TEHA Group elaboration, 2026.



## The UAE: a global Hub for innovation and investment

The United Arab Emirates are emerging as one of the world's most attractive innovation ecosystems, thanks to a combination of pro-business policies, international openness, investment incentives, and a strong ability to attract highly skilled talent.

In the Global Attractiveness Index 2025 – which measures the attractiveness of global economies across four macro-dimensions: Openness, Innovation, Efficiency, and Endowment – the United Arab Emirates achieved a score of 72.3, approximately 12 points higher than Italy.

At the same time, the country stands out as an international hub for education and global human capital: in 2024, international students accounted for around 65% of total tertiary education enrolments, the highest share worldwide.

A key pillar of the Emirati strategy is its strong ability to attract foreign direct investment (FDI). In 2024, the UAE recorded a historic high of approximately USD 45.6 billion in foreign investment inflows, marking a 48% year-on-year increase. The country also ranked 2<sup>nd</sup> globally in the number of announced greenfield projects, with 1,369 initiatives launched in 2024 alone. These results are part of the broader National Investment Strategy 2031, which aims to triple the cumulative stock of foreign investment to USD 600 billion, with a particular focus on strategic sectors such as advanced manufacturing, clean energy, and the digital economy.

The UAE's attractiveness is also

supported by a regulatory and administrative framework strongly geared toward international competitiveness. The Basher system enables companies to be established in approximately 15 minutes through digitalised procedures, automation, and AI-assisted approvals. This is complemented by a 9% corporate tax rate, simplified licensing procedures, 21 partnership agreements, and more than 120 investment treaties, all of which help reduce entry barriers for international operators.

At the same time, the UAE has developed a targeted strategy to attract highly qualified talent. In 2025, the country ranked among the world leaders in attractiveness for tech talent, supported in part by long-term residency programmes such as the Golden Visa, which grants 5- to 10-year residency permits to outstanding students, researchers, highly skilled professionals, and investors in strategic technology sectors.

In 2025, the Blue Visa was also introduced, focusing on sustainability and eco-tech, with the aim of attracting specialised expertise in green technologies and the sustainable transition.

The UAE's high degree of international openness, administrative efficiency, ability to attract capital, and focus on global talent and strategic technologies help explain its growing position as a global hub for innovation and technological investment.

*Source: TEHA Group elaboration on various sources, 2026.*



## China's Attractiveness Ecosystem

China is strengthening its position as a global innovation hub by expanding foreign direct investment (FDI) incentives. The Chinese Government issued in 2019 the Catalogue for Foreign Investments and updated it regularly until last year. The catalogue outlines the industrial sectors where foreign investments are either encouraged or prioritized. It serves as a fundamental guide for international investors looking to operate in China, by clearly indicating the areas where their investments are most welcomed.

The newly released 2025 Draft Foreign Investment Encouraged Catalogue now includes 1,679 items, marking a 13.9% increase from the 1,474 in 2022. This includes 619 items in the national catalogue (previously 519) and 1,060 in the regional catalogue (previously 955). Compared to the 2022 edition, this reflects: 205 net new entries and 303 revisions. The expansion is the result of extensive consultation with foreign-invested enterprises (FIEs), business associations, industry experts and local governments, ensuring that the Catalogue is closely aligned with the expectations of global investors and China's industrial priorities. China continues to regard manufacturing as the backbone of its economy. The updated Catalogue broadens the range of encouraged manufacturing activities, from foundational technologies to high-value components, reflecting China's push toward innovation-driven growth and more resilient supply chains. A notable

change in the 2025 Catalogue is the strong emphasis placed on modern services, particularly those supporting industrial upgrading and consumption enhancement.

Moreover, foreign investors in China benefit from strong financial incentives, including:

- ▶ Customs duty exemptions for imported self-use equipment (with certain exclusions).
- ▶ Priority access to industrial land, with reduced minimum land transfer prices (down to 70 percent of the standard) and flexible leasing models.
- ▶ Reduced corporate income tax (15 percent) for eligible projects in western China and Hainan.
- ▶ Tax credits for reinvestment when foreign investors reinvest their profits into projects listed in the National Catalogue.

These measures lower operational costs and strengthen investment certainty.

China's strategic expansion of investment sectors and aggressive financial incentives make it an increasingly attractive destination for foreign innovation and R&D. With a fast-growing industrial base, a focus on cutting-edge technology, and continued policy support, China is solidifying its role as a top player in the global innovation ecosystem.

*Source: TEHA Group elaboration on Chinese National Development and Reform Commission, 2026.*

### 2.3.5 EFFECTIVENESS OF INNOVATIVE ECOSYSTEM

The last area of the TEHA-GII aims to capture the innovative effectiveness of ideas and their economic impact. This area encompasses eight output variables: the number of citations per 1,000 researchers, the number of publications per 1,000 researchers, the H-index per 1,000 researchers, the number of patent publications per 1 million inhabitants, the success of patenting activity, the export rate of high-tech goods compared to total manufacturing exports, trade balance on technology products, trade balance on R&D services. Singapore is confirmed as the first country in the world in terms of effectiveness of the innovation ecosystem with a dominating score of 4.85 – slightly lower than 2023 (5.54). It is followed by Estonia with 4.68 points and, in third position, Israel (4.64). In this area of the TEHA-GII, Italy ranks 6<sup>th</sup> worldwide with an overall score of 4.53 (Figure 35).

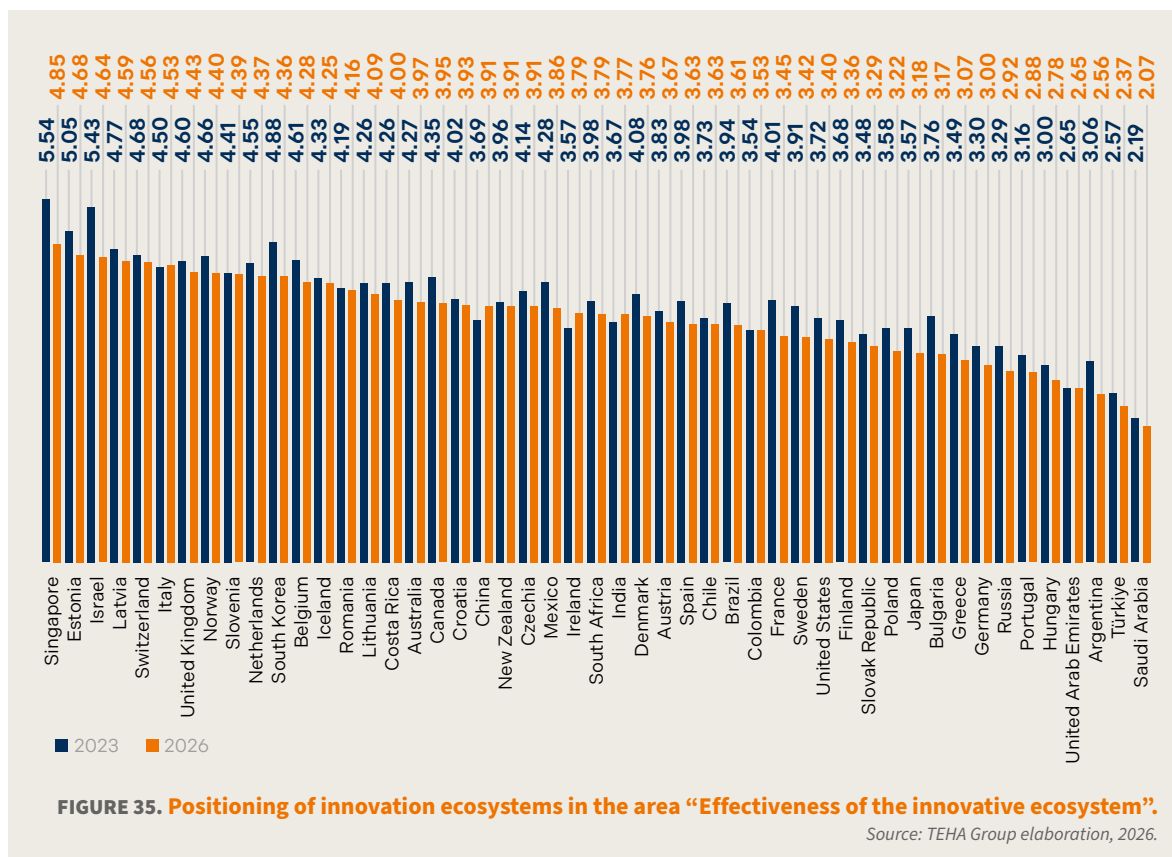
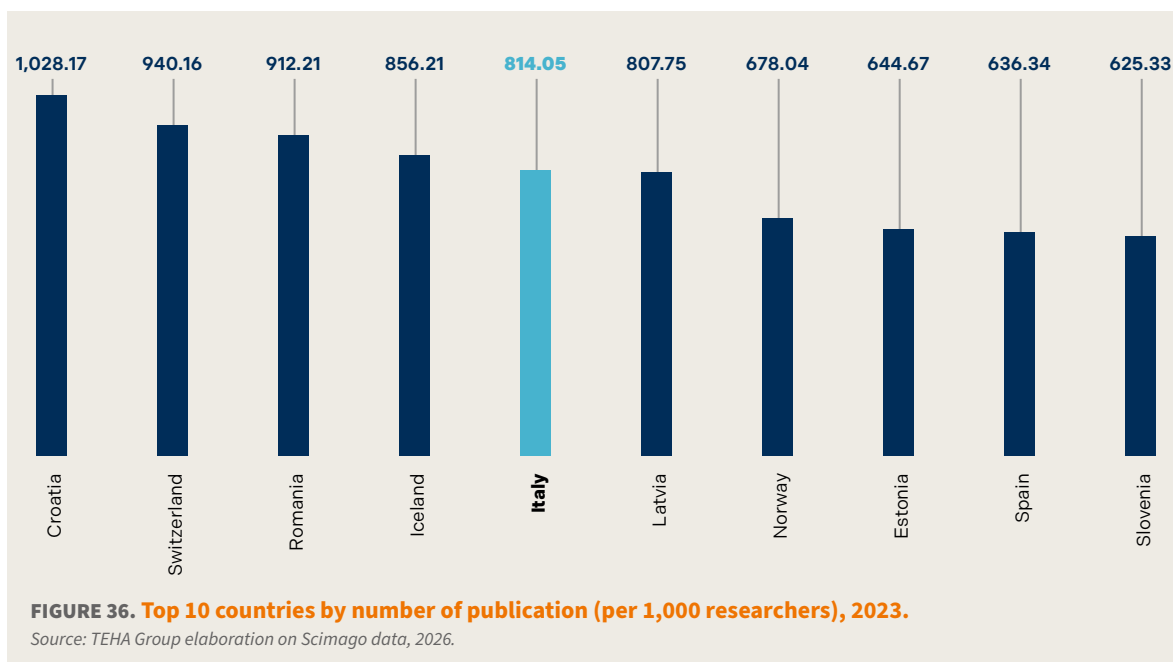


FIGURE 35. Positioning of innovation ecosystems in the area “Effectiveness of the innovative ecosystem”.

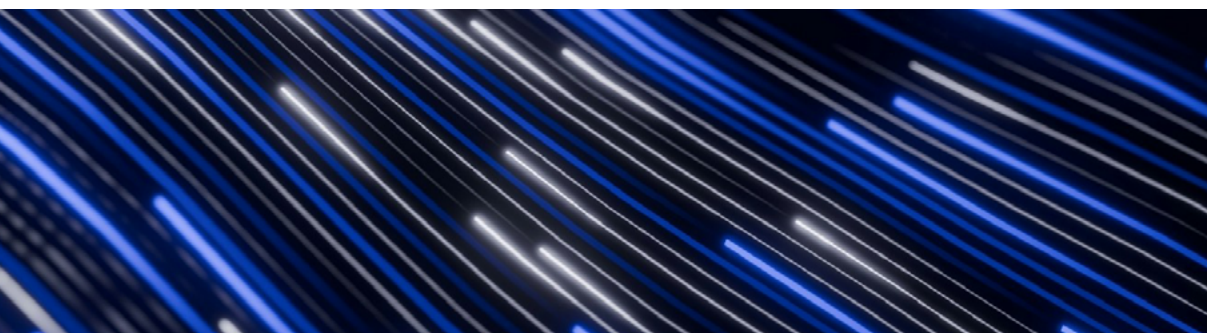
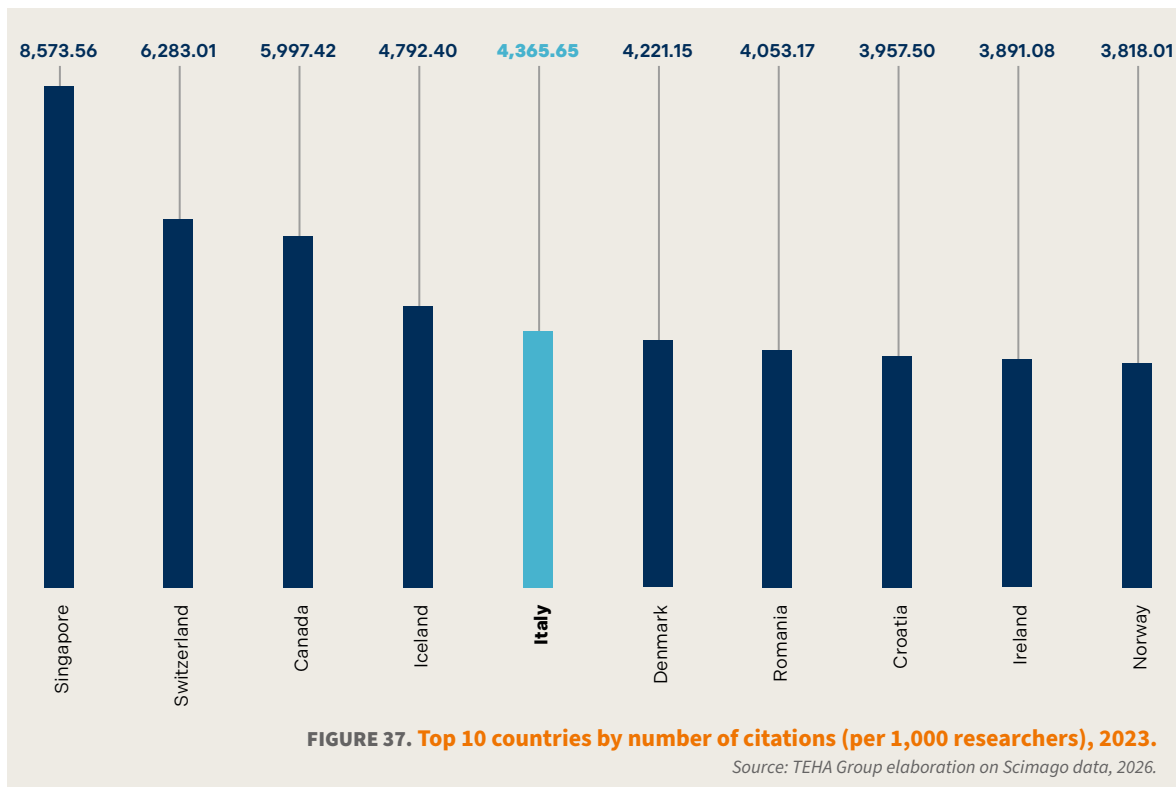
Source: TEHA Group elaboration, 2026.

In the following narrative, the individual sub-indicators that make up the area “Effectiveness of the innovation ecosystem” are described.

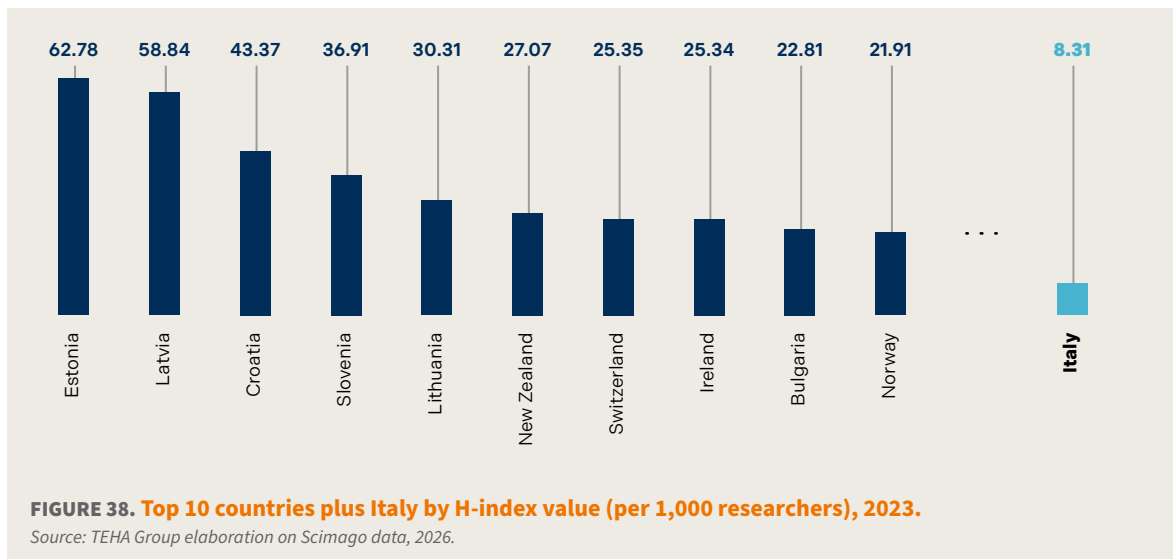
Looking at the number of publications per 1,000 researchers, we find Italy in the top 5. This sub-indicator gives an indication of a country's capacity to produce new basic knowledge, as academic publications tend to be a proxy for the advancement of basic research, i.e. the more frontier research that is generated in the academic sphere. In first place is Croatia with 1,028.17 publications published yearly for every 1,000 researchers, followed by Switzerland with 940.16 publications per 1,000 researchers and Romania in third place (912.21). Italy ranks 5th (814.05) confirming its position as one of the international poles for the generation of new knowledge. This KPI is particularly relevant as it highlights the productivity and international visibility of a country's scientific community – essential factors for building innovation capacity and fostering global collaboration (**Figure 36**).



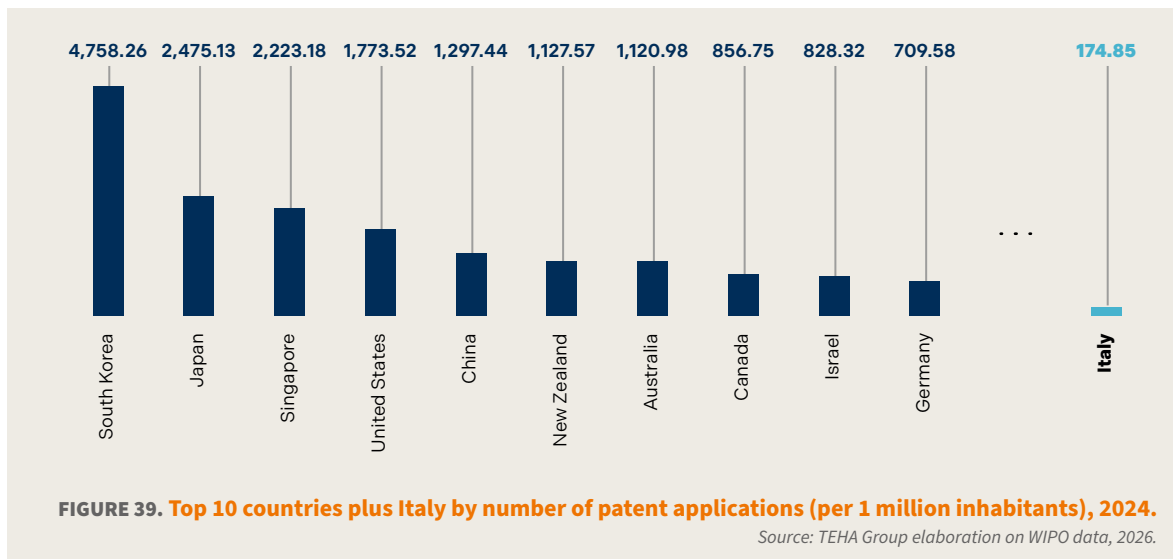
Next, we look at the quality of academic research by considering the number of citations per 1,000 researchers. This indicator is crucial as it reflects the international relevance and impact of a country's scientific output – higher citation rates often signal that research is influential, widely recognized, and contributes meaningfully to global knowledge advancement. Italy ranks fifth, with 4,365.65 citations per 1,000 researchers. Singapore ranks first with 8,573.56 citations per 1,000 researchers, followed by Switzerland (6,283.01) and Canada (5,997.42) (**Figure 37**).

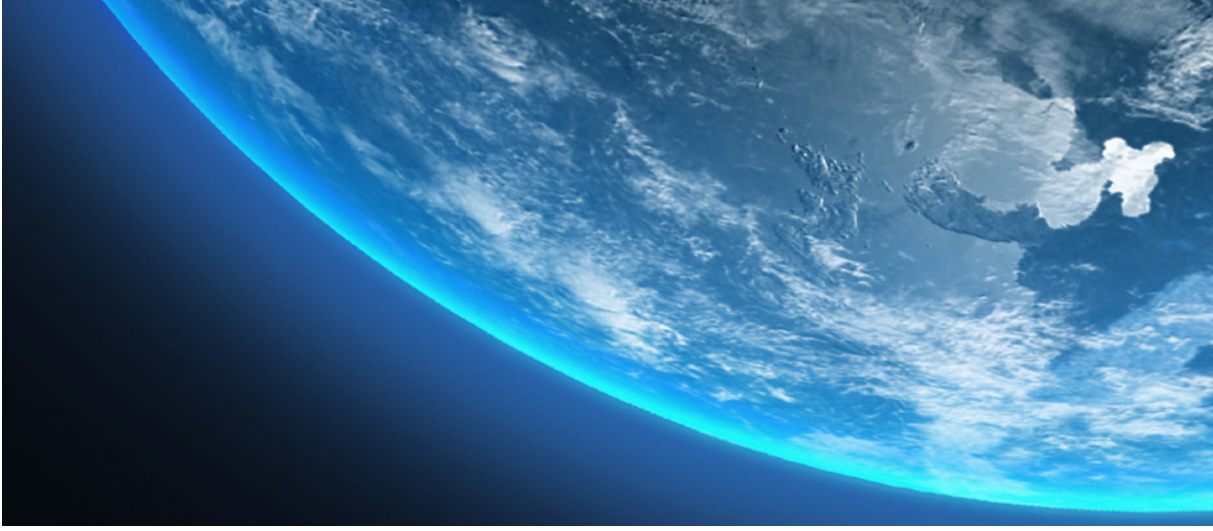


The third sub-indicator is the H-index per 1,000 researchers, which shows us productivity and citation impact of publications. Estonia leads the way with an index of 62.78, followed by Latvia (58.84) and Croatia (43.37). Italy ranks 25<sup>th</sup> with an index of 8.31 (Figure 38). This metric is important because it combines both the quantity and quality of scientific output, offering a balanced view of how consistently researchers contribute to influential and enduring academic work.

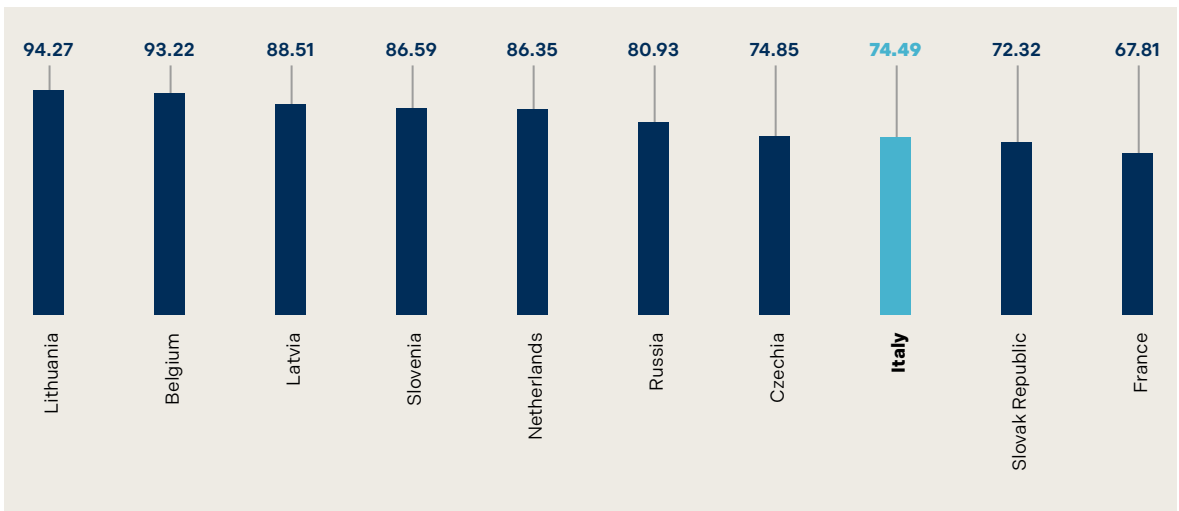


We look at the number of patent applications filed, worldwide, per 1 million inhabitants, considering the working population of the respective country. South Korea ranks first with 4,758.26 patent applications per 1 million inhabitants. It is followed by Japan with 2,475.13 and Singapore with 2,223.18 patent applications per 1 million inhabitants. Italy ranks 21<sup>st</sup> with just 174.85 patent applications filed per 1 million inhabitants (**Figure 39**). This indicator is a key measure of technological innovation, as it reflects a country's ability to transform research and ideas into potentially marketable and protected inventions.





The fifth sub-indicator considers the success rate of patenting activity, measured as the ratio of granted patents to patent applications. This metric is particularly relevant because it captures not only the volume of innovation output, but also its ability to withstand examination and secure legal protection – an indication of the quality and viability of patented inventions. In the latest available year, Lithuania ranked first with 94.27% of success rate of patenting activity. It is followed by Belgium (93.22) and Latvia (88.51), with Italy finishing in 8<sup>th</sup> place (74.49%).

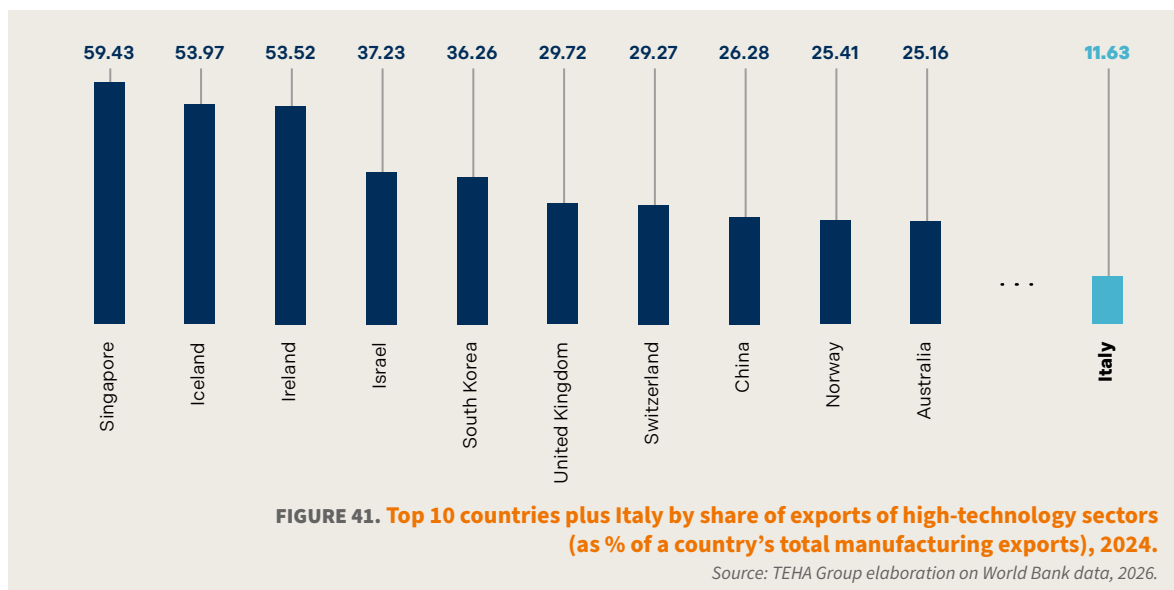


**FIGURE 40. Top 10 countries by success rate of patenting activity, 2024.**

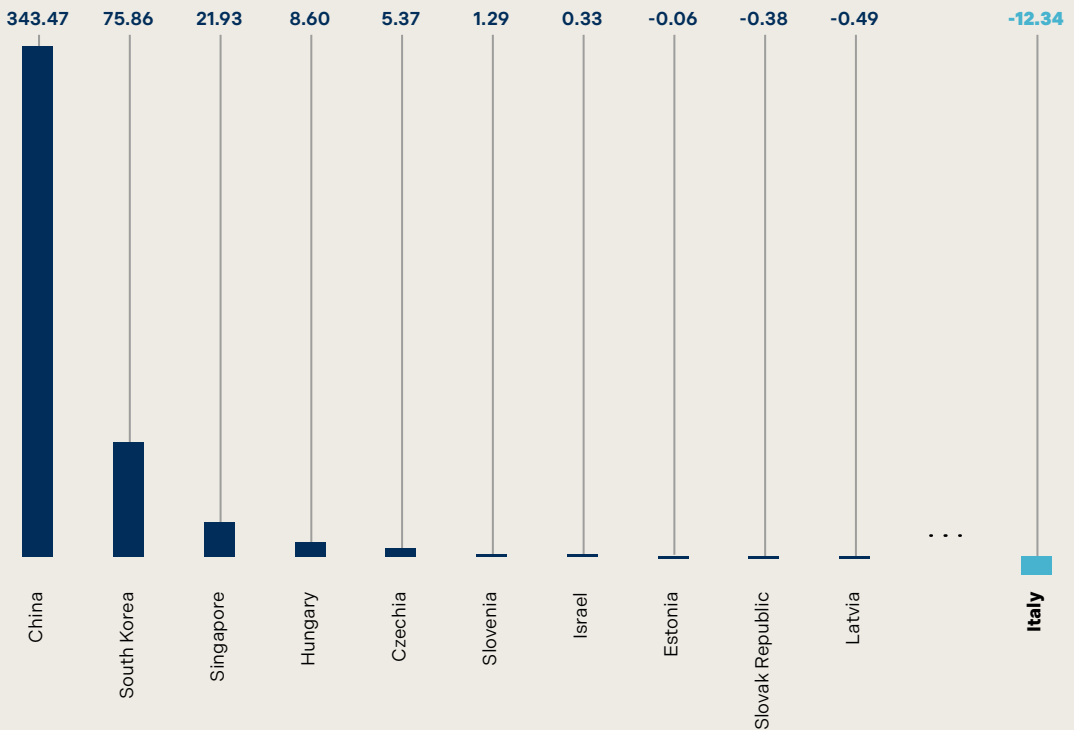
Source: TEHA Group elaboration on WIPO data, 2026.



The sixth sub-indicator considers the share of exports of high-technology sectors – i.e. chemicals and pharmaceuticals, ICT and aerospace – in a country’s total manufacturing exports. This KPI is significant as it reflects the degree to which a country’s industrial base is oriented toward advanced, innovation-intensive products – an essential component of long-term economic competitiveness in global markets. From the analysis carried out, Singapore came out on top with a 59.43% share of high-tech exports in total exports. This is followed by Iceland with 53.97% and Ireland with 53.52%. Finally, Italy is in 35<sup>th</sup> position with 11.63% of exports related to high-tech sectors (**Figure 41**).



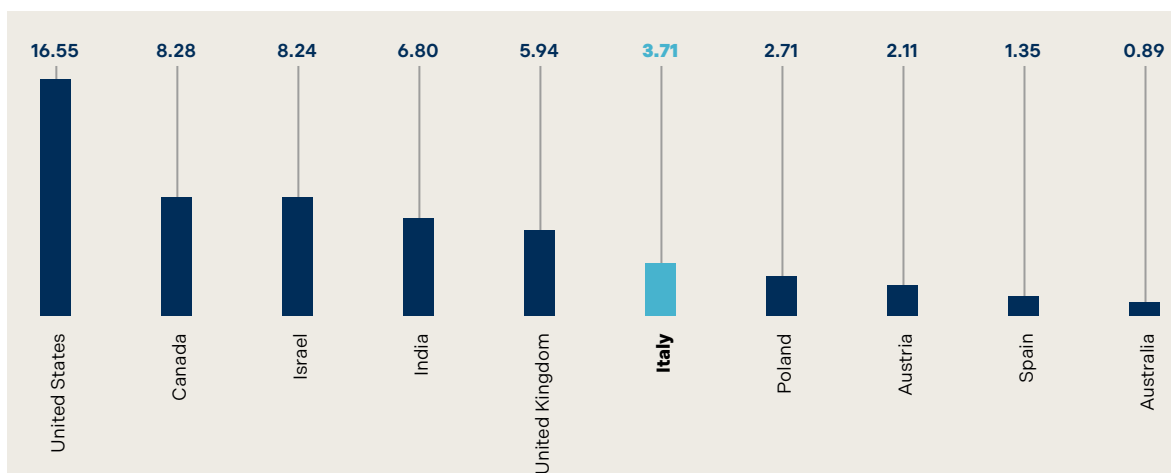
The seventh sub-indicator shows us the trade balance (exports minus imports) of technology-adjacent industries, indicating whether countries already possess technical prowess or rely on importing technologies. This indicator is important as it signals a country's technological self-sufficiency and its position in the global value chain – positive trade balances often point to strong domestic innovation and industrial capabilities. China comes first with a trade balance of \$343.47 billion, followed by South Korea (\$75.86 billion) and Singapore (\$21.93 billion). Italy ranks 33<sup>rd</sup> with a negative balance of -\$12.34 billion, showing that it has a deficit because it imports more technology than it exports (Figure 42).



**FIGURE 42. Top 10 countries plus Italy by trade balance of technology industries value (billions of \$), 2024.**

Source: TEHA Group elaboration on UNCTADSTAT data, 2026.

The final sub-indicator assesses the trade balance (exports minus imports) of research & development services, providing insight into a country's ability to offer high-value R&D expertise to international markets relative to its reliance on foreign innovation capabilities. This KPI is particularly meaningful as it highlights a country's global competitiveness in delivering advanced research services – an area closely linked to intellectual capital, scientific reputation, and innovation leadership. The United States ranks first, with a trade balance of \$16.55 billion, followed by Canada (\$8.28 billion) and Israel (\$8.24 billion). Italy places 6<sup>th</sup> with a good trade balance of \$3.71 billion (Figure 43).



**FIGURE 43. Top 10 countries by trade balance of R&D services value (billions of \$), 2025.**

Source: TEHA Group elaboration on UNCTADSTAT data, 2026.



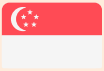
## United States R&D services

United States research and development services exports generated \$50.8 billion in 2024, with an estimated trade surplus of \$16.55 billion in R&D services exports. This position reflects the country's ability to commercialize and export research-intensive services on a large scale.

The United States benefits from a broad and diversified innovation base, including

leading technology companies, research universities, federal laboratories, and high-value-added sectors such as software, AI, biotechnology, semiconductors, and pharmaceuticals. These actors generate globally tradable R&D outputs, including contract research, advanced product development, technology licensing, and other knowledge-intensive business services.

Source: TEHA Group elaboration on USA International Trade Administration, 2026.



## Singapore as a center of research excellence, advanced manufacturing, and technological capability

Singapore stands out as one of the world's most advanced scientific and technological ecosystems, thanks to a model strongly oriented toward research excellence, high-tech manufacturing, and industrial innovation. The country performs particularly well both in the quality of its research output and in its ability to transform scientific knowledge into industrial applications and technological competitiveness.

From an academic perspective, Singapore ranks 4<sup>th</sup> globally in terms of the share of universities included in the world's top 200, with 50% of its universities among the leading international institutions. At the same time, the country ranks 2<sup>nd</sup> worldwide for the share of Top 2% scientists relative to the total research population, with 6.77%, second only to the United Kingdom at 6.95%. These results reflect the high quality of Singapore's university system and scientific research environment, driven in particular by institutions such as the National University of Singapore (NUS), Nanyang Technological University (NTU), and the research centers of the Agency for Science, Technology and Research (A\*STAR).

This strong scientific impact is supported by substantial public investment in research and development. The national Research, Innovation and Enterprise 2025 (RIE2025) plan, covering the 2021–2025 period, was launched with a budget of 25 billion Singapore dollars (approximately USD19.5 billions), the largest amount ever allocated to R&D in the country's history. Approximately 29% of this funding has been dedicated to strengthening core research capabilities within universities and A\*STAR institutes, confirming Singapore's long-term and structural commitment to scientific and technological development.

Singapore also stands out for its ability to transfer research and innovation into the productive system. The country ranks 3<sup>rd</sup> globally in terms of trade balance in high-tech products, highlighting a strong specialization in technologically advanced exports. An important role in this process is played by the initiatives promoted by A\*STAR in the field of advanced manufacturing and Industry 4.0.

Among these initiatives, particular importance is attached to the Model Factory Initiative developed at the Advanced Remanufacturing and Technology Centre (ARTC) and the Singapore Institute of Manufacturing Technology (SIMTech). Since its introduction, the initiative has implemented nearly 2,600 Industry 4.0 technologies across more than 100 local companies, supporting industrial transformation, automation, and productivity enhancement processes.

The A\*STAR Model Factory at SIMTech represents one of the leading experimental platforms dedicated to Industry 4.0 and, increasingly, Industry 5.0, enabling companies to test and develop advanced technologies in a collaborative environment alongside universities, research institutes, and industrial partners. This approach promotes co-innovation processes and accelerates the industrial adoption of advanced solutions in high-technology manufacturing sectors.

The high quality of scientific research, strong public investment in R&D, the presence of world-class universities, and the ability to integrate innovation with advanced manufacturing therefore explain Singapore's leadership position in indicators related to research, technology, and high-tech competitiveness.

*Source: TEHA Group elaboration on various sources, 2026.*



## Estonia's innovation ecosystem effectiveness

Estonia's strong performance in the dimension related to the effectiveness of the innovation ecosystem is supported by the combination of a high scientific impact and a policy framework explicitly oriented toward strengthening research excellence, technology transfer, and innovative entrepreneurship.

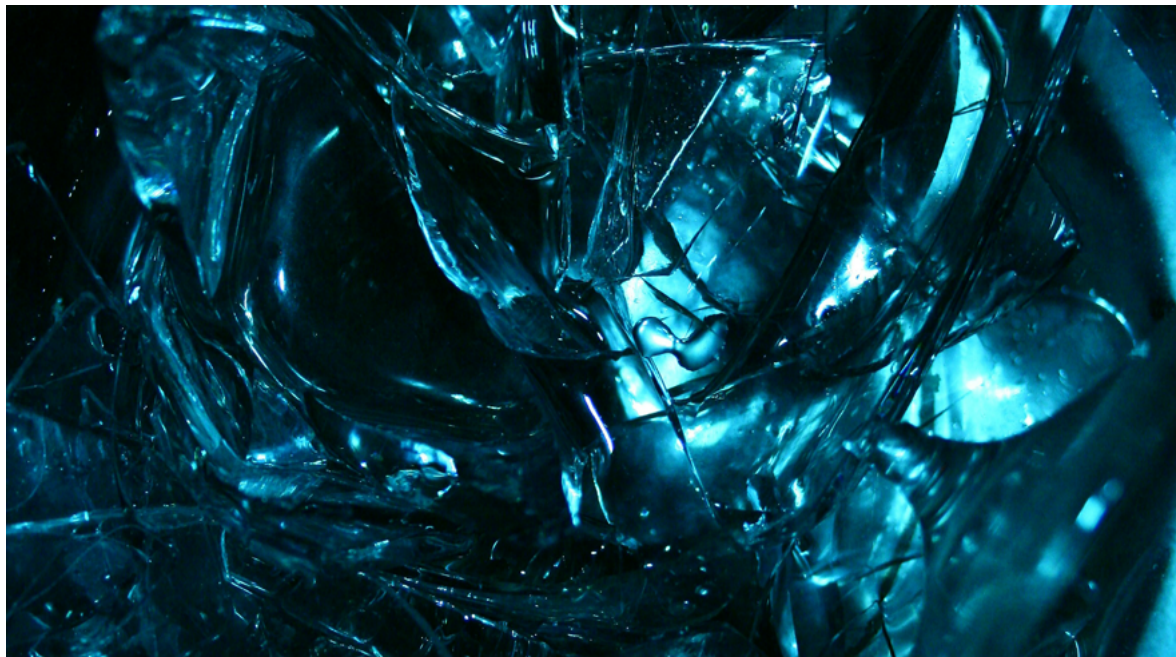
A central pillar of this approach is the Research, Development, Innovation and Entrepreneurship Strategy 2021–2035 (RDIE), which aims to strengthen the core capabilities of the research system, promote knowledge transfer between scientific institutions and businesses, and create a favorable environment for the development of

knowledge-intensive and high value-added companies.

The strategy also seeks to increase the impact and relevance of research for society and the economy, reinforcing the role of researchers and scientific institutions as key partners for the productive system and public policymaking.

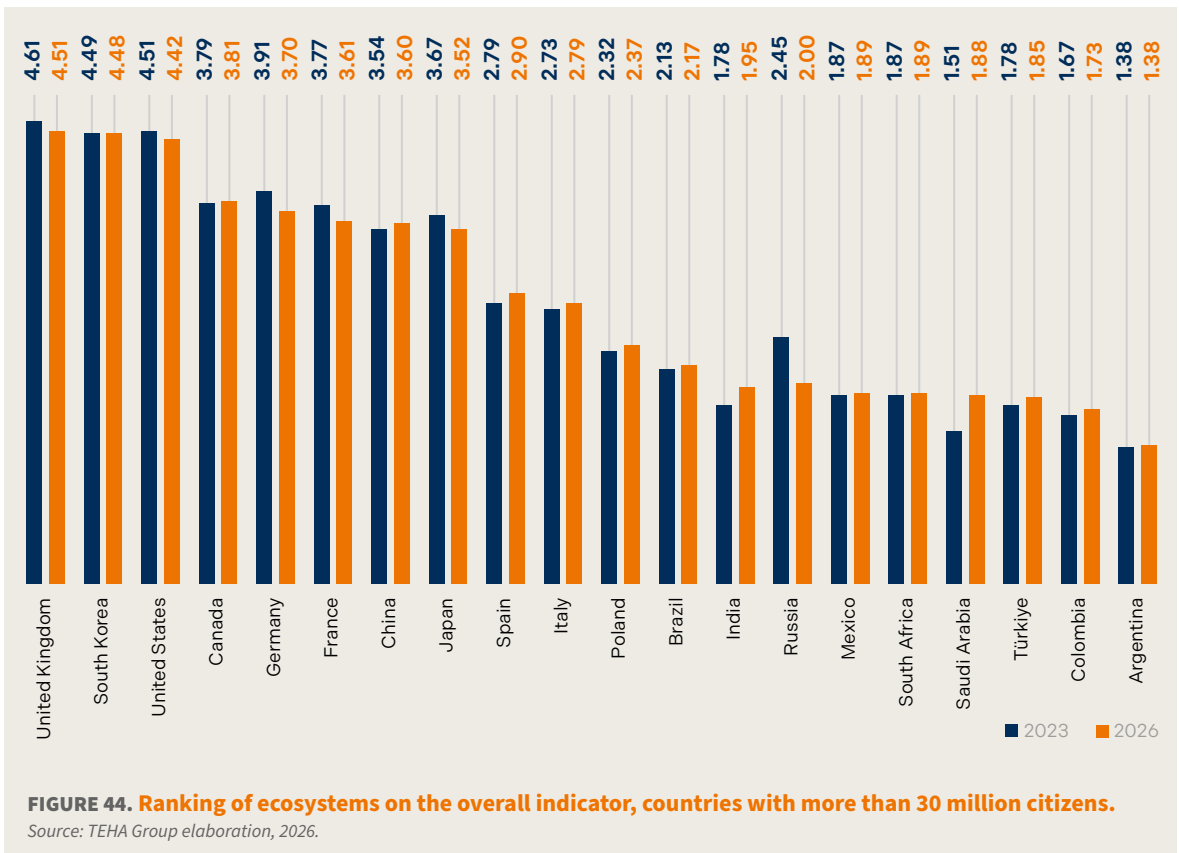
Total funding planned for the RDIE Strategy over the 2021–2035 period amounts to approximately €7,897 million, allocated across the research system (€2,828 million), knowledge transfer (€3,361 million), and the business environment (€1,708 million).

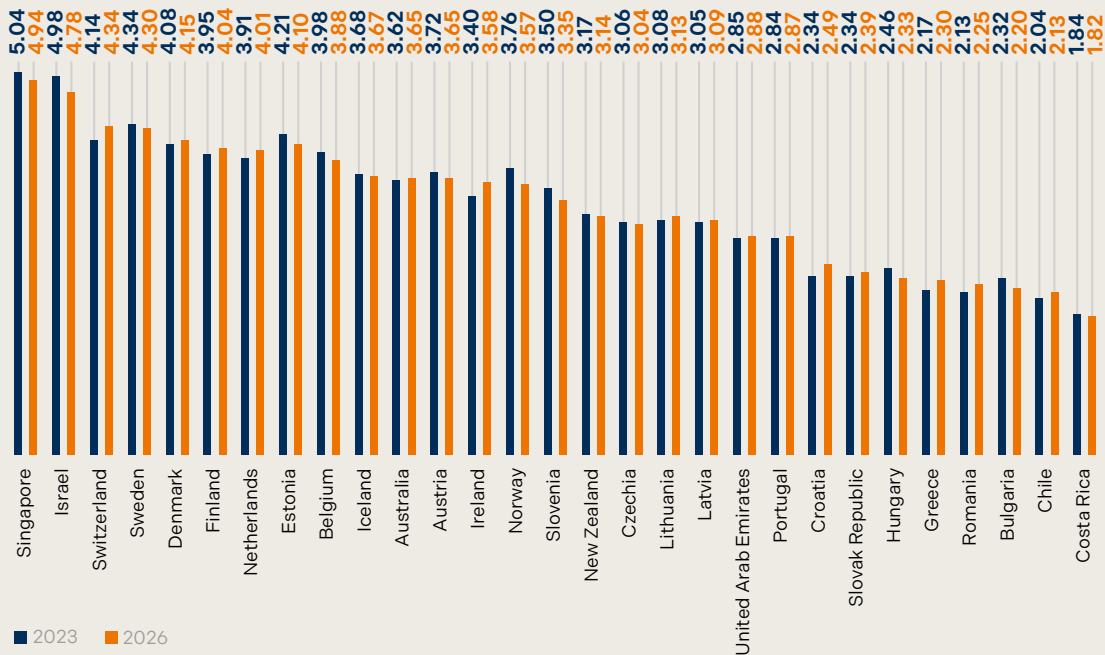
*Source: TEHA elaboration on Estonia Government Offices, 2026.*



## 2.4 Population segmentation of innovation ecosystems

In order to understand innovative ecosystems within context, it is necessary to segment them by size. For this chapter, we divide the indexed countries into two proportions – those with a population larger than 30 million people and those with less than 30 million people (**Figure 44** and **45**).





**FIGURE 45. Ranking of ecosystems on the overall indicator, countries with less than 30 million citizens.**

Source: TEHA Group elaboration, 2026.

The contrast between the indexes of larger and smaller economies is quite evident, given that the average index of large economies is 2.82 while the average index of smaller economies is 3.31 – a very significant difference of 17.3%.

We hypothesize that a variety of factors are responsible for such a significant discrepancy between larger and smaller populations:

1. **Innovation Density** – Innovation often thrives in clusters where researchers, entrepreneurs, and investors are geographically concentrated. This proximity fosters collaboration, knowledge sharing, and the cross-pollination of ideas, leading to a higher density of innovation. Higher innovation density is significantly easier to achieve in geographically smaller countries (and consequently smaller population), given that innovators and innovation enablers will be concentrated within a smaller geographic area.
2. **Resource Dilution** – Larger populations often require more resources to be allocated towards basic needs like education, infrastructure, and healthcare. This can leave less funding available for research and development (R&D), a key driver of innovation.



3. **Bureaucracy** – Complex bureaucracies in large countries can stifle innovation. Implementing new ideas and navigating regulations can be slow and cumbersome, discouraging innovation.
4. **Governance Complexity** – Larger countries often face complex multi-layered governance structures, which can result in fragmented innovation policies and inconsistent implementation across regions. This can hinder the effectiveness of national strategies aimed at boosting innovation, unlike in smaller countries where centralized governance may lead to more cohesive and agile policymaking.



# 3

THE TEHA – REGIONAL  
INNOSYSTEM INDEX 2026  
(TEHA - RII 2026)

Innovation does not emerge uniformly across a country, it concentrates, clusters, and takes root in specific places. A nation's aggregate performance often masks the vastly different realities of its regions, where distinct combinations of research ecosystems, entrepreneurial density, talent pools, and digital infrastructure create unique conditions for innovation to thrive, or to stall. Understanding these regional dynamics is essential: it is at the local level that policies are implemented, investments take shape, and innovation ecosystems are ultimately built. This is precisely why a granular, region-by-region assessment is needed to capture the true state of innovation across Europe.

The InnoTech Community of The European House – Ambrosetti has developed an index to map out the innovation landscape across European regions: the TEHA Regional Innosystem Index 2026 (TEHA - RII 2026). This comprehensive indicator evaluates the 242 European regions, categorized according to the Nomenclature of Territorial Units for Statistics (NUTS) 2 system, offering a detailed overview of regional innovation capabilities and performance.

The TEHA – RII leverages data from the Eurostat database, the European Patent Office and the QS World Ranking. It employs key performance indicators that serve as proxies for significant economic and social factors that influence and determine the innovation performance of a region.



The 2026 edition of the TEHA – RII includes a total of 11 indicators, grouped into 4 categories, following similar methodology already used for the TEHA Global Innosystem Index (TEHA – GII). The four categories are: Economic Development, Human Capital, Talent for Innovation and Digital Infrastructures and Technologies.



**Economic  
Development**



**Human  
Capital**



**Talent  
for Innovation**



**Digital Infrastructures  
and Technologies**

The composition of these categories is detailed as follows:

### Economic Development:

1. **Gross Domestic Expenditure in Research and Development** as a percentage of GDP to measure the proportion of wealth invested in R&D, serving as an indicator for a region's commitment to fostering innovation.
2. **Gross Domestic Product** as an indicator of a region's overall economic wealth and prosperity. It reflects the capacity of a region to generate wealth and the necessary resources for investment in innovation and development.
3. **Number of patents filed with the European Patent Office** to quantify the level of technical and technological advancement in a region. A higher number of patents highlights a vibrant innovation ecosystem, where new ideas are being developed.

### Human Capital:

4. **Participation rate in education and training** as a percentage value of the total population age between 25 to 64 years, serves as a proxy of the lifelong learning, upskilling, and reskilling among adults. A high participation rate reflects the presence of an ongoing learning culture that is crucial to fostering innovation.
5. **Tertiary education attainment** as a percentage value of the population aged between 25 to 64 years, a proxy for the quality of the region's human capital.
6. **Universities as the number of universities ranked in the top 100 in QS World ranking in Europe** indicating the overall quality of tertiary education within a region. A high number of universities suggests a stronger educational ecosystem capable of encouraging innovation.



## Talent for Innovation:

7. **Human resources employed in the Research and Development** sector as a percentage value of the total employed population, as a proxy of a region's dedication to produce new knowledge, products, processes, and methods.
8. **Human Resources in Science and Technology (HRST)** as a percentage value of the total population employed, as an indicator of the proportion of workforce dedicated to the generation, advancement, and diffusion of scientific and technological knowledge. This indicator signals a region's capacity to innovate and support cutting-edge industries.
9. **Employment in High-Tech sectors and knowledge intensive services** as a percentage of the total population employed, as a direct measure of the human resources involved in sectors at the forefront of innovation.

## Digital Infrastructures and Technologies:

10. **Percentage of Households where at least one member has access to internet from home**, serving as an indicator for the population's access to fixed broadband connectivity and a region's digital readiness for innovation.
11. **Number of Data Centers in the Region**, serving as an indicator of a region's digital infrastructure capacity and its ability to support data-intensive services and technologies.

Compared to the previous edition, the 2026 TEHA – RII introduces one methodological change in its set of indicators. The indicator measuring the percentage change in the number of enterprises, previously used as a proxy for the dynamism of a region's business environment, has been discontinued due to the lack of updated data, with the last available observation dating back to 2020. At the same time, a new indicator has been introduced: the number of data centers in the region. This addition reflects the growing strategic relevance of data infrastructure in today's innovation landscape, where cloud computing, artificial intelligence, and large-scale data processing are becoming fundamental drivers of regional competitiveness. The index was built based on a total of 34,606 observations\*.

\* Calculated as 242 regions \* 11 dimension \* 13 years.

### 3.1 The results of the TEHA Regional Innosystem Index 2026 (TEHA – RII 2026)

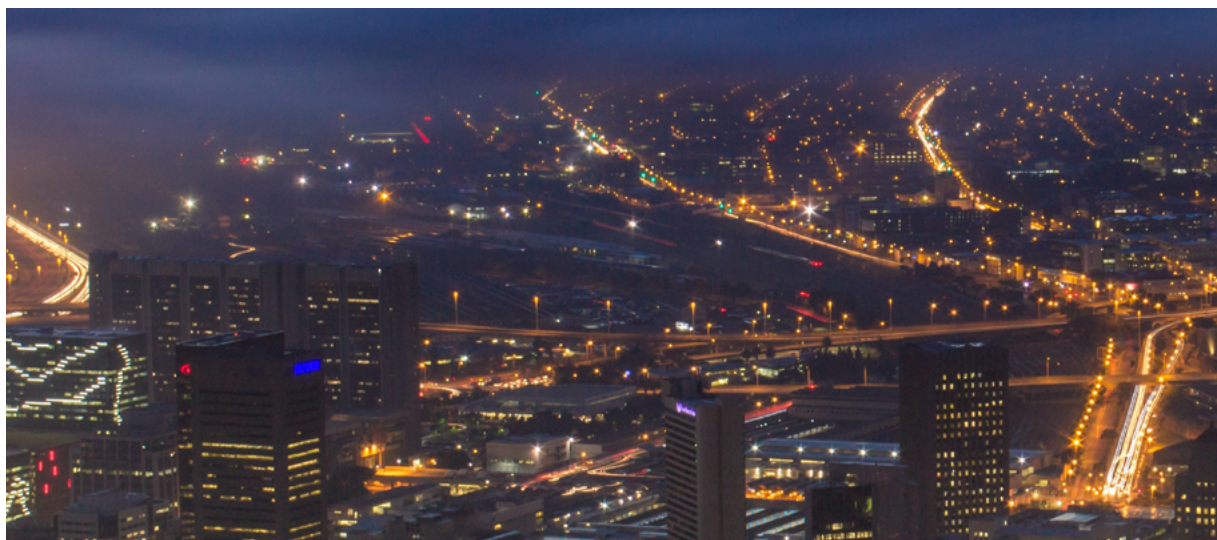
The TEHA – RII 2026 is based on data from 2023 to 2025, or the last 3 available years, consolidating the KPIs previously described, each dedicated to portraying a significant aspect that relates or influences the innovation performance of a region. This approach has allowed to define a comprehensive overview of the innovation performance for each region for 2026, looking at various aspects. Additionally, to facilitate the comparison with past trends and understand changes over the recent years, another indicator, the TEHA – RII 2023, was calculated. This indicator is based on data spanning the three immediately preceding years, from 2020 to 2022. The comparison between the TEHA – RII 2026 and the TEHA – RII 2023 provides insights into the evolution of innovation performance over time for the different regions.

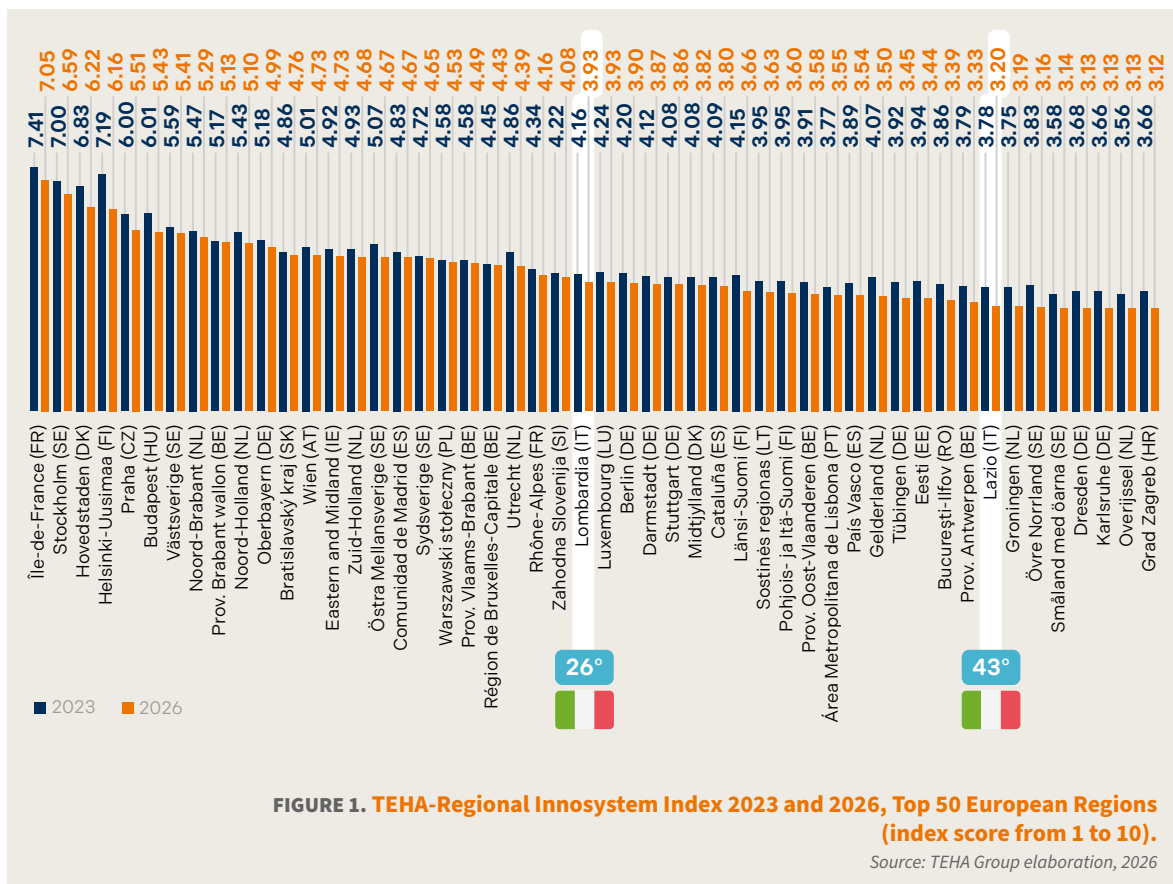
The TEHA Regional Innosystem Index 2026 shows the Île-de-France region leading the rankings with a score of 7.05, followed by Stockholm with a score of 6.59. The subsequent three positions feature Hovedstaden (Denmark), Helsinki-Uusimaa (Finland), and Praha (Czech Republic) with respectively 6.22, 6.16 and 5.51 (**Figure 1**).

By extending the scope of observation and looking within the top fifty regions, two Italian regions have secured their spot. Lombardia ranks 26<sup>th</sup> with a score of 3.93, followed by Lazio at the 43<sup>rd</sup> position with a score of 3.20. Third in Italy and 82<sup>nd</sup> in Europe is the Emilia-Romagna region with a score of 2.73.

On the other hand, among the lowest ranking, always concerning the Italian scenario, the three lowest regions are Calabria 232<sup>nd</sup>, Basilicata 224<sup>th</sup>, Sicilia 221<sup>st</sup>, registering scores that are between 0.85 and 1.27.

While overall, the last region ranked is the French Mayotte, with a score of 0.001.





**FIGURE 1. TEHA-Regional Innosystem Index 2023 and 2026, Top 50 European Regions (index score from 1 to 10).**

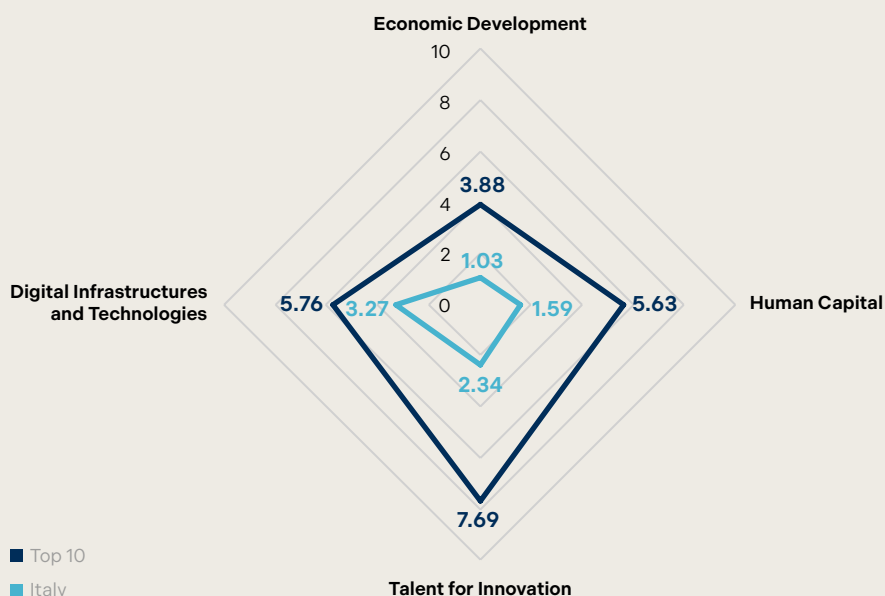
Source: TEHA Group elaboration, 2026



## 3.2 The positioning of the Italian regions in the European context

To gain a better understanding of how Italian regions rank across the different 11 facets that compose the analysis, comparing their performance with the top 10 EU regions serves as an insightful approach. By looking at the four categories assessed, Italian regions are found to lag the top 10 European regions in every category.

The widest gap in absolute terms is registered in Talent for Innovation, where the top 10 European regions score 7.69 compared to an Italian average of 2.34, resulting in a difference of 5.35 points. However, it is in Economic Development that Italian regions record their lowest performance, with an average of just 1.03 against 3.90 for the top 10, a ratio of nearly four to one (Figure 2).

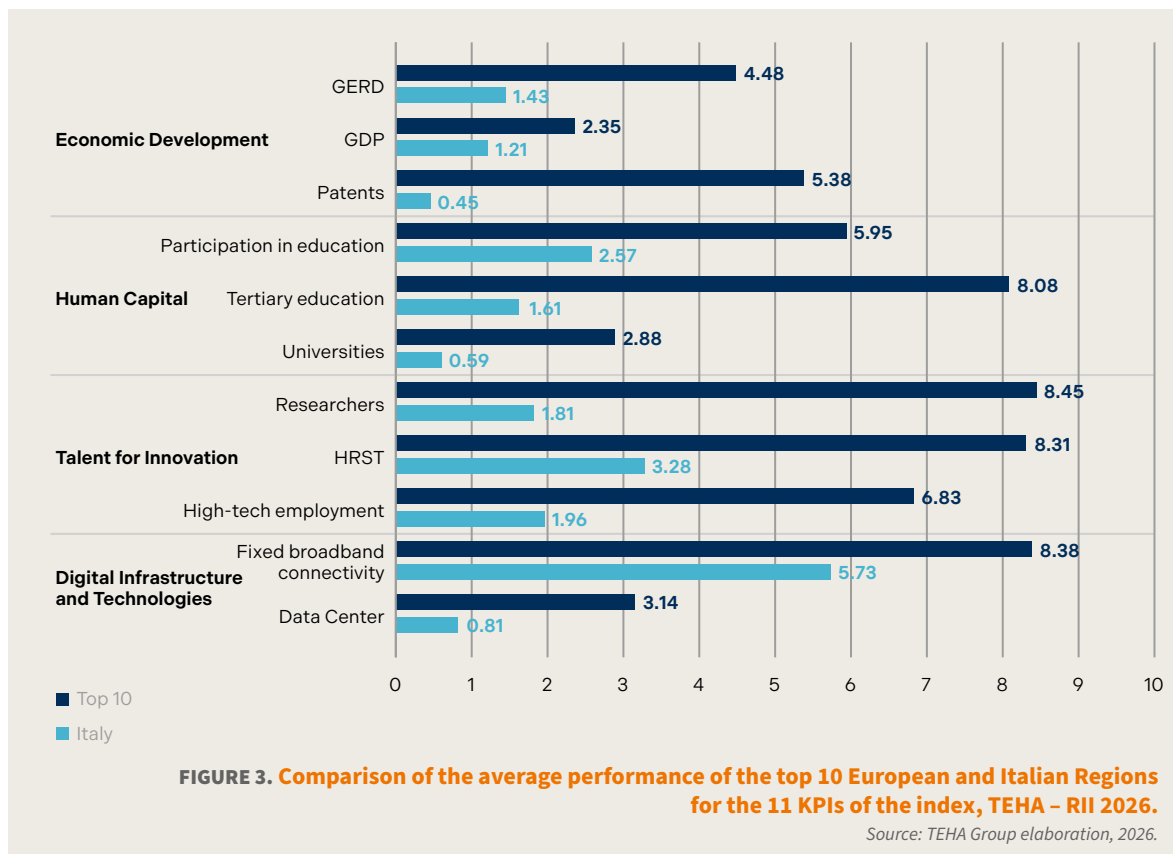


**FIGURE 2. Comparison of the average performance of the top 10 European and Italian Regions for the four categories of analysis, TEHA – RII 2026.**

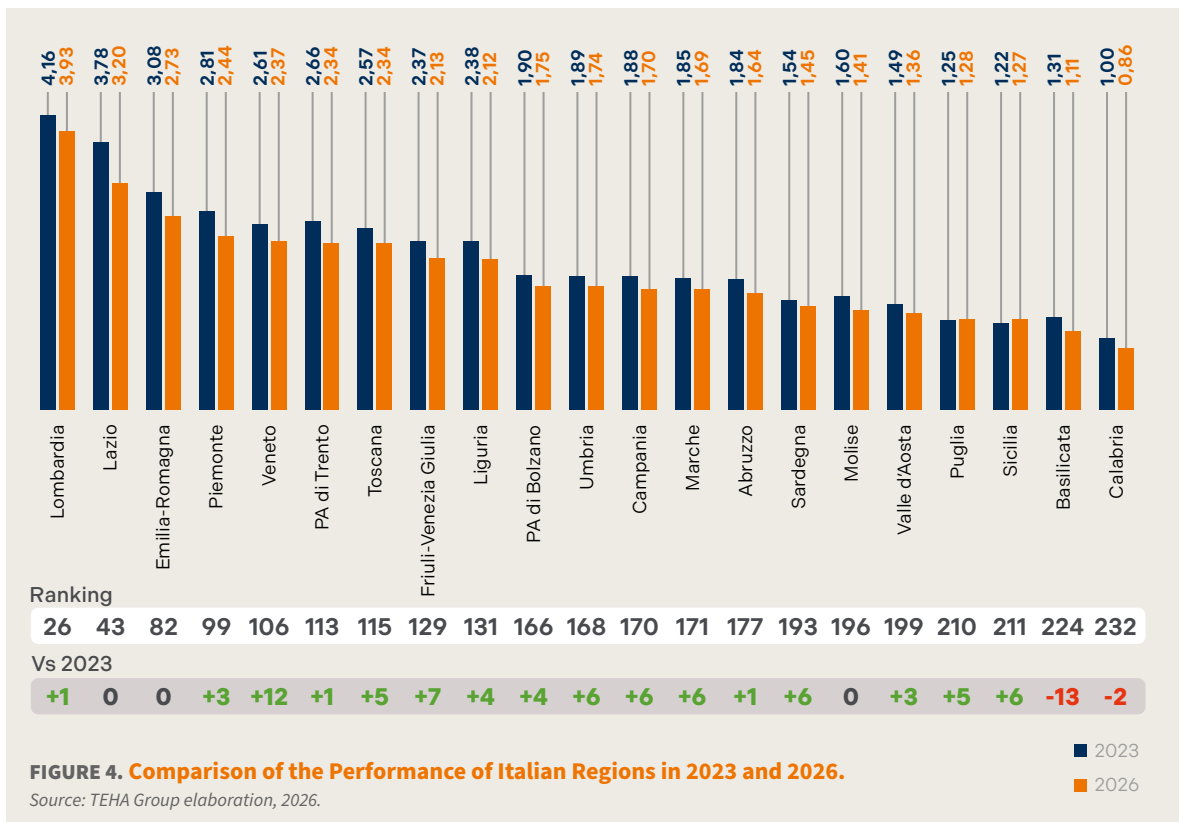
Source: TEHA Group elaboration, 2026.

Expanding the observation to the specific KPIs that compose each category of the index would offer a detailed overview of the strengths and weaknesses in innovation across Italian regions.

The widest gaps are found in Researchers and Tertiary Education, with differences of 6.64 and 6.47 points respectively, highlighting a critical shortfall in the country's human capital base. Conversely, the narrowest gaps are registered in GDP and Universities ranked in the top 100 in Europe, where Italian regions come closest to the European frontrunners (**Figure 3**).



The comparison between the TEHA – RII 2023 and the TEHA – RII 2026 shows a largely positive trend for Italian regions. However, interpreting year-on-year ranking movements requires an important methodological caveat. The TEHA-RII is a composite index encompassing 242 European regions: in an index of this scale and complexity, scores tend to cluster closely together, particularly in the middle segments of the distribution. This structural characteristic means that even marginal improvements or deteriorations in underlying indicators can translate into significant ranking shifts. Lombardia remains the top performer nationally, gaining one position compared to the 2023 edition. Lazio maintains its ranking at 43<sup>rd</sup> place, while Emilia-Romagna also holds steady at 82<sup>nd</sup> (Figure 4). Beyond these cases, the overall picture is encouraging, with only Basilicata and Calabria losing ground in the European rankings.



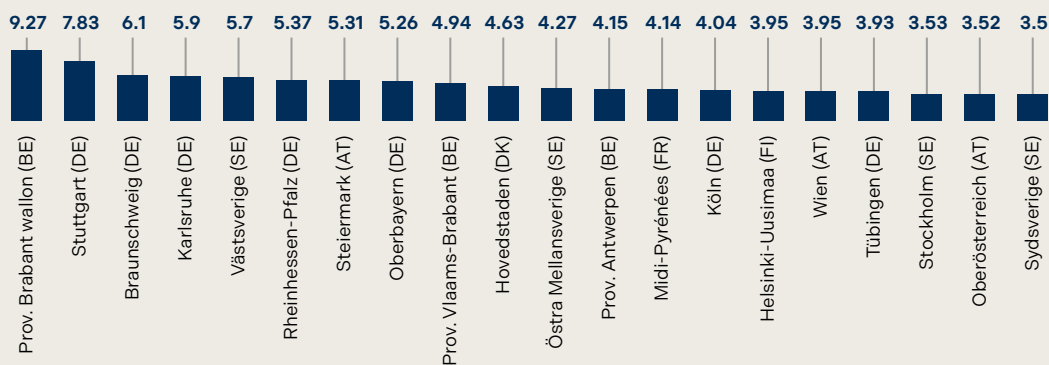
**FIGURE 4. Comparison of the Performance of Italian Regions in 2023 and 2026.**

Source: TEHA Group elaboration, 2026.

The most notable aspect of the overall performance is the marked disparity between the regions in northern Italy and those in the south. Most of the southern regions rank among the bottom 50 in Europe, highlighting a significant performance gap.

### 3.2.1 ECONOMIC DEVELOPMENT

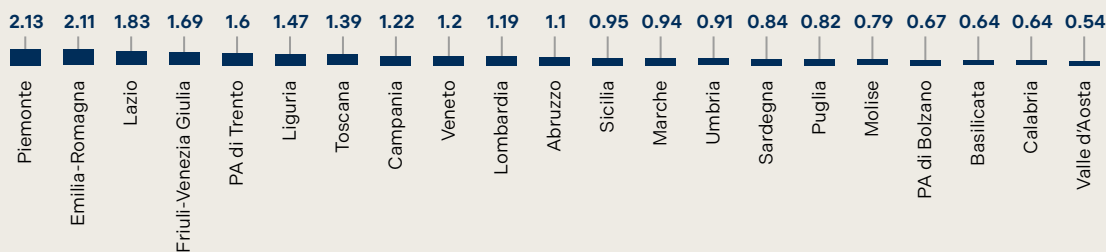
The “Economic Development” category aggregates indicators that reflect a region’s economic resources, the vibrancy of its business environment, and its capacity for generating new knowledge through the publication of new patents. Specifically, Brabant Wallon (Belgium) leads with an expenditure of 9.3% of the GDP, followed by Stuttgart (Germany) with 7.8% and Braunschweig with 6.1% (Figure 5). If we broaden the scope to the top 50, no Italian region appears in the ranking for this indicator. Notably, the sphere of research and development (R&D) expenditure, the leading positions are held by regions from Germany.



**FIGURE 5. Top 20 European regions by Gross Expenditure in Research and Development (as % of GDP), 2023.**

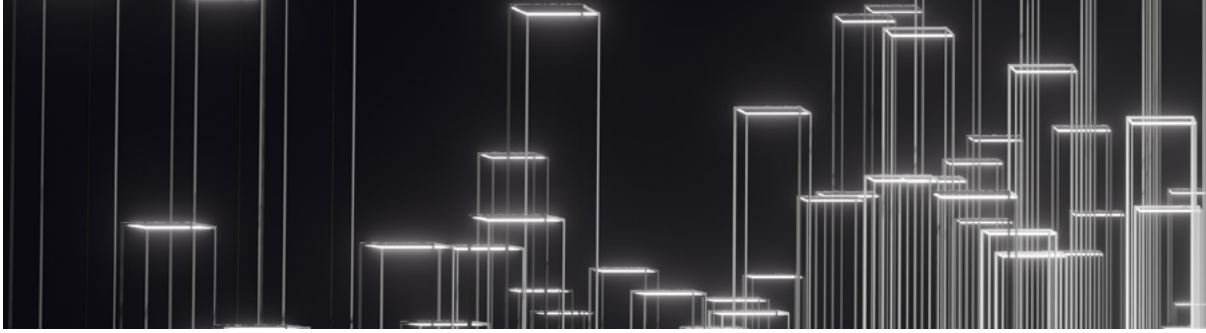
Source: TEHA Group elaboration on Eurostat data, 2026.

Within the Italian context, Piemonte ranks highest for R&D expenditure, yet it stands at the 59<sup>th</sup> position (2.13%), with Emilia-Romagna and Lazio trailing at the 61<sup>st</sup> (2.11%) and 73<sup>rd</sup> (1.83%) positions, respectively (Figure 6).

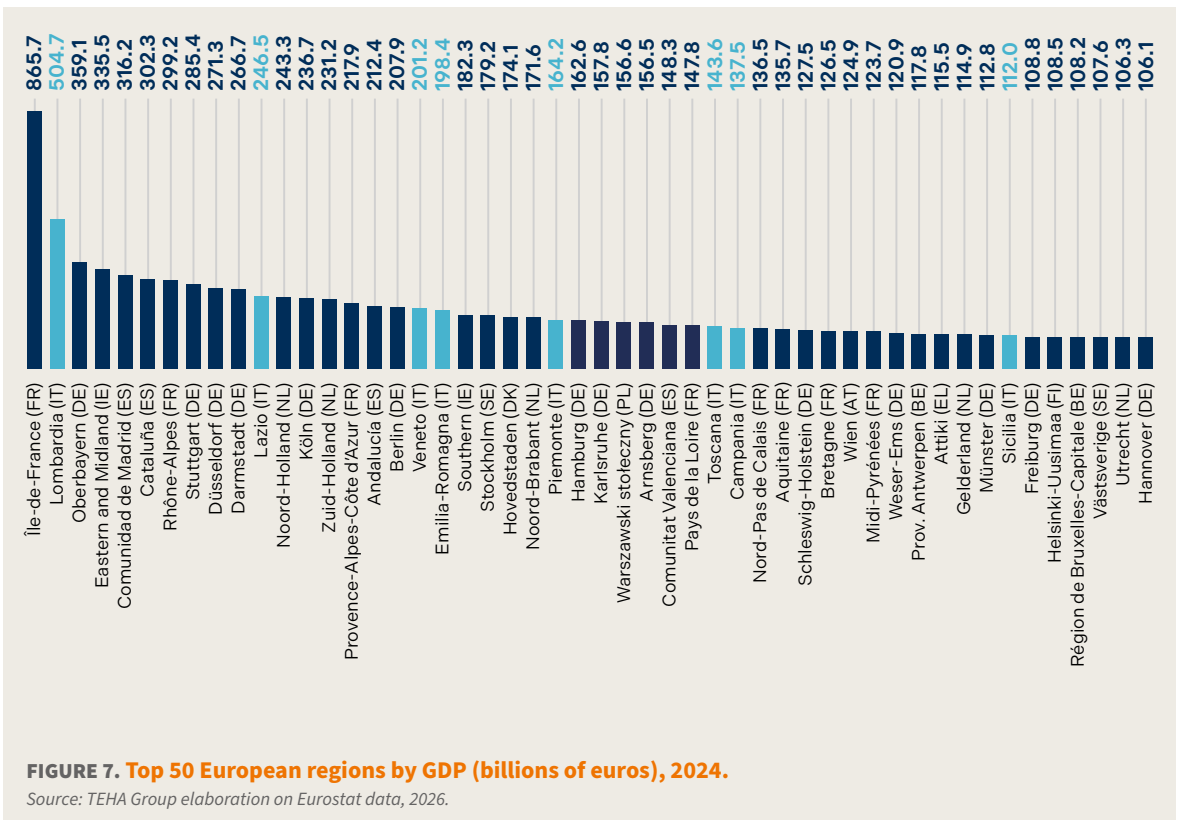


**FIGURE 6. Gross Expenditure in Research and Development of the Italian regions (as % of GDP), 2023.**

Source: TEHA Group elaboration on Eurostat data, 2026.

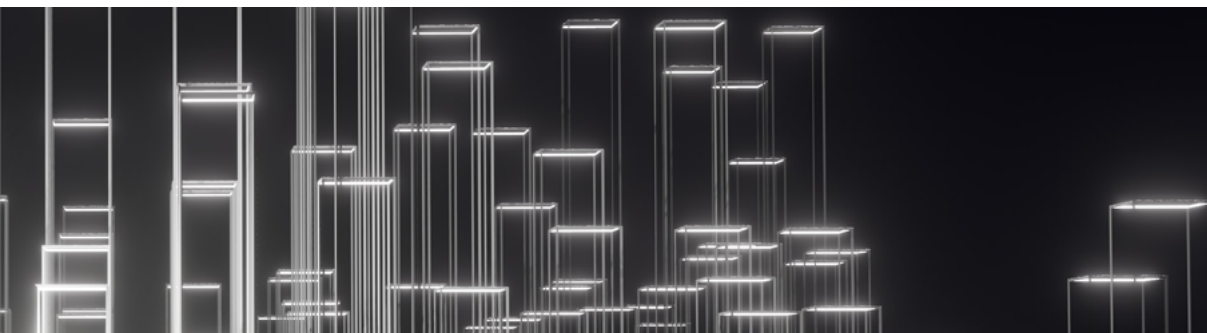


Analysing Gross Domestic Product reveals that Italy has 8 regions ranking among the top 50 in Europe. Notably, Lombardia stands out, securing the 2<sup>nd</sup> position, with a GDP of €504.7 billion. It is only surpassed by Île-de-France, which leads with a GDP of €865.7 billion, while it precedes Oberbayern in Germany, which ranks 3<sup>rd</sup> with a GDP of €359.1 billion (**Figure 7**).

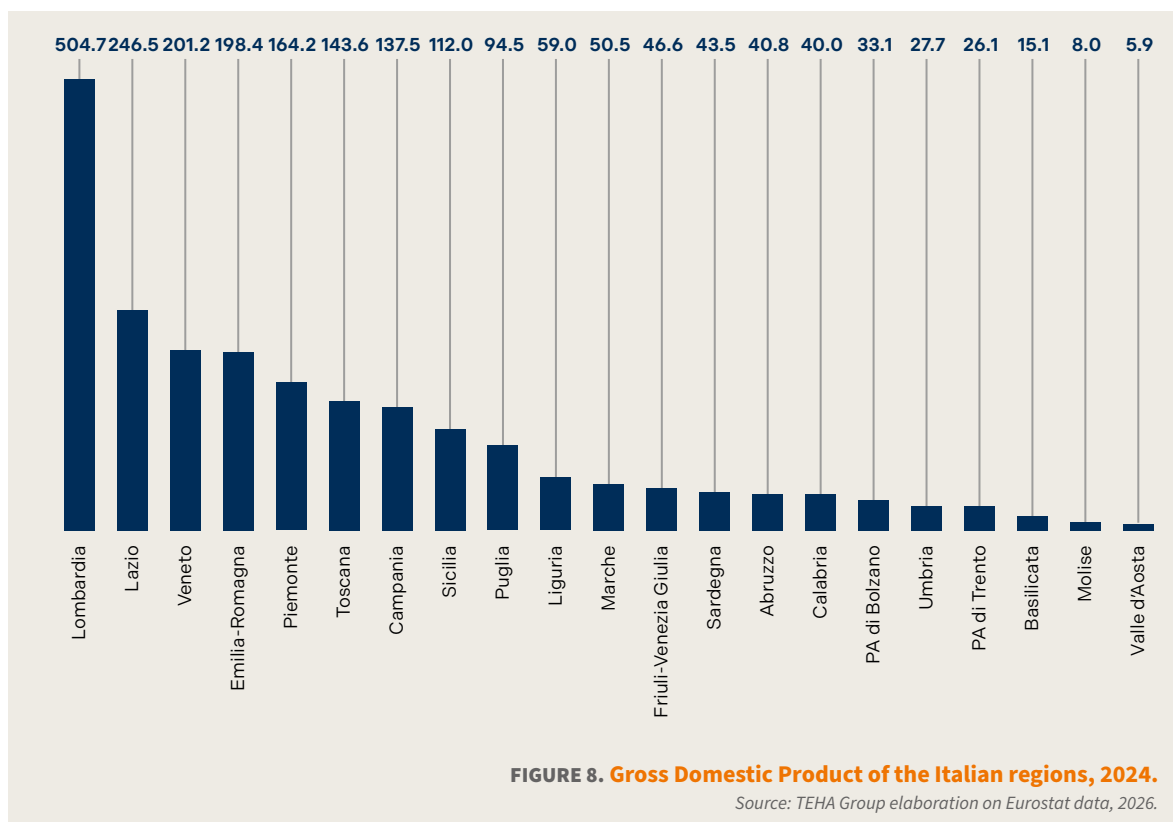


**FIGURE 7. Top 50 European regions by GDP (billions of euros), 2024.**

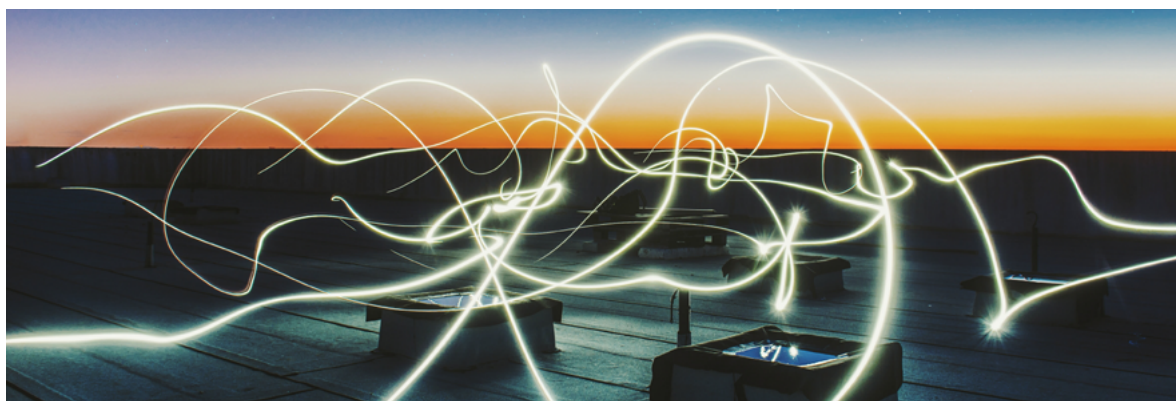
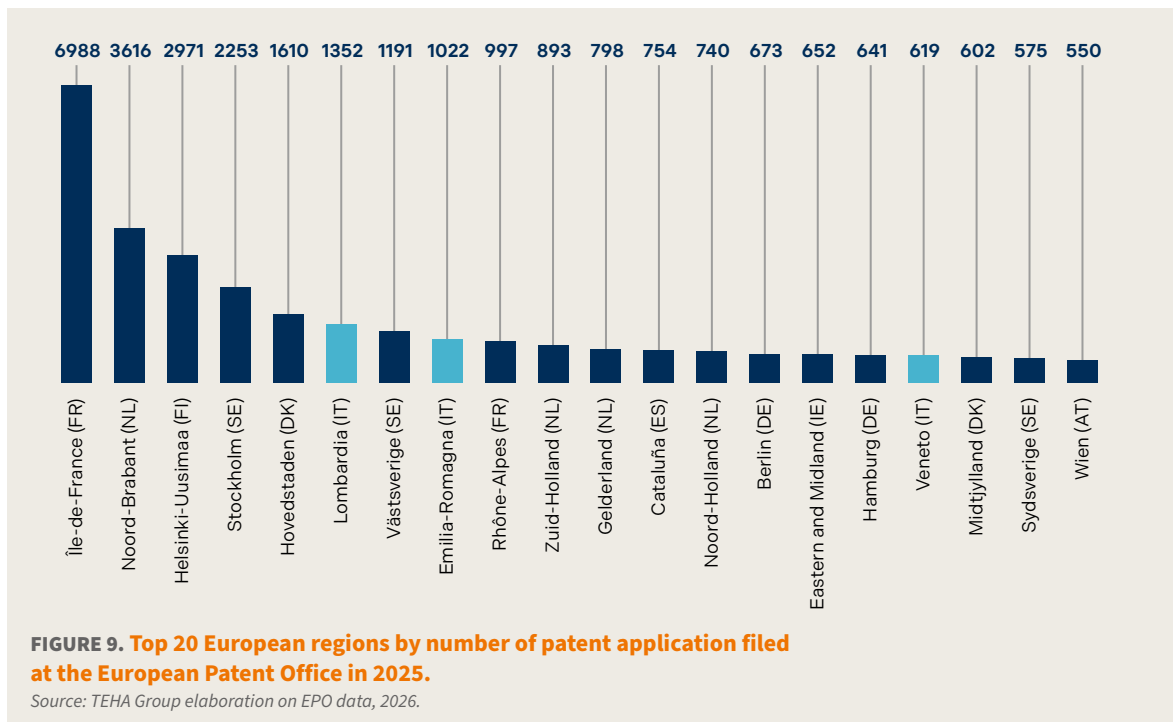
Source: TEHA Group elaboration on Eurostat data, 2026.



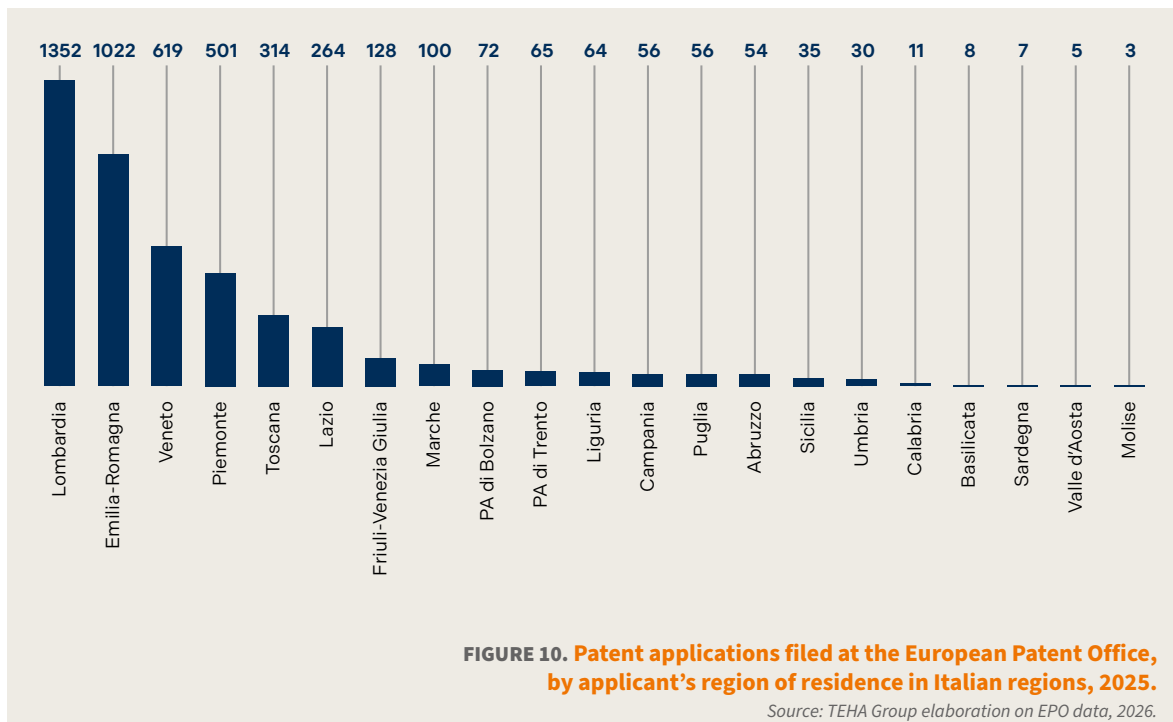
Other Italian regions also demonstrate significant economic weight: Lazio (€246.5 billion) ranks 11<sup>th</sup> in Europe, followed by Veneto (€201.2 billion) in 18<sup>th</sup> position, Emilia-Romagna, Piemonte, Toscana, Campania, and Sicilia. Conversely, southern and insular regions present more modest economic performances. Regions such as Puglia, Calabria, and Basilicata show lower GDP levels, with Molise (€8.0 billion) and Valle d'Aosta (€5.9 billion) at the bottom of the national ranking (**Figure 8**).



In the realm of patents published, the top three regions are Île-de-France, with 6,988 patents published in 2025, Noord-Brabant (3,616) and Helsinki-Uusimaa (2,971). Lombardia stands out by ranking 6<sup>th</sup> at European level with 1,352 patents, though this figure amounts to less than a fifth of those published in Île-de-France. The gap widens further for the other Italian regions: with the exception of Emilia-Romagna, which ranks 8<sup>th</sup> with 1,022 patents, their outputs fall well below the 1,000 mark (**Figure 9**).



Nevertheless, Italy demonstrates a solid and widespread innovative capacity across its territory: six Italian regions rank within the European top 50 for patents published: Lombardia (6<sup>th</sup>), Emilia-Romagna (8<sup>th</sup>), Veneto (17<sup>th</sup>), Piemonte (21<sup>st</sup>), Toscana (36<sup>th</sup>) and Lazio (40<sup>th</sup>) (**Figure 10**). This broad regional presence underscores that, while no single Italian region can yet rival the concentration of patent activity seen in Île-de-France, Italy's innovative strength lies in its polycentric model, with multiple regions contributing significantly to the country's overall output.



Overall, the Economic Development analysis reveals a nuanced picture for Italy. On the one hand, the country's regions remain structurally distant from the top European performers in R&D investment, with no Italian region featuring among the top 50 for Gross Expenditure in Research and Development.



## Emilia-Romagna: Italy's Leader in Patent Intensity

While Lombardia leads Italy in absolute patent volumes, Emilia-Romagna stands out as the country's most innovative region when measured by patent intensity. In 2025, the region filed 1,022 patent applications with the European Patent Office, representing 21.4% of the national total and marking a 10.8% year-on-year increase compared to 2024 (922 applications), reaching 229 applications per million inhabitants. This places Emilia-Romagna 26th in Europe by patent intensity, confirming its position among the continent's most research-driven regional economies.

The region's patent activity is highly concentrated in sectors where its industrial base holds a longstanding competitive advantage: packaging, automotive, and pharmaceuticals. This specialisation is reflected in the profile of Italy's most active patent filers, seven of whom are headquartered in Emilia-Romagna. Coesia, a global leader in automation and packaging

solutions, leads the national ranking with 179 applications, followed by Ferrari with 151, whose research focus on aerodynamics and advanced propulsion systems makes Maranello one of Italy's most productive innovation hubs. Chiesi Farmaceutici, with over 5,500 patents in its global portfolio and R&D investments exceeding €885 million in 2025, further exemplifies the depth of the region's research ecosystem.

Underpinning this performance is a tightly integrated industrial ecosystem, one in which large firms, SME supply chains, and knowledge institutions reinforce one another. In a year when global patent filings reached a historic high of over 202,000 applications, Emilia-Romagna's per-capita leadership offers a compelling illustration of how regional innovation strength is built not only on scale, but on the density and quality of knowledge production embedded in its productive fabric.

*Source: TEHA Group elaboration, 2026.*

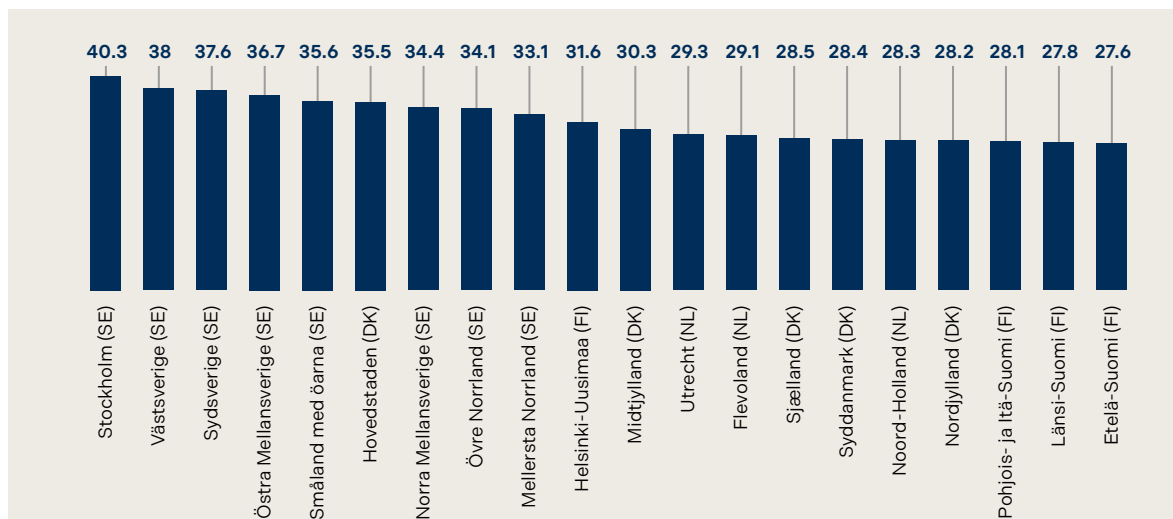
### 3.2.2 HUMAN CAPITAL

Turning to the second category, Human Capital, the analysis assesses a region's ability to cultivate and sustain a highly skilled workforce, a precondition for any innovation ecosystem to thrive. By combining tertiary education attainment, participation in lifelong learning programmes, and the presence of top universities, this category captures not only the current stock of knowledge and competences available in a region, but also its capacity to continuously renew and upgrade them over time.

Specifically looking at the three KPIs:

For the percentage of people aged 25-64 participating in education and training programmes, Sweden stands out remarkably, with all its regions placed within the top 10. The leading regions are Stockholm (40.3%), Västsverige (38.0%) and Sydsverige

(37.6%), showcasing the country's effective commitment to lifelong learning (**Figure 11**). Beyond Sweden, Hovedstaden (Denmark) also distinguishes itself, ranking 6<sup>th</sup> with a participation rate of 35.5%.



**FIGURE 11. Top 20 European regions by number of Workers who participated in training courses, (as % of population aged 25-64), 2024.**

Source: TEHA Group elaboration on Eurostat data, 2026.

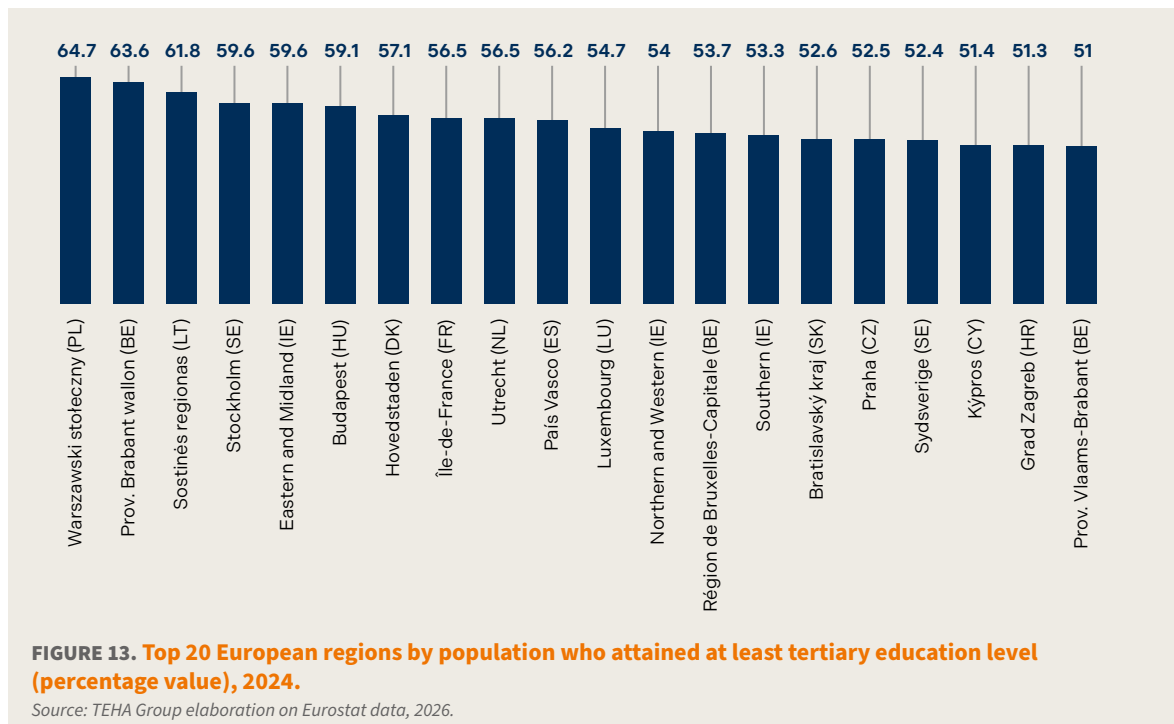
None of the Italian regions feature in the top 50. The highest-ranking is the Provincia Autonoma di Trento, placed 88<sup>th</sup> with a participation rate of 14.5%, a value that has declined from the 17.1% recorded in 2023 that positioned the region at the 43<sup>rd</sup> place at the European level. It is followed by Emilia-Romagna in 98<sup>th</sup> position (13.6%) and Friuli-Venezia Giulia in 107<sup>th</sup> (12.8%) (**Figure 12**).



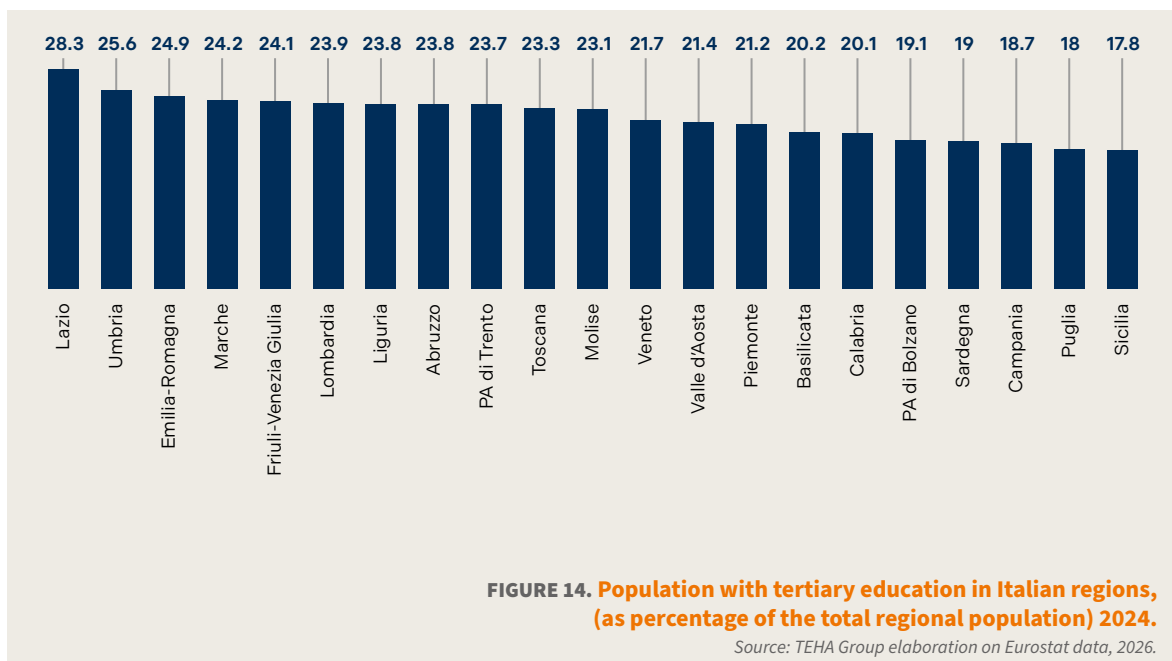
**FIGURE 12. Number of workers who participated in training courses in Italian regions, (as % of population aged 25-64) 2024.**

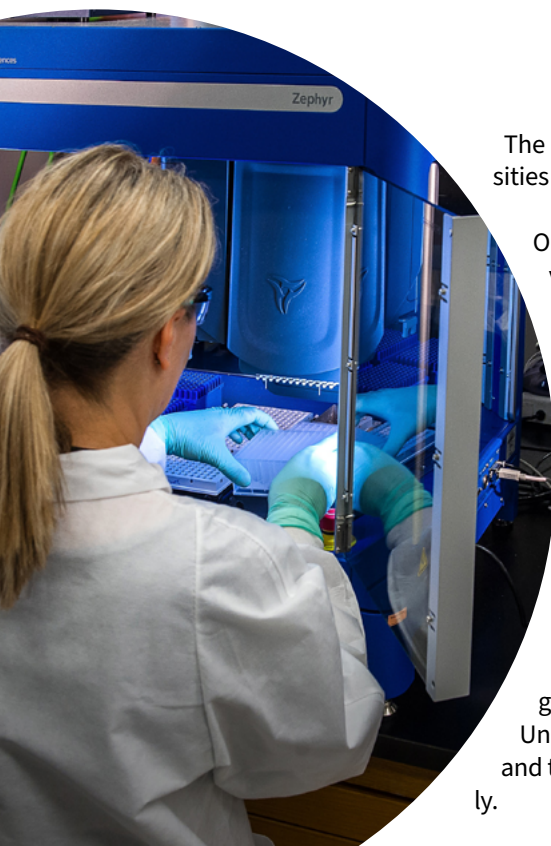
Source: TEHA Group elaboration on Eurostat data, 2026.

Contrastingly the leading position for the regions with the highest percentage of individuals holding a tertiary education degree presents a more diverse picture. Leading the ranks are Warszawski Stołeczny in Poland (64.7%), Prov. Brabant wallon in Belgium (63.6%) and Sostinės regionas in Lithuania (61.8%) (**Figure 13**).



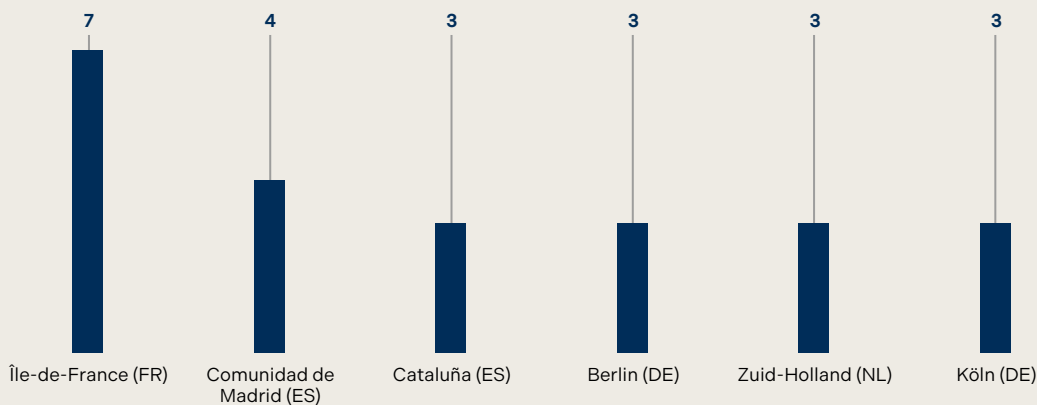
On the other hand, Italian regions find themselves far behind in this ranking, only beginning to appear beyond the 150<sup>th</sup> position. The leading Italian region is Lazio, ranked 175<sup>th</sup> with a rate of 28.3%, followed by Umbria at 190<sup>th</sup> (25.6%) and Emilia-Romagna at 191<sup>st</sup> (24.9%) (**Figure 14**). This ranking reveals a substantial challenge for Italy in raising the level of higher education attainment among its population compared to other European regions.





The third sub-indicator considers the number of universities ranked in the top 100 of the QS European ranking.

The region hosting the highest-ranked university is Oberbayern (Germany), home to the Technical University of Munich, which tops the QS ranking. In terms of concentration, Île-de-France leads with 7 universities in the top 100 (**Figure 15**), including PSL University and Institut Polytechnique de Paris, which rank 2<sup>nd</sup> and 3<sup>rd</sup> respectively. Italy counts 7 universities in this group, spread across six regions. Lombardia and Lazio each host two: Politecnico di Milano (16<sup>th</sup>) and the University of Milan (70<sup>th</sup>) in Lombardia; Sapienza University of Rome (26<sup>th</sup>) and University of Rome Tor Vergata (92<sup>nd</sup>) in Lazio. The remaining five regions, Emilia-Romagna, Veneto, Piemonte, Toscana and Campania, each contribute one: the University of Bologna (29<sup>th</sup>), the University of Padova (57<sup>th</sup>), Polytechnic University of Turin (60<sup>th</sup>), the University of Pisa (87<sup>th</sup>) and the University of Naples Federico II (97<sup>th</sup>), respectively.



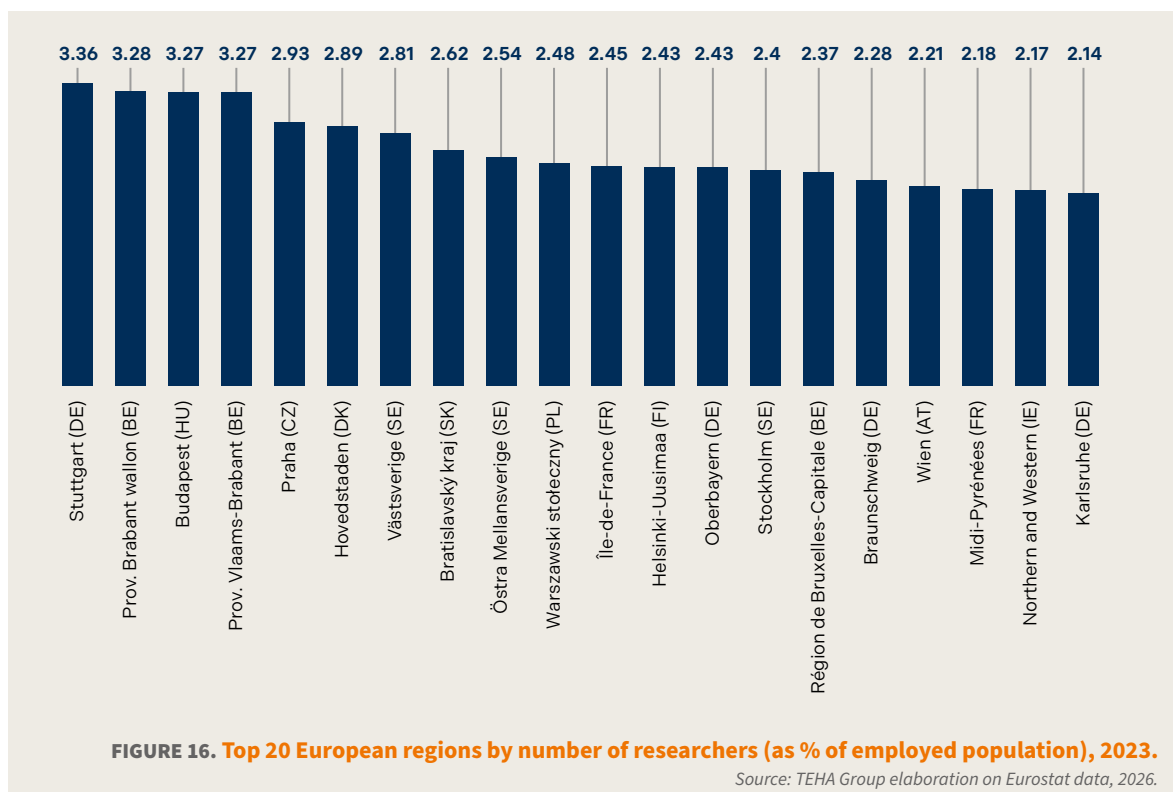
**FIGURE 15. European regions with at least 4 universities ranked in the QS Worlds Ranking, 2025.**

Source: TEHA Group elaboration on QS Ranking data, 2026.

### 3.2.3 TALENT FOR INNOVATION

The “Talent for Innovation” category aims to capture the landscape of available talent within a region, focusing on individuals that are engaged in research, employed in science and technology sectors, and those working in high-tech industries. These indicators collectively reflect a region’s ability to attract, develop, and retain the specialized human capital that underpins its innovation ecosystem. In this area, Italy finds itself significantly behind the top ten European regions.

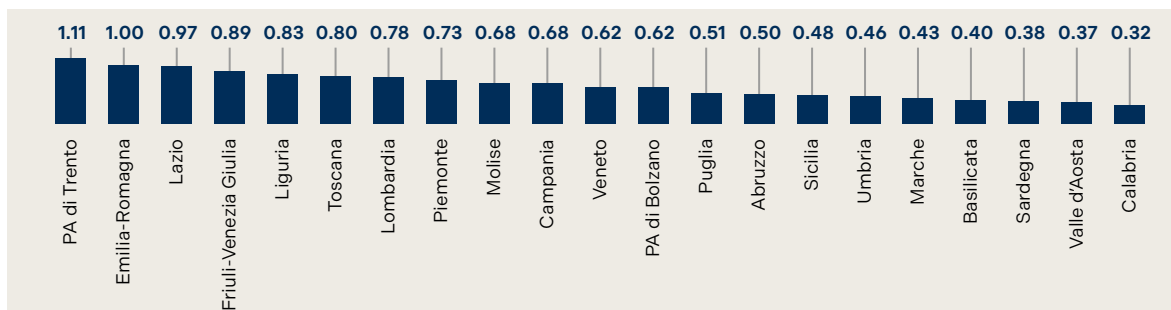
In the first indicator, focusing on the percentage of the labour force employed as researchers, the leading regions showcase impressive numbers. Stuttgart in Germany takes the leading position with 3.36%, followed closely by the province of Brabant Wallon in Belgium and Budapest in Hungary, ranking second and third with rates of 3.28% and 3.27% respectively (**Figure 16**). If we broaden the scope to the top 50, no Italian region appears in the ranking for this indicator.



**FIGURE 16. Top 20 European regions by number of researchers (as % of employed population), 2023.**

Source: TEHA Group elaboration on Eurostat data, 2026.

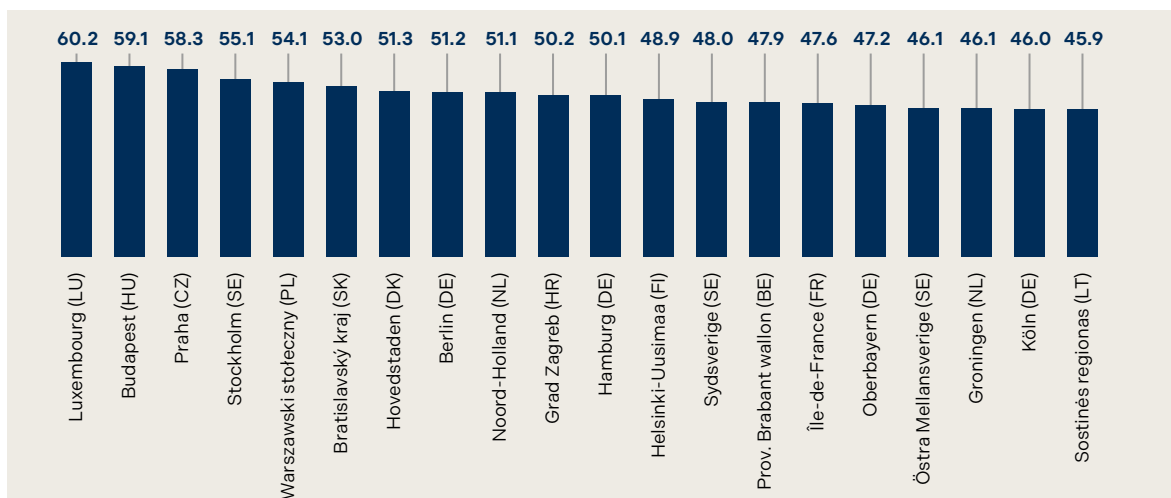
In comparison, Italy's highest-ranking region in this aspect is the Provincia Autonoma di Trento, which places 65<sup>th</sup> with a rate of 1.11%. This is followed by Emilia-Romagna 73<sup>rd</sup> with 1.00% and Lazio at 75<sup>th</sup> with 0.97% (**Figure 17**).



**FIGURE 17. Share of workers employed in R&D as a percentage of the total workforce in Italy (percentage value), 2023.**

Source: TEHA Group elaboration on Eurostat data, 2026.

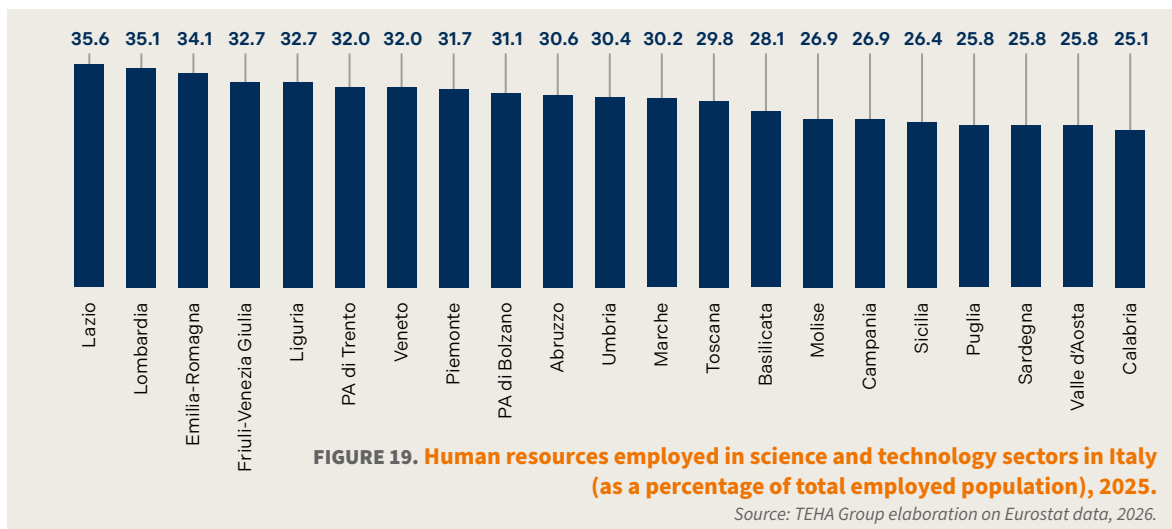
At the forefront in Europe in terms of the share of human resources employed in science and technology sectors are regions such as Luxembourg (60.2%), Budapest (59.1%), and Prague (58.3%) (**Figure 18**). Italian regions, by contrast, mostly rank beyond the 100<sup>th</sup> position.



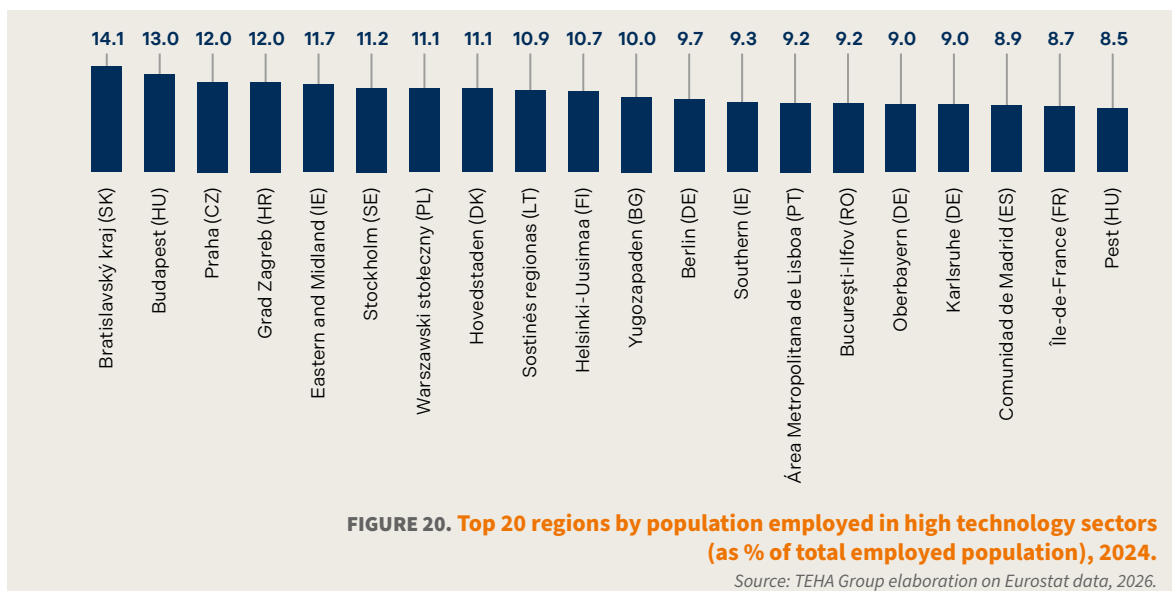
**FIGURE 18. Top 20 European regions by human resources employed in science and technology sectors (as % of employed population), 2024.**

Source: TEHA Group elaboration on Eurostat data, 2026.

The top performer regions in Italy are Lazio, in 114<sup>th</sup> position, with 35.6%, Lombardia (119<sup>th</sup> position) and Emilia-Romagna (131<sup>st</sup> position) with 35.1% and 34.1% of human capital employed in science and technology sectors respectively (**Figure 19**).

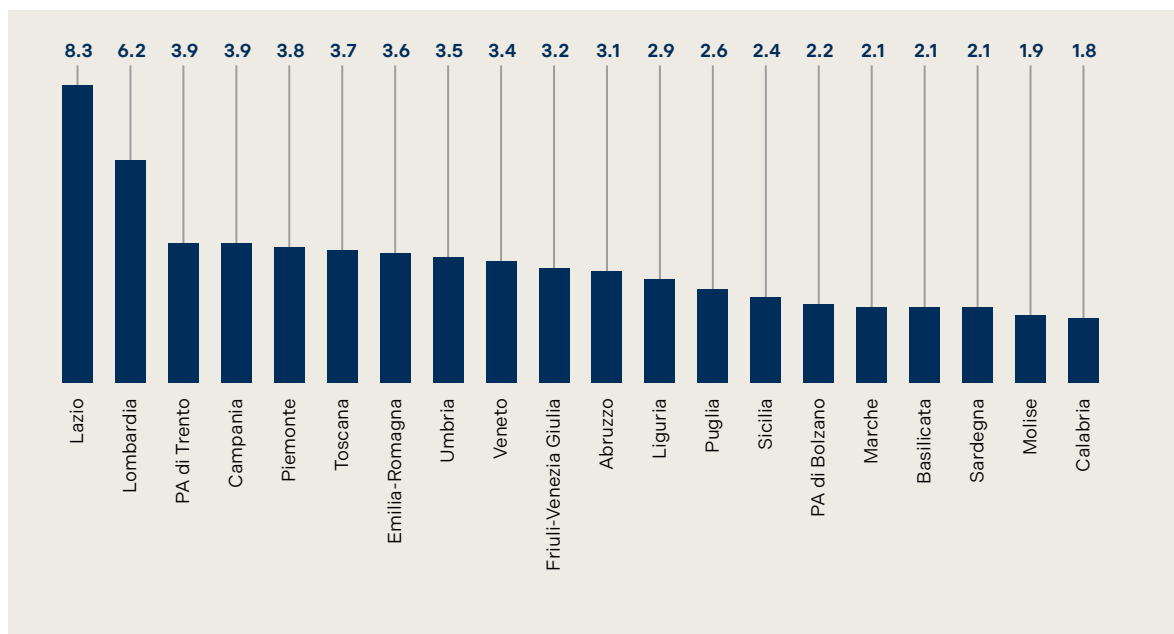


Finally, in the specific area of employment within high technology sectors, Bratislavský kraj leads with a rate of 14.1%, closely followed by Budapest at 13.0% (**Figure 20**).





Italy shows promising signs in this domain, with two regions ranking among the top 50 in Europe. Lazio stands out at the 21<sup>st</sup> position with a rate of 8.3% and Lombardia follows at the 47<sup>th</sup> position with a 6.2% rate (**Figure 21**).



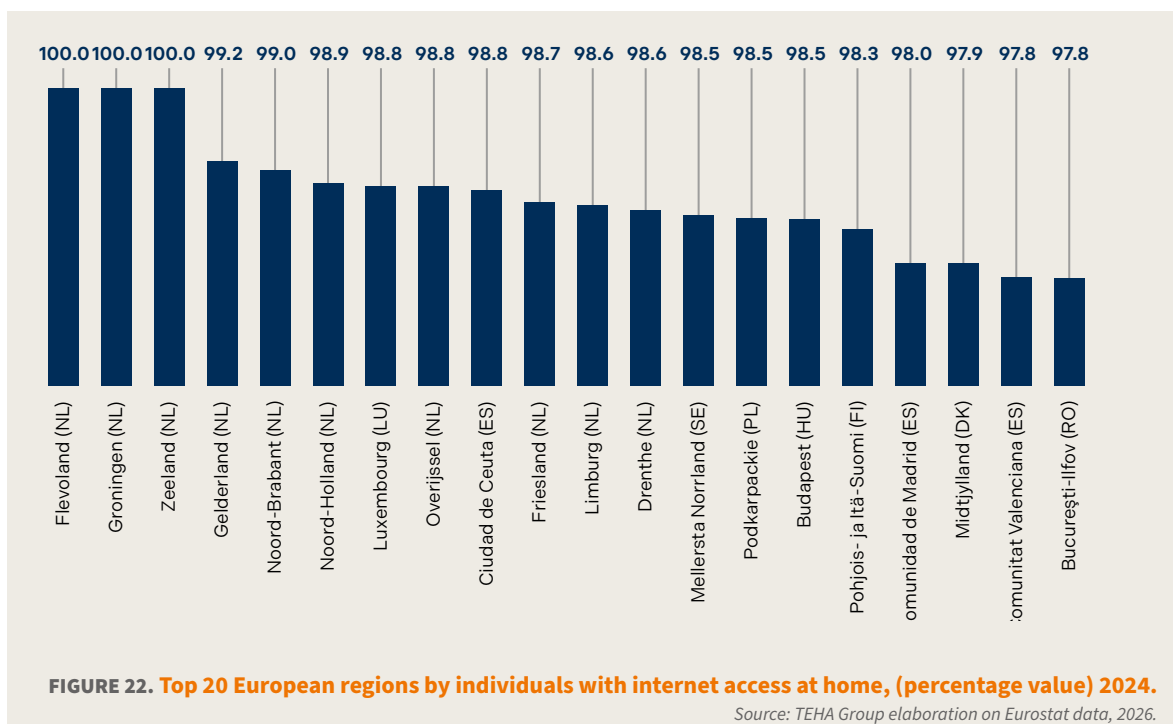
**FIGURE 21. Personnel employed in High-technology sectors in Italy (as % of total employment) 2024.**

Source: TEHA Group elaboration on Eurostat data, 2026.

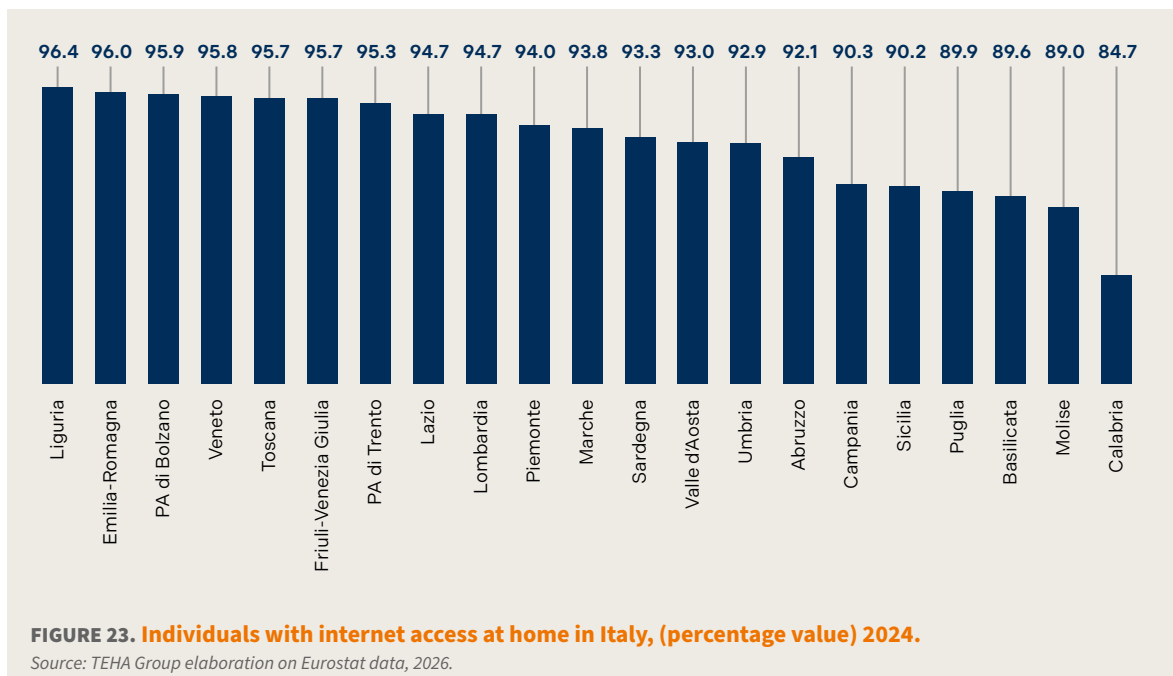
### 3.2.4 DIGITAL INFRASTRUCTURES AND TECHNOLOGIES

This last category assesses the foundational digital ecosystem upon which innovation increasingly depends. It combines two complementary dimensions: the extent to which a region's population is connected to the internet, reflecting digital inclusion and readiness at the household level, and the presence of data centre facilities, capturing the physical infrastructure that underpins cloud computing, artificial intelligence applications, and data-intensive services.

Looking at the percentage of households where at least one member has access to the internet from home, all regions of the Netherlands rank within the top 20 in Europe; in particular, Flevoland, Groningen, and Zeeland top the ranking with a score of 100% (Figure 22).

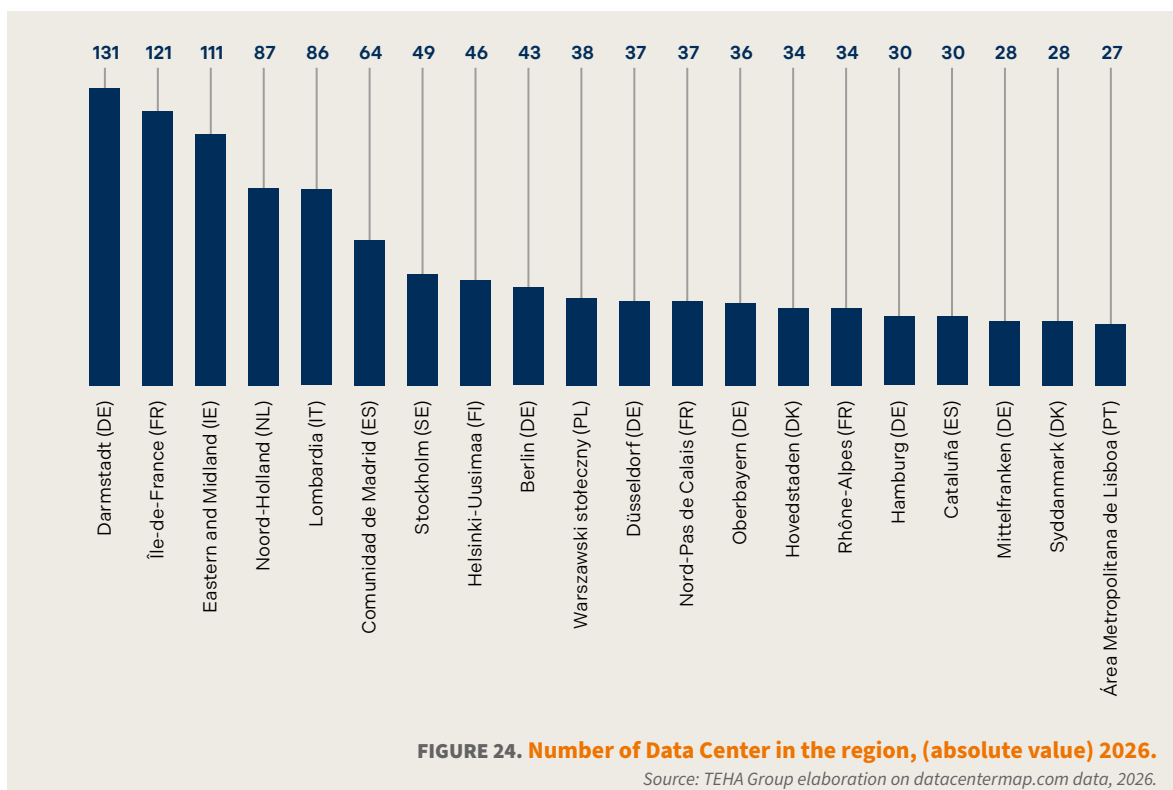


Within Italy, Liguria leads first at the 41<sup>st</sup> position with a rate of 96.4% followed by Emilia-Romagna 53<sup>rd</sup> (96.0%) and Provincia Autonoma di Bolzano 57<sup>th</sup> (95.9%) (**Figure 23**).



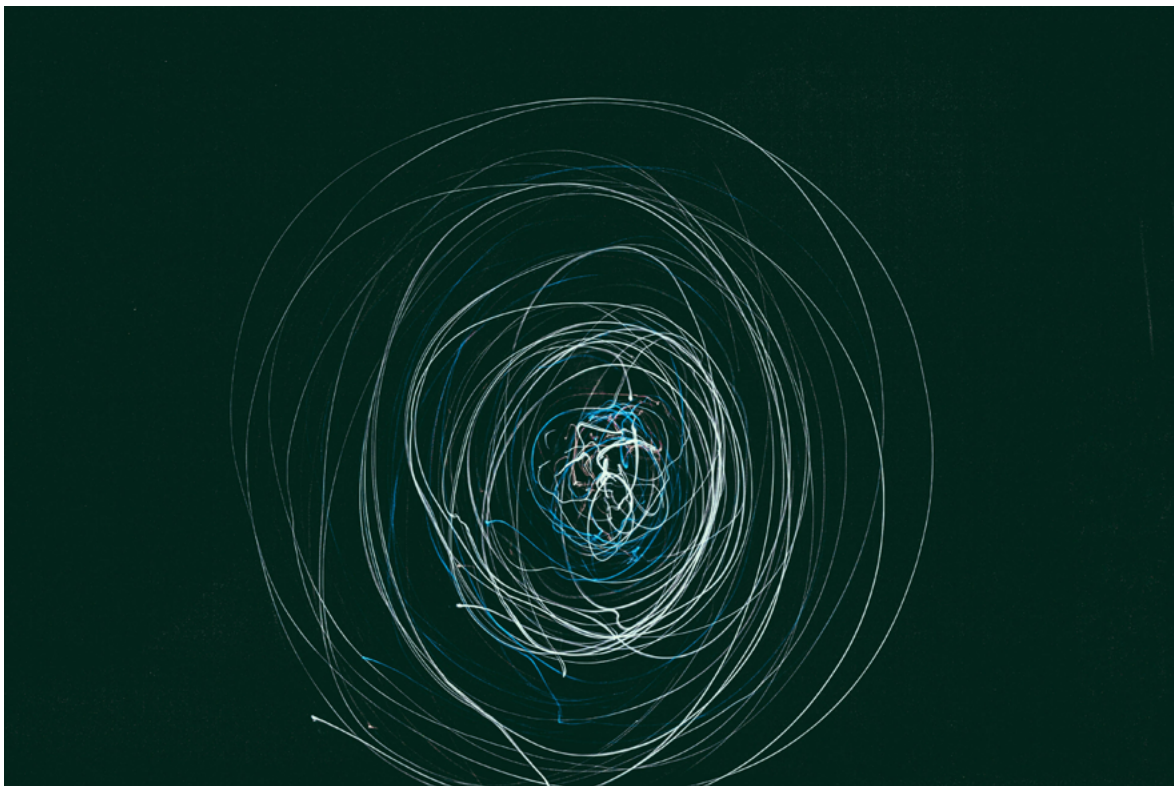
The last KPI introduced in this edition concerns data centers. Lombardia stands out with 86 data centers in the region, ranking 5<sup>th</sup>, while the top positions are held by Darmstadt (Germany) with 131, followed by Île-de-France with 121, and Eastern and Midland (Ireland) with 111 (**Figure 24**).

A second tier, including Emilia-Romagna and Piemonte (11 each) and Toscana (10), shows a moderate but still relevant presence. Beyond this group, the remaining regions display progressively lower figures, highlighting a limited and uneven spread across the country. Overall, this pattern points to a strong geographical concentration of digital infrastructure in Italy's main economic and industrial hubs.



**FIGURE 24. Number of Data Center in the region, (absolute value) 2026.**

Source: TEHA Group elaboration on [datacentermap.com](https://datacentermap.com) data, 2026.



### 3.3 Beyond the Index: How leading regions are shaping the Future of innovation

Quantitative indicators capture the structural conditions for innovation, but they do not tell the full story. The top-performing regions in the TEHA – RII 2026 are not only strong across measurable dimensions, they are also actively translating their structural assets into concrete strategies at the frontier of technology and knowledge. The case studies presented in this section illustrate three distinct approaches through which leading European regions are shaping the next generation of innovation: Île-de-France’s coordinated bet on quantum technologies, Stockholm’s model of continuous learning as the engine of an entrepreneurial ecosystem, and Praha’s integration of artificial intelligence into public administration. Taken together, they suggest that excellence in the TEHA – RII is not an end point, but a platform from which the most advanced regions are building their next competitive advantage.



## CASE STUDY – THE ÎLE-DE-FRANCE REGION (FRANCE)

### Building a European Quantum Hub

Île-de-France, the top-ranked region in the TEHA – RII 2026, has translated its structural advantages in research, talent and digital infrastructure into a deliberate and coordinated strategy to become Europe’s leading hub for quantum technologies. The region accounts for the vast majority of French quantum research activity, with approximately 80% of national efforts concentrated between Paris, Saclay and Grenoble.

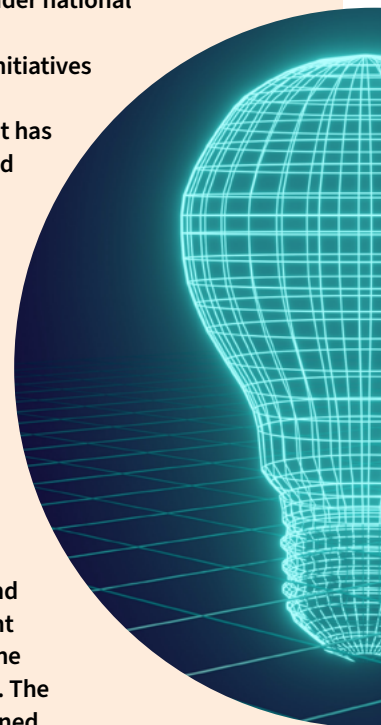
The regional quantum strategy rests on two complementary pillars. The first is the **Quantum Pack**, a programme launched in 2020 that has been recognised as a pioneering model for the development of quantum solutions across France and Europe. To date, it has funded 14 experimental projects between startups and large companies, mobilising over €8 million. The second is the **QuantIP network** (Quantum Technologies in Paris Region), designated as a Major Research and Innovation Domain (DIM) by the Île-de-France Region for a five-year period from 2022 to 2026, and supported by the CNRS. The network federates world-class academic teams alongside a pool of startups and companies, with the aim of developing cutting-edge application technologies and accelerating the transfer of quantum innovations to industry. QuantIP is structured around four thematic areas – quantum computing, quantum simulation, quantum communications, and quantum sensors and metrology – complemented by cross-cutting axes devoted to enabling technologies, entrepreneurship, and training.

These regional initiatives are embedded

within France’s broader national ambition.

These regional initiatives sit within a broader national context that has proved fertile ground for their development. France’s national quantum strategy, launched in 2021, is backed by €1.8 billion in combined public and private investment, providing Île-de-France with a supportive policy and funding environment that has amplified the region’s own efforts. The results of this sustained commitment are already visible in the regional ecosystem. The Paris-Saclay campus, where Nobel Prize-winning physicist Alain Aspect conducted his foundational experiments, has seen the emergence of several quantum startups.

Paris has emerged as Europe’s leading deep tech hub, with quantum technologies forming one of its most strategically prioritised verticals, a position that reflects not only the scale of investment deployed, but the depth of the scientific and entrepreneurial ecosystem that Île-de-France has built over decades.





## CASE STUDY – THE STOCKHOLM REGION (SWEDEN)

### Education and Talent as the Engine of Innovation

Stockholm ranks third in the TEHA – RII 2026, and its performance is inseparable from a distinctive model in which education, research, and entrepreneurship are treated as a single, integrated system.

According to the TEHA – RII 2026, Stockholm leads all European regions in the share of workers who participated in training courses, with a rate of 40.3%. Remarkably, Sweden occupies all of the top eight positions in this ranking, with regions including Västsverige (38.0%) and Sydsverige (37.6%) following closely behind, a performance that reflects a deeply embedded

national culture of continuous learning rather than the result of a single regional policy.

This commitment to lifelong education is reinforced by sustained public investment: Sweden allocates 3.41% of GDP to research and development, the highest share among European countries. Part of this

investment sustains a network of world-class institutions concentrated in the Stockholm region, foremost among which is KTH Royal Institute of Technology, recognised as one of Europe’s principal talent incubators for the new generation of deep tech and AI founders. The university’s role extends well beyond teaching: it functions as a direct pipeline into the startup ecosystem, with spinouts and alumni ventures forming a significant share of the region’s most dynamic companies.

Public policy amplifies these foundations in concrete ways. Any employee in Sweden can take six months of leave to start a business through the Swedish “Right to Leave to Conduct a Business Operation Act” scheme, lowering the barrier between employment and entrepreneurship.

The outcomes are measurable and distinctive. Stockholm has the highest number of unicorns per capita of any city in the world outside of Silicon Valley.

These results are not incidental: they are the compounding return on a model in which continuous learning, institutional excellence and pro-entrepreneurship policy have been deliberately aligned over decades. Stockholm’s case suggests that in the most advanced innovation regions, the true frontier technology is not any single application or platform, it is the system that produces the people capable of building them.





## CASE STUDY – THE PRAGUE REGION (CZECH REPUBLIC)

# Integrating Artificial Intelligence into Public Administration and Regional Services

The Prague region ranks among the top five in the TEHA – RII 2026, standing out not only for its strong performance across quantitative indicators but also for its forward-looking approach to integrating artificial intelligence into the public sector. While the TEHA – RII captures the structural conditions that enable innovation – such as R&D investment, talent availability, and digital infrastructure – the Prague case illustrates how leading regions are actively leveraging these assets to transform governance and public service delivery through emerging technologies.

The Czech Republic’s digital transformation rests on two national pillars: the Digital Czechia programme and the National Artificial Intelligence Strategy 2030 (NAIS). Together, these frameworks aim to modernize public services, enhance the interoperability of government systems, strengthen cybersecurity, and promote the responsible adoption of AI in alignment with the European regulatory framework, including the AI Act.

At the local level, the City of Prague has translated these national strategies into a coherent urban approach, developing an integrated digital ecosystem that supports the use of AI both in internal administrative processes and in citizen-facing services. The city’s initiatives span three key areas. In the area of digitalization, the administration has expanded online services – including the Portál Pražana citizen portal – and deployed risk

management systems to improve administrative workflows. In the area of process automation, robotic process automation has been applied to repetitive tasks such as accounting, document management, and banking controls. In the area of artificial intelligence, the city has introduced AI-powered tools for document analysis, automated meeting transcription, legal research agents, and advanced data comparison systems, yielding significant time savings across multiple departments.

The development of digital and AI competencies is supported through a combination of national programmes and local initiatives, including training and reskilling courses, hands-on workshops, pilot projects, and centralized methodological support. Attention is also devoted to the ethical and regulatory dimensions of AI, in preparation for the full implementation of the AI Act.

The implementation process has not been without challenges. The Prague administration has encountered significant organizational fragmentation, owing to the presence of numerous entities, publicly owned companies, and administrative structures operating with a high degree of autonomy. Infrastructure and technology limitations – including heterogeneous IT systems, uneven data quality, and complexities in platform integration and interoperability – have added further obstacles. Cultural and organizational factors, such as resistance to change,

limited digital literacy, and widespread caution towards artificial intelligence, have also slowed adoption. Finally, the evolving regulatory landscape, particularly regarding the security, transparency, and compliance requirements introduced by the AI Act, has required non-trivial organizational and technical adjustments.

The Prague experience highlights several key success factors for the effective and sustainable integration of AI in the public sector. Strong leadership and a clear strategic vision, supported at the political and institutional level, have proven essential in orienting investment and ensuring policy continuity. The development of multidisciplinary competencies, combining technical, legal, ethical, and managerial skills, has enabled public employees to build familiarity with AI tools and incorporate them into daily

workflows through continuous training and pilot-based learning. From a technological standpoint, modern and interoperable digital infrastructures, built on high-quality data and common standards, have facilitated the scalability of AI solutions while reducing fragmentation. A citizen-centred approach has guided the design of digital services towards real user needs, improving accessibility and service quality. Transparency, reliability, and regulatory compliance have been indispensable in building public trust, with systematic preparation for the AI Act and the adoption of clear governance models playing a decisive role. Finally, knowledge-sharing across institutions – including at the European level – and the availability of stable, long-term funding have been critical in sustaining innovation throughout the entire project lifecycle.





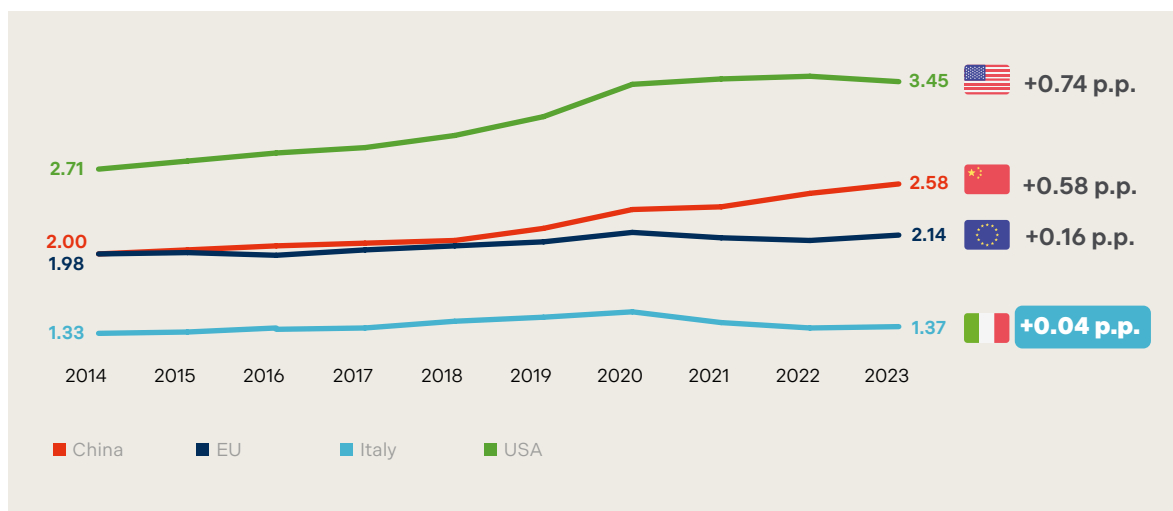
# 4

FROM RESEARCH TO MARKET:  
TECHNOLOGY TRANSFER  
AND VENTURE CAPITAL

Italy's innovation challenge is not rooted in a lack of scientific capability. On the contrary, the country produces a volume and quality of research that places it among Europe's strongest scientific systems. The weakness emerges where research must be protected, translated, financed, and scaled. This chapter examines the gap between Italy's scientific performance and its capacity to generate marketable innovation, assessing the role and limitations of Technology Transfer Offices, the depth of the venture capital market, and the structural bottlenecks that weaken the link between research excellence and economic impact.

## 4.1 From research to market: Italy's technology transfer landscape

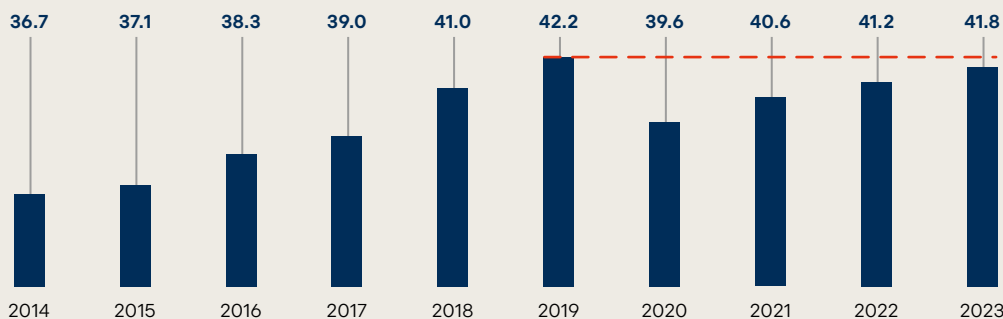
Italy's investment in research and development reflects a long-standing pattern of undercommitment. Gross expenditure on R&D (GERD) stood at 1.37% of GDP in 2023, well below the EU average of 2.14%, and at a considerable distance from the levels sustained by leading innovation economies such as the United States (3.45%) and China (2.58%) (Figure 1). Over the past decade, Italy's GERD as a share of GDP has grown by just 0.04 percentage points, a near-standstill that signals a persistent absence of strategic prioritization.



**FIGURE 1. Gross Expenditure on Research and Development (GERD) (% of GDP), 2014-2023.**

Source: TEHA Group elaboration on OECD data, 2026.

In real terms, research funding in 2023 fell below even pre-pandemic levels, a reduction that stands in contrast with the trajectory of several other advanced economies, where R&D investment accelerated over the same period (**Figure 2**).

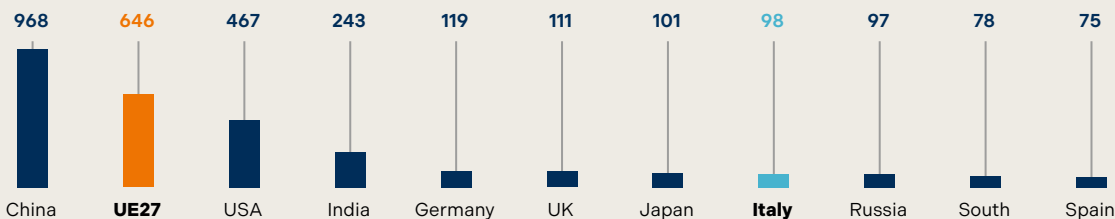


**FIGURE 2. Gross Expenditure on Research and Development (GERD) (billions of \$, constant prices PPP 2020), 2014-2023.**

Source: TEHA Group elaboration on OECD data, 2026.

And yet, Italy's research system continues to perform strongly. The country ranks among the top ten countries worldwide by volume of scientific publications: with more than 98,000 publications in 2023, it is the second highest European contributor after Germany and represents around 15% of the EU's aggregate output (**Figure 3**).

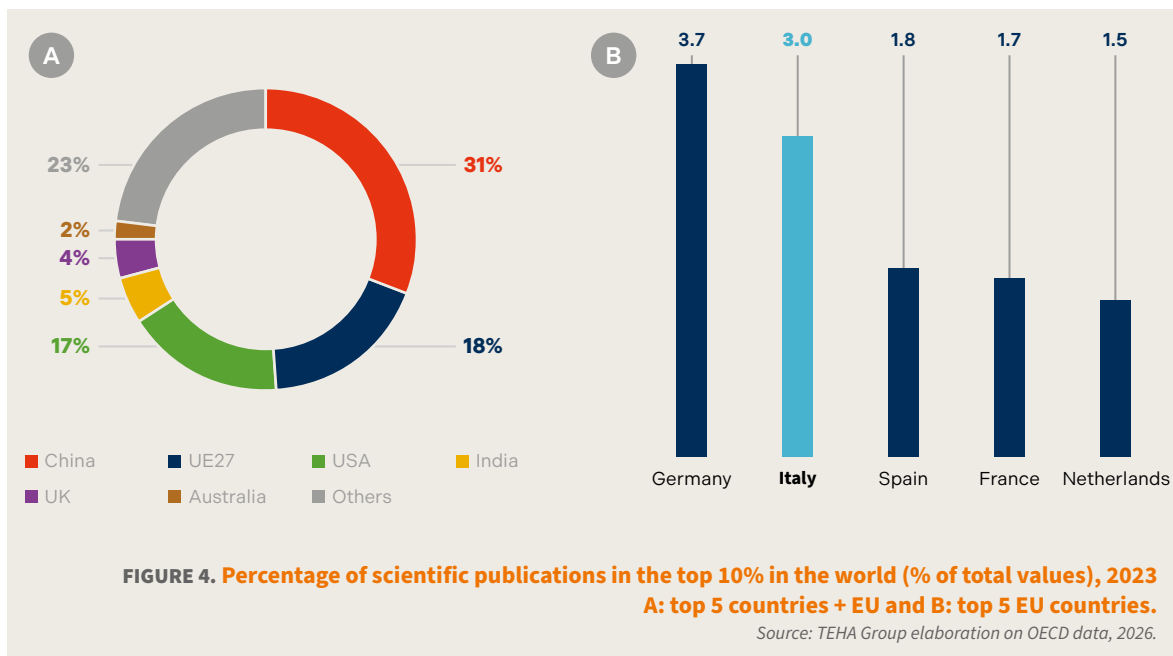
Italy's research strength lies not only in the volume of publications but also in their quality. Within Europe, Italy again ranks second after Germany in its contribution to the world's most-cited scientific output, accounting for approximately 3% of the global total. The issue, therefore, is not the quality of Italian science, the research base is a clear national asset (**Figure 4**).



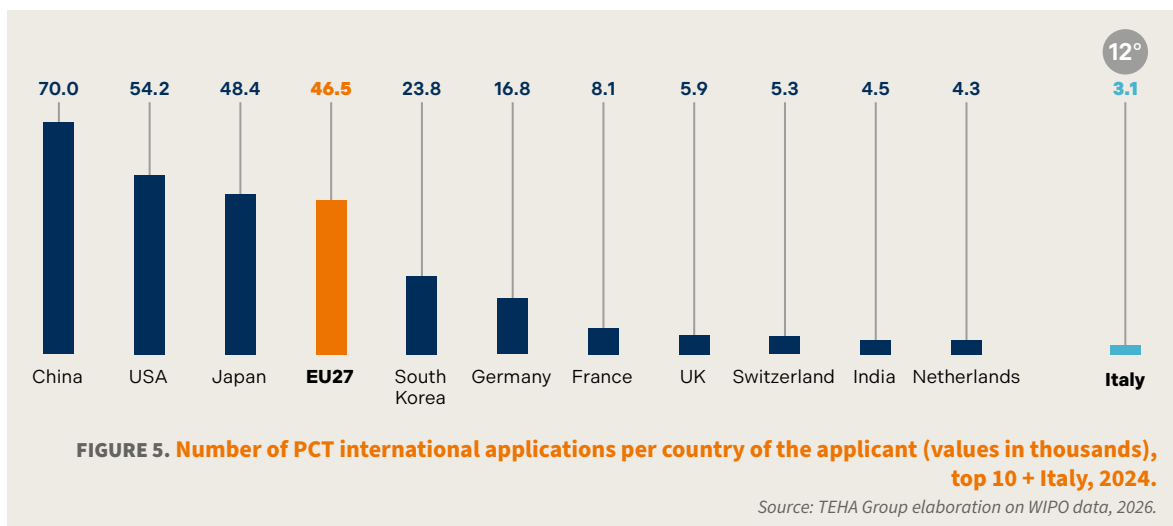
**FIGURE 3. Number of publications by country (values in thousands), Top 10 countries + EU27, 2023.**

Source: TEHA Group elaboration on OECD data, 2026.

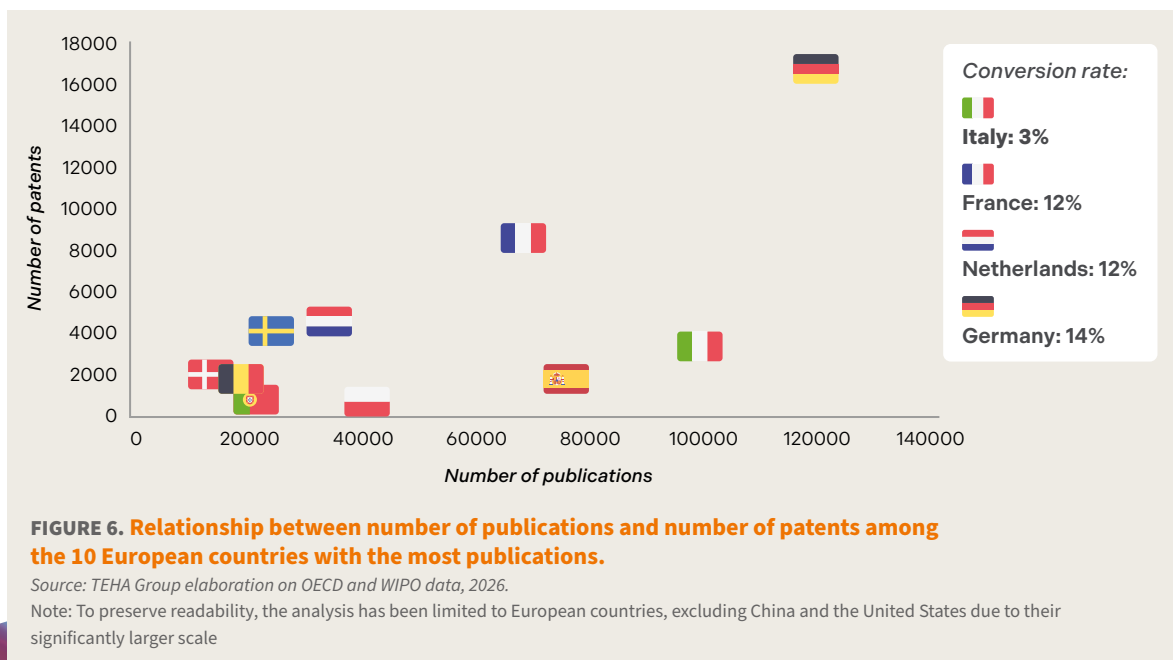
Note: Publications are attributed to countries based on authors' affiliations; Counting is fractional per participant unit.



The weakness emerges in the transition from basic research to application. Italy generates approximately 3,100 international patent filings per year, compared with 16,800 in Germany and 8,100 in France (Figure 5). China, which also leads in publication volume, filed over 70,000 international patent applications in 2024, roughly a quarter of the global total, and around 1.5 times the entire EU's output combined.



The conversion gap is even more telling: Italy transforms only 3% of its scientific publications into patents, while Germany converts 14% and France and the Netherlands 12%, both publishing less than Italy (**Figure 6**). The gap suggests that Italy does not lack scientific capability. Rather, its system is not adequately structured to transform scientific excellence into protected, applied, and commercially relevant knowledge.



**FIGURE 6. Relationship between number of publications and number of patents among the 10 European countries with the most publications.**

Source: TEHA Group elaboration on OECD and WIPO data, 2026.

Note: To preserve readability, the analysis has been limited to European countries, excluding China and the United States due to their significantly larger scale

This gap is not a recent development, nor is it accidental, but reflects long-standing features of the Italian innovation system. The following sections examine this architecture in more detail: first, the institutional infrastructure intended to connect research with the market; then, the capital environment needed to scale innovative solutions; and finally, the structural bottlenecks that help explain why Italy's innovation system continues to underperform relative to the strength of its research base.

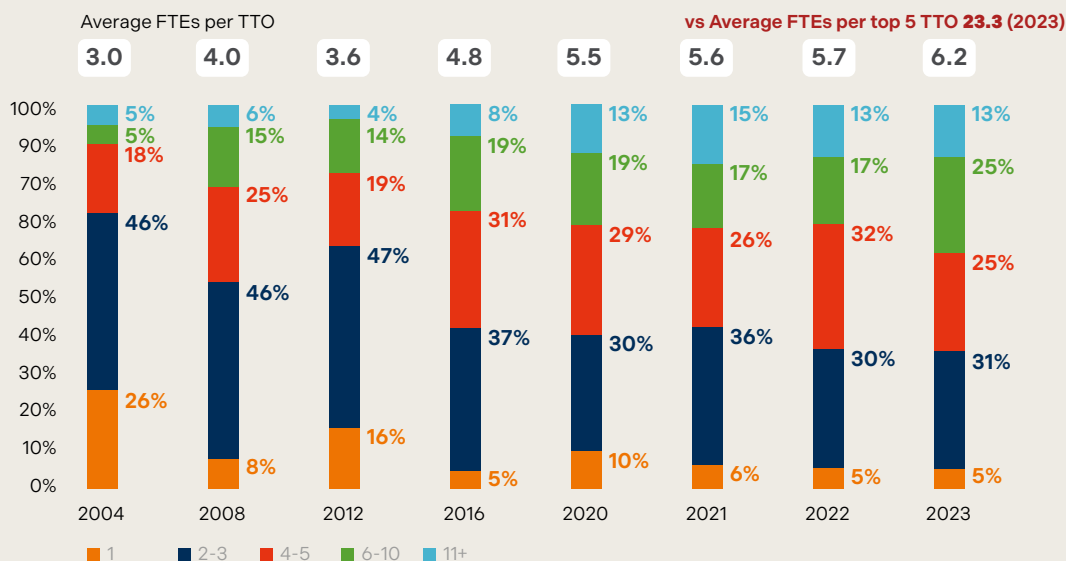
## 4.2 The transfer infrastructure: Italy's Technology Transfer Offices

The institutional backbone of technology transfer in Italy is a network of Technology Transfer Offices (TTOs), structures embedded within universities and public research institutions, responsible for identifying, protecting, and commercializing the intellectual property generated by academic research.

Italy currently counts 122 TTOs, of which 67 are within universities, 9 within public research bodies and 46 within IRCCS (scientific institute for research, hospitalization and health care).

Over the past decade, this system has become more mature. The average Italian TTO employs 6.2 full-time equivalent staff (FTEs), doubling since 2004, when the average stood at 3. Among the top five TTOs, however, the average rises significantly to 23.3 FTEs, highlighting a strong concentration of capabilities within a limited number of institutions.

However, a more granular look shows that 61% of Italian TTOs employ five people or fewer, while only 13% have more than 10 FTEs (**Figure 7**). These are not organisations capable of running complex commercialisation processes, managing international patent portfolios, and building sustained relationships with industry and investors.

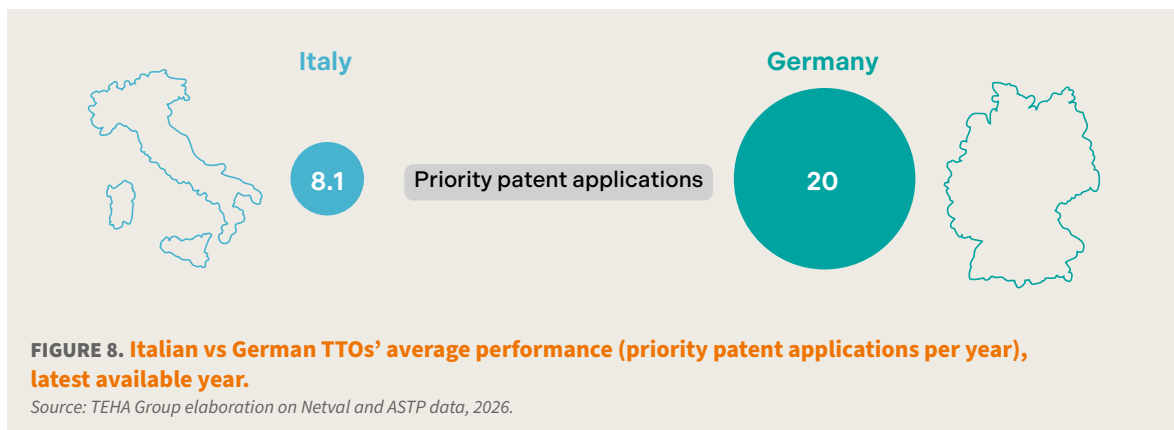


**FIGURE 7. Number of employees (FTEs) in an Italian Technology Transfer Office (average values and % values).**

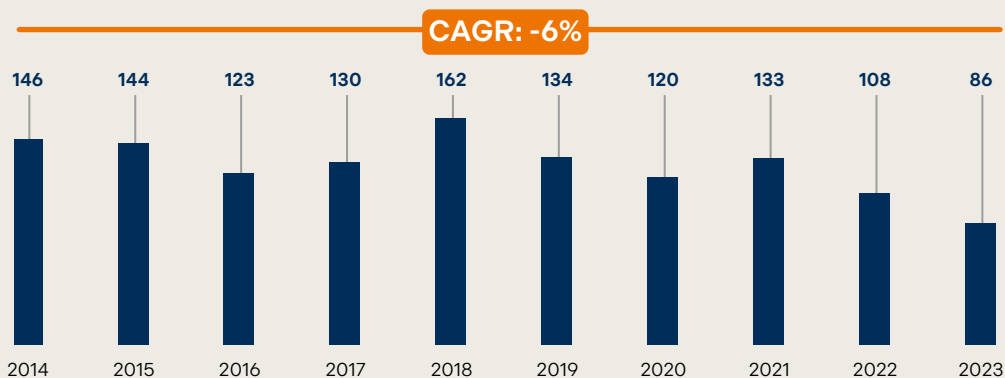
Source: TEHA Group elaboration on Netval data 2026.

Italian TTOs also lag behind their European counterparts on several key indicators of technology transfer performance.

For example, Germany's TTOs file an average of 20 priority application per year, compared to 8.1 in Italy, underscoring again the mismatch between the quality of Italian research and its ability to convert it into protected intellectual property (**Figure 8**).



The disparity is even greater in venture creation. Across Europe, TTOs generate on average 3.7 spin-offs and 14.4 start-ups per office. In Italy, by contrast, the entire national network produced only 86 new academic spin-offs in 2023. This figure declined from 108 in 2022 and has been falling over the past decade, with a compound annual decrease of -6% (Figure 9).



**FIGURE 9. Number of spin-offs from public research institutions (absolute values), 2014-2023.**

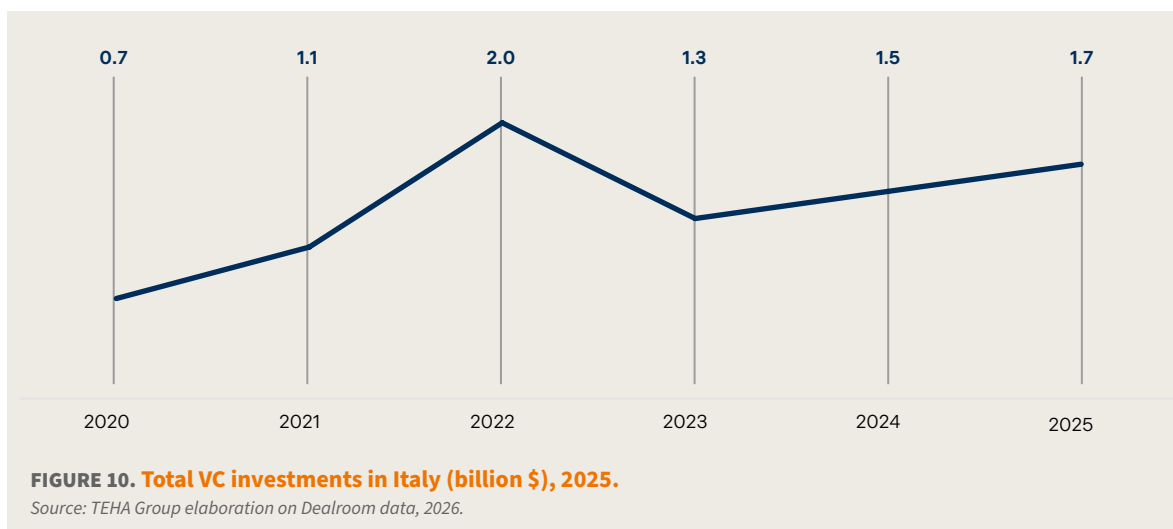
Source: TEHA Group elaboration on Netval data, 2026.

Moreover, there is a high concentration of output across a small share of entities. The five most active Italian institutions account for approximately 46% of patents in portfolio, 64% of new licensing contracts, and 81% of total licensing revenues. This suggests that Italy has a highly uneven system, in which a small number of leading institutions operate at or near European standards while the majority remains substantially behind.

Taken together, these figures point to a systemic issue. The challenge is not simply low aggregate performance, but the absence of sufficiently widespread institutional capacity to translate scientific excellence into commercial outcomes at the scale achieved by other European ecosystems.

### 4.3 The Italian venture capital ecosystem

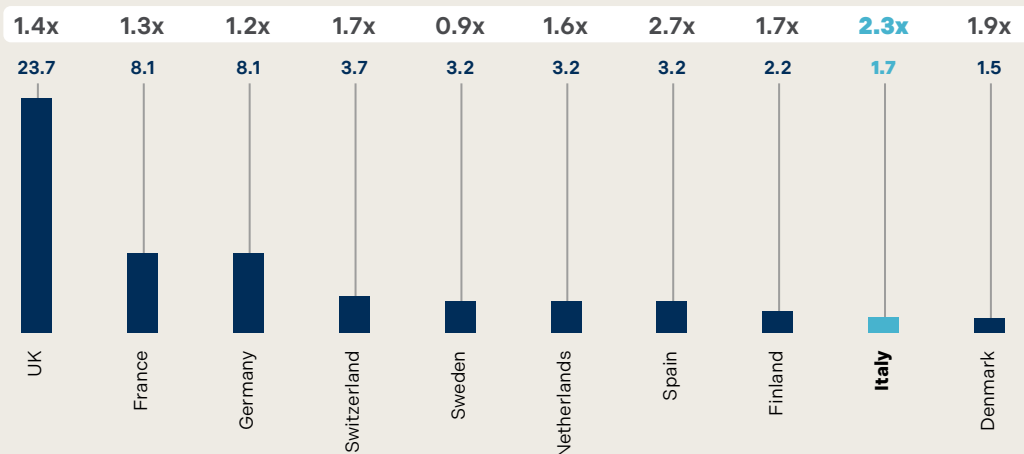
Even when Italian technologies successfully move beyond the research system, they often encounter a capital environment that remains insufficient to support scale. Italy's venture capital market has grown significantly in recent years, with total investment rising from approximately \$729 million in 2020 to \$1.7 billion in 2025, an increase of 133% (**Figure 10**). This growth is important and signals a more dynamic ecosystem than in the past. However, it starts from a low base and does not resolve a structural gap: the market remains too small, too geographically concentrated, and not yet well aligned with the needs of technological and scientific innovation.



Italy's recent growth rate is among the strongest in Europe, but the size of the market remains well below that of its main peers. The United Kingdom is Europe's largest venture capital market, with \$23.7 billion invested in 2025, nearly 14 times the Italian level (**Figure 11**).

Italy's venture capital market is not only smaller than those of comparable economies; it is smaller by a margin that cannot be explained by GDP, population, or scientific output alone. Several countries with smaller economies than Italy, including Switzerland, Sweden, the Netherlands, and Spain, attract roughly twice as much venture capital.

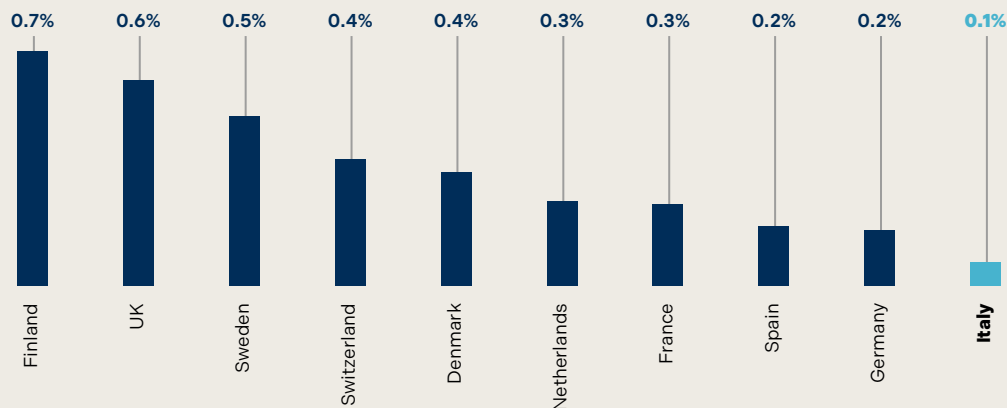
vs. 2020



**FIGURE 11. Top 10 European countries by total VC investments (billion \$ and growth vs 2020), 2025.**

Source: TEHA Group elaboration on Dealroom data, 2026.

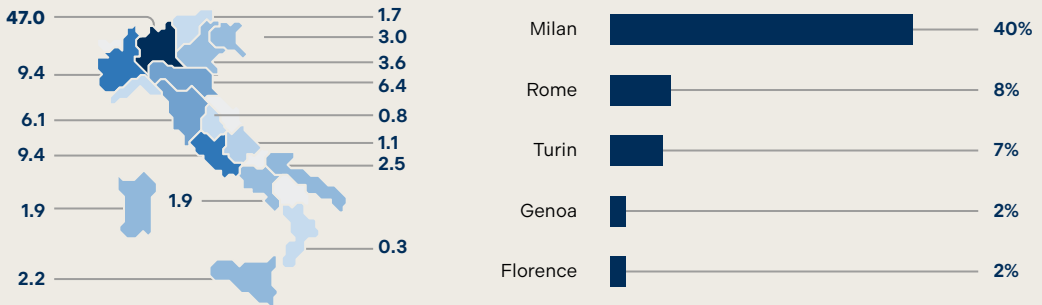
The gap is even clearer when venture capital investment is measured as a share of GDP. Italian VC investment represents approximately 0.1% of GDP, compared to 0.6% in the United Kingdom and 0.7% in Finland, placing Italy at the bottom of the ranking (Figure 12). The GDP-adjusted figure is particularly relevant as it controls for economic size and points to a structural weakness of the market, rather than a simple difference in economic scale.



**FIGURE 12. VC investments as a share of GDP (% values), 2025.**

Source: TEHA Group elaboration on Dealroom and World Bank data, 2026.

Venture funding is also highly concentrated geographically. The majority of Italian VC activity is concentrated in Milan and the broader Lombardy region, which accounts for 47% of total deal volume. Rome, Turin, Genoa and Florence together account for a further 20%. By contrast, Southern Italy, which hosts a significant share of Italy's university system and public research infrastructure, account for only 10.8% (**Figure 13**).

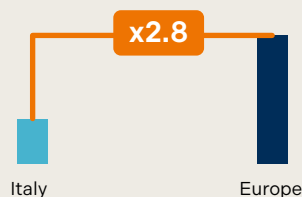


**FIGURE 13. Left: Distribution of funding rounds by Italian region (% values), 2025. Right: Distribution of funding rounds by city, Top 5 Italian cities (% of total), 2025.**

Source: TEHA Group elaboration on Crunchbase data, 2026.

Beyond geography, a second structural feature of the Italian VC market emerges when looking at the size of individual transactions rather than their number. The median deal size for Series B and later rounds in Italy stands at \$14 million, compared to a European median of \$40 million: a gap of 2.8 times (**Figure 14**). Italian companies reaching the growth stage find investors who commit much less than the capital that their European counterparts can deploy at the same stage.

The typical deal is structurally insufficient to fund the journey from promising venture to globally competitive company. The result is a scale-up gap: companies that succeed in raising initial funding often struggle to access the larger rounds needed to expand, internationalise, and compete with better-capitalised foreign rivals.



**FIGURE 14. Series B+ round median Italy and Europe (million \$), 2025.**

Source: TEHA Group elaboration on Crunchbase data, 2026.

Despite these constraints, a more recognisable venture market has taken shape in Italy over the past few years. A small but growing group of Italian companies has shown that the country can produce ventures of international quality. At the same time, their rarity highlights the central issue: landmark deals remain exceptions, not yet evidence of a deep and repeatable market.

Company	Amount raised	Date	Stage	Sector
<b>Bending Spoons</b>	<b>€230M</b>	Oct 30, 2025	<i>Venture - Series Unknown</i>	Software
<b>AAVantgarde Bio</b>	<b>€120M</b>	Nov 3, 2025	<i>Series B</i>	Life Sciences
<b>Exein</b>	<b>€100M</b>	Dec 18, 2025	<i>Venture - Series Unknown</i>	Cybersecurity
<b>NanoPhoria</b>	<b>€84M</b>	Oct 6, 2025	<i>Series A</i>	Life Sciences
<b>Generative Bionics</b>	<b>€70M</b>	Dec 8, 2025	<i>Seed</i>	Robotics
<b>Exein</b>	<b>€70M</b>	Jul 16, 2025	<i>Series C</i>	Cybersecurity
<b>D-Orbit</b>	<b>€45M</b>	Jan 22, 2026	<i>Series D</i>	Aerospace
<b>Bending Spoons</b>	<b>€42M</b>	Jan 22, 2025	<i>Venture - Series Unknown</i>	Software
<b>Niulinx</b>	<b>€38M</b>	Apr 11, 2026	<i>Seed</i>	Automotive
<b>Caracol</b>	<b>€34M</b>	Oct 14, 2025	<i>Series B</i>	Additive Manufacturing
<b>Subbyx</b>	<b>€30M</b>	Mar 25, 2026	<i>Series A</i>	Consumer Electronics
<b>Trifoglio</b>	<b>€30M</b>	Mar 26, 2026	<i>Seed</i>	Automotive
<b>Innovo Renewables</b>	<b>€30M</b>	Jan 14, 2025	<i>Venture - Series Unknown</i>	Energy
<b>Bee Maps</b>	<b>€27M</b>	Oct 6, 2025	<i>Series A</i>	AI
<b>Gruppo Manifatture Italiane</b>	<b>€25M</b>	Jul 24, 2025	<i>Venture - Series Unknown</i>	Fashion
<b>Jet HR</b>	<b>€25M</b>	Jun 18, 2025	<i>Series A</i>	HR
<b>Tretau</b>	<b>€20M</b>	Sep 14, 2025	<i>Series C</i>	Automotive
<b>Lexroom.ai</b>	<b>€16M</b>	Sep 29, 2025	<i>Series A</i>	AI
<b>DRONUS</b>	<b>€15M</b>	Mar 24, 2026	<i>Series A</i>	Aerospace
<b>Subbyx</b>	<b>€15M</b>	Jan 30, 2025	<i>Seed</i>	Consumer Electronics
<b>Iama Therapeutics</b>	<b>€15M</b>	Apr 16, 2025	<i>Venture - Series Unknown</i>	Life Sciences
<b>NanoPhoria</b>	<b>€15M</b>	Feb 17, 2025	<i>Seed</i>	Life Sciences

#### Methodological note:

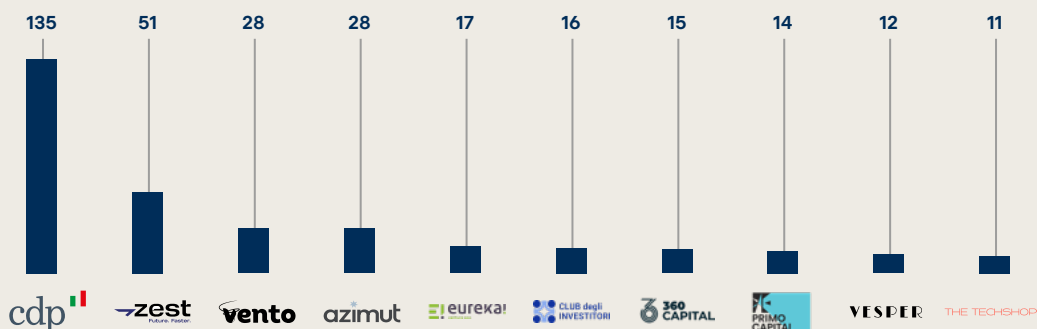
Part of the data presented in this chapter, specifically the analyses of geographical distribution of funding rounds, median Series B+ deal size, and top deals, draw on an original TEHA Group elaboration of Crunchbase data. The dataset covers investment rounds closed between 1 January 2025 and 28 April 2026 (date of last consultation) in companies headquartered in Italy, including pre-seed, seed, angel, Series A through J, and venture rounds of unknown series. Debt instruments, grants, and secondary transactions are excluded.

**FIGURE 15. Top VC deals in Italy, 2025-2026.**

Source: TEHA Group elaboration on Crunchbase data, 2026.

The investor base of the Italian VC ecosystem is also highly concentrated. CDP Venture Capital is by far the most active investor, with 135 deals in 2025, more than twice the activity of the next investor by deal count (**Figure 16**). Its central role reflects a genuine public commitment to strengthening the venture ecosystem, but also shows how dependent the market remains on public capital to sustain deal flow at scale.

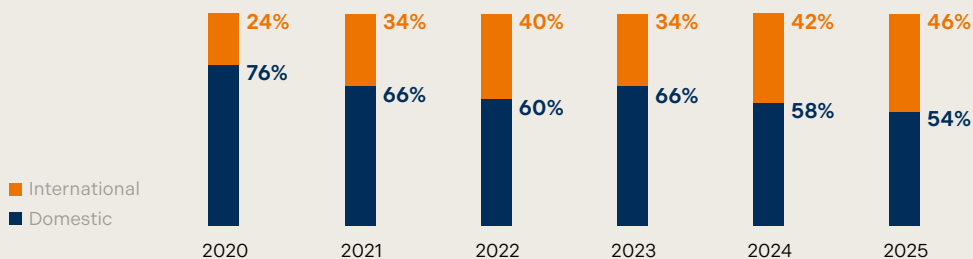
Among private funds, Zest leads with 51 deals, followed by Vento and Azimut with 28 each. Eureka! recorded 17 deals and Club degli Investitori 16, while 360 Capital registered 15, Primo Capital 14, Vesper 12, and The Techshop 11. This cluster of mid-sized, largely generalist and early-stage funds forms the operational core of Italy's private VC market.



**FIGURE 16. Most active investors by number of rounds, Italy (absolute values), 2025.**

Source: TEHA Group elaboration on Italian Tech Alliance data, 2026.

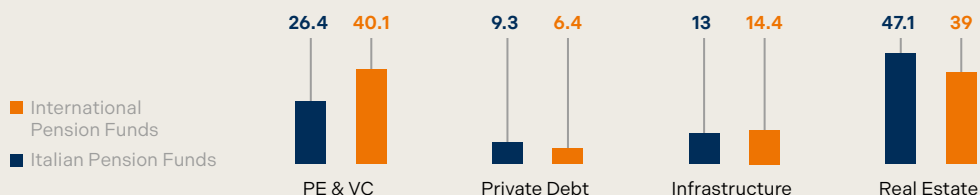
A structurally significant trend within this landscape is the growing presence of international investors. In 2025, international participation reached 46%, up from just 24% in 2020, driven primarily by investors from the United States and the rest of Europe (**Figure 17**). This trajectory reflects a growing recognition of Italy as a credible venture market and is a positive signal for the ecosystem's maturation.



**FIGURE 17. Active investors in Italy, domestic vs international (% values), 2020-2025.**

Source: TEHA Group elaboration on Italian Tech Alliance data, 2026.

The deeper structural absence is that of large domestic institutional investors. In Italy, pension funds maintain a notably conservative asset allocation compared to their international peers: in 2023, they allocated 26.4% of alternative assets to PE and VC, significantly below the 40.1% recorded by international pension funds (Figure 18). Instead, they favor real estate, allocating 47.1% of assets against an international average of 39.0%. This conservative posture reflects a historically limited culture of risk and familiarity with venture capital as an asset class, leaving the Italian ecosystem without the patient, long-horizon institutional capital that anchors more mature venture markets.



**FIGURE 18. Pension Funds' Asset Allocation by Asset Class (% values), 2023.**

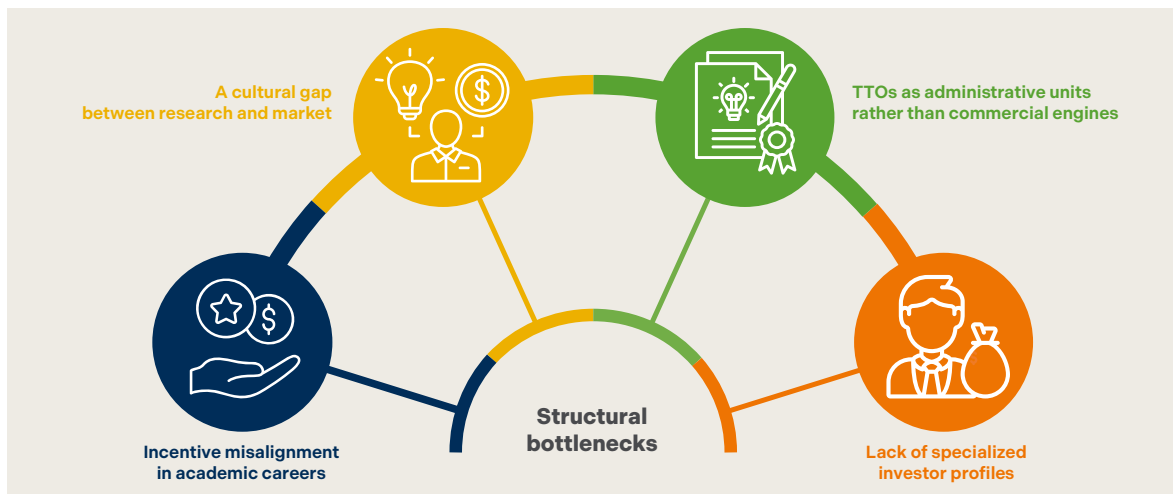
Source: TEHA Group elaboration on AIFI data, 2026.

A potentially significant regulatory shift is underway. Law 193/2024 (Legge annuale per la concorrenza 2023), entered into force in December 2024, introduces a mandatory minimum allocation to venture capital funds for pension funds and private professional pension schemes (*casse di previdenza*) wishing to maintain their fiscal exemption on capital gains. The obligation requires that at least 3% of qualified investments be directed to venture capital funds, rising to 5% in 2026 and 10% from 2027. Estimates suggest that the measure could mobilise up to €6.4 billion toward Italian venture capital development. If fully implemented, this would represent a structural transformation of the Italian VC investor base, introducing long-horizon institutional capital into the venture ecosystem.

## 4.4 Structural bottlenecks

The weaknesses described in the previous sections are linked by a set of structural conditions that consistently direct talent, institutional effort, and capital away from the activities most needed to strengthen the country's innovation capacity.

Four bottlenecks stand out as particularly significant:



### Incentive misalignment in academic careers

In Italy, academic career progression remains governed primarily by publication volume and citation impact. Patents, spinoffs, and industry collaborations play a limited role in evaluation frameworks and are often treated as secondary to the core academic mission. This creates a clear disincentive. A researcher who spends time protecting intellectual property, engaging with industry, or supporting the creation of a spin-off does so at the expense of the activities most directly linked to career advancement. In practical terms, commercialisation carries an opportunity cost that the system does not adequately recognise.

Until academic evaluation frameworks formally reward technology transfer as a legitimate scholarly contribution, many of the researchers best placed to generate commercially relevant knowledge will remain weakly incentivised to engage in it.

### A cultural gap between research and market

Beyond formal incentives, a deeper cultural gap separates Italian academic research from commercial application. Most researchers are trained within a scientific paradigm that gives little exposure to markets, business models, intellectual property, entrepreneurship, or investor expectations.

As a result, commercialisation is not yet widely understood as a legitimate continuation of research activity. It is rarely embedded systematically in doctoral training, aca-

ademic career development, or institutional communication. The outcome is a research community that is scientifically strong, but often poorly equipped to navigate the processes through which scientific knowledge becomes economic value.

Without regular exposure to commercial pathways, market validation, and entrepreneurial skills, technology transfer remains dependent on individual initiative rather than becoming a normal feature of the research system.

### **TTOs as administrative units rather than commercial engines**

Italy's Technology Transfer Offices are, in many cases, still closer to administrative support units than to commercially oriented organisations. As shown above, they are often understaffed and under-resourced. Many also lack the hybrid expertise that effective technology transfer requires, combining scientific understanding, legal knowledge, business development, licensing experience, and investor engagement.

This limits their role. Instead of actively scouting promising research, shaping intellectual property strategies, negotiating with industrial partners, supporting spin-off formation, and building relationships with investors, many TTOs focus on compliance and procedural tasks, and wait for the researchers to come to them with innovations to protect and scale.

The result is a weak translation layer between research institutions and the market. Even when high-quality scientific outputs exist, the institutional capacity needed to identify, protect, package, and commercialise them is often insufficient.

### **Lack of specialized investor profiles**

Italy's venture capital landscape remains dominated by generalist funds, with limited depth in the specialised profiles required by science-based ventures. These companies often need investors who understand the long development cycles, technical risk, regulatory pathways and industrial partnerships characterizing their sector.

Generalist early-stage investors may support the first phase of company creation, but they are often less equipped to provide the sector-specific expertise, international networks, and follow-on capital required as these ventures mature.

The lack of specialised capital therefore reinforces the weaknesses of the technology transfer system. Even when a promising research-based company is created, it may struggle to find investors capable of supporting its development beyond the initial stage.

The picture that emerges is one of latent potential that remains systematically underused. Italy has a strong research base, but it lacks the institutional and financial infrastructure needed to convert that strength into scalable innovation. Technology Transfer Offices remain too thinly resourced and unevenly developed, academic incentives still privilege publications over application, and the venture capital market, despite recent growth, remains too small and concentrated to support a broad pipeline of science-based companies.

Closing the gap calls for structural intervention across academic incentives, professional training, technology transfer capacity and capital mobilization, to better connect scientific excellence to industrial and commercial development.

# 5

## TEHA'S PROPOSAL FOR ITALY

## 5.1 TEHA's proposals for the Italian innovation ecosystem

Following the TEHA-Global Innosystem Index rankings, TEHA developed 10 proposals to help boost innovation in Italy, structured into three strategic areas: Strategic Competitiveness, Building the Talent and Skills Foundation, and Unlocking Italy's Research and Innovation Potential.

The first strategic area, Strategic Competitiveness, encompasses three proposals aimed at building Italy's long-term competitive edge: defining a National Technological Policy (**Proposal 1**), establishing Special Innovation Zones – ZIS (**Proposal 2**), and shaping the EU.inc framework to prevent regulatory arbitrage (**Proposal 3**).

The second strategic area, Building the Talent and Skills Foundation, brings together three proposals focused on human capital development: defining a National STEM Strategy to bridge the skills gap (**Proposal 4**), integrating the “coding for all” approach with a Digital Literacy and Innovation Culture framework (**Proposal 5**), and launching a Talent Attraction Package to attract high-potential global talent (**Proposal 6**).

The third strategic area, Unlocking Italy's Research and Innovation Potential, comprises four proposals designed to translate Italy's research excellence into market and economic value: establishing a One-Stop Shop for experimental research (**Proposal 7**), strengthening collaboration between Industry and Academia while increasing PhD researchers' remuneration (**Proposal 8**), providing long-term stability for R&D investments through a dedicated Attraction Package (**Proposal 9**), and strengthening Technology Transfer (**Proposal 10**).



# STRATEGIC AREA 1: STRATEGIC COMPETITIVENESS

## PROPOSAL 1

### Define a National Technological Policy to build Italy's long-term competitive edge

#### PREMISE

Major economies competing in the global technology race operate with structured, long-term national strategies. China's 15th Five-Year Plan (2026–2030) identifies specific technological domains in which it aims to achieve world leadership. France's "France 2030" plan has allocated resources across ten strategic areas. These countries recognise that innovation leadership is not the product of spontaneous market dynamics alone, but of deliberate strategic investment and institutional coordination.

Italy has taken significant steps in this direction. The Made in Italy Law (L. 206/2023) does important work in valorising and protecting the productive supply chains that define Italian manufacturing identity, from textiles to agri-food. However, a complementary instrument is needed: one that looks ahead to the next ten years and answers a different question – in which emerging technologies does Italy want to build its future competitiveness?

Without a forward-looking national technology policy, Italy risks being locked into its current industrial profile while other nations move decisively into frontier domains such as artificial intelligence, advanced manufacturing, clean energy, and biotechnology. A strategic document on priority technologies, would identify a limited number of frontier technological domains in which Italy intends to build a position of leadership or co-leadership, taking into account existing industrial supply chains.

#### RECOMMENDATION

- Develop a strategic document on priority technologies that, in complementarity with L. 206/2023, identifies a limited number of frontier technological domains – such as AI, advanced manufacturing, clean energy, and biotech – in which Italy intends to build a position of leadership or co-leadership, taking into account existing industrial supply chains.

**PROPOSAL 2****Establish Special Innovation Zones (ZIS) to concentrate and accelerate technological excellence****PREMISE**

Innovation does not distribute itself uniformly across a territory. It clusters where research, businesses, infrastructure, and qualified human capital converge. The most competitive innovation ecosystems in the world, from Silicon Valley to the Oxford-Cambridge Arc, are the result of deliberate policy choices that created concentration and critical mass around strategic technologies.

Italy's ZES Unica (Special Economic Zone for the South) is a legitimate territorial economic policy instrument aimed at supporting overall economic activity through fiscal incentives and generalised administrative simplifications. However, from an innovation policy perspective, a different and complementary instrument is needed, one with a distinct purpose: creating concentration, specialisation, and critical mass around the strategic technologies that will define national competitiveness.

The concept of a specialised innovation zone has already been the subject of discussion in the Lombardy Region, which has explored these models in late 2025 to concentrate resources and expertise in its areas of excellence. The proposal is therefore to build on this regional experience and vision to construct a national framework, extending the approach across the entire country and equipping it with consistent governance, resources, and regulatory structures at the national level.

Special Innovation Zones (ZIS) would serve a dual role. First, they would accelerate existing hubs where critical mass already exists: in areas where research centres of excellence, innovative companies, and infrastructures already converge, the ZIS would provide the quality leap to transform a spontaneous concentration into a globally competitive ecosystem. Second, they would build new hubs from scratch where a strategic opportunity exists: in technological domains where Italy has a national interest but no territorial critical mass yet, such as next-generation nuclear energy, quantum computing, or advanced batteries, the ZIS would function as a long-term industrial policy instrument, selecting an area, equipping it with the necessary infrastructure, and attracting public and private investment to create a new ecosystem.

**RECOMMENDATION**

- ▶ Establish Special Innovation Zones (ZIS) at the national level as an innovation-oriented industrial policy instrument, distinct from and complementary to the ZES, with a dual mandate: accelerating existing clusters where critical mass is emerging, and building new hubs from scratch in strategic domains where Italy has a national interest.

**PROPOSAL 3****Shape the EU.inc framework to prevent regulatory arbitrage and strengthen the European innovation ecosystem****PREMISE**

The EU.inc is an opportunity to simplify the expansion of startups across the single market, reducing the administrative and legal complexity that today forces European companies to incorporate in the most convenient jurisdiction rather than the most strategic one.

However, there is a fundamental risk: rather than becoming a tool to develop the European innovation ecosystem, the EU.inc could turn into an arbitrage mechanism. If EU.inc companies can freely choose the most convenient fiscal and judicial jurisdiction, the effect will not be market unification but further polarisation – concentrating companies and tax revenues in a handful of member states while weakening the others.

Italy should take a proactive stance in European negotiations to ensure that the EU.inc framework is designed to foster genuine integration rather than regulatory arbitrage. This means bringing concrete positions to the negotiating table that address fiscal convergence and judicial harmonisation.

**RECOMMENDATIONS**

Italy should promote two key principles in the European discussion on EU.inc:

- ▶ **Minimum fiscal convergence:** make the adoption of the EU.inc conditional on the definition of common rules that prevent fiscal arbitrage between jurisdictions – for example, by requiring that companies be taxed in the country where their effective operational headquarters are located, not merely their legal registered office.
- ▶ **Harmonisation of corporate litigation:** propose that disputes involving EU.inc companies be subject to a uniform resolution mechanism, for example, specialised chambers coordinated at European level, overcoming the risk that the choice of judicial jurisdiction itself becomes a tool of competition between member states.

## STRATEGIC AREA 2: BUILDING THE TALENT AND SKILLS FOUNDATION

### PROPOSAL 4

## Define a National STEM Strategy to bridge the skills gap in Italy

### PREMISE

Italy currently faces a structural digital skills gap of significant proportions: 4.5 million workers with advanced digital competencies are missing today, and the mismatch could affect 10 million people by 2030. These figures point to a systemic challenge that goes well beyond short-term labour market adjustments, they reflect a fundamental misalignment between the country's education system and the needs of its evolving economy.

The Meloni Government recognised the centrality of the issue by issuing in December 2022 the Guidelines for STEM disciplines (introduced under Law No. 197/2022), providing a three-year intervention plan from early childhood to lower secondary education. This was an important first step, but the challenge requires a broader and more structurally ambitious response.

Beyond the purely scientific dimension, the challenge is also cultural: Italy needs to develop not only STEM graduates but professionals capable of combining technical skills with ethical reasoning, contextual understanding, and humanistic sensitivity – what is increasingly referred to as the STEAM model (Science, Technology, Engineering, Arts, Mathematics). Integrating humanistic competencies into STEM pathways, and digital fluency into humanities curricula, would prepare a new generation of professionals equipped to navigate complex, technology-driven environments.



## RECOMMENDATIONS

- ▶ Assess and complete the existing framework: conduct a thorough evaluation of the implementation status of the 2022 STEM guidelines and expand the plan to cover the entire educational pipeline, from early childhood through university and vocational training.
- ▶ Massively strengthen ITS (Higher Technical Institutes) as an alternative channel for advanced technical education, and introduce fiscal incentives for companies that invest in STEM training for their employees.
- ▶ Integrate humanistic competencies into the STEM strategy: develop STEAM training pathways that make humanities students capable of interacting with digital technologies and AI, and STEM students capable of understanding ethical implications and social dynamics.
- ▶ Build public-private alliances to develop high-quality content, platforms, and training programmes accessible nationwide, actively involving businesses together with universities, ITS, local authorities, and ministries.

## PROPOSAL 5

# Integrate “coding for all” with a Digital Literacy and Innovation Culture framework

### PREMISE

The rapid advancement of AI-powered tools – from code generation to automation platforms – has fundamentally changed what digital competence means. Today, the ability to write code from scratch is no longer the only critical skill: what matters is the capacity to understand, evaluate, and effectively use the tools that technology makes available. The risk of a narrow “coding-first” approach is that it trains students for a specific technical skill that is already being automated, while neglecting the broader mindset – curiosity, problem-solving, critical thinking, and adaptability – that will define employability in the coming decades. Rather than teaching syntax, the priority should be to build digital awareness and an innovation culture, equipping students at every level with the ability to understand how technology works, what it can and cannot do, and how to use it critically and creatively.

This shift from programming instruction to digital literacy represents a more future-proof approach: one that prepares students not just to code, but to navigate, evaluate, and shape the digital world around them.

### RECOMMENDATIONS

- ▶ Introduce digital literacy as a foundational subject across the entire educational pathway, with age-appropriate programmes that develop computational thinking, AI awareness, and responsible use of digital tools – without requiring programming expertise.
- ▶ Promote an experiential, tool-based approach: rather than teaching syntax, expose students to real AI and digital tools, fostering a hands-on understanding of their potential and limitations.
- ▶ Train teachers first: invest in continuous teacher training to ensure educators across all disciplines – not just IT – can integrate digital awareness into their teaching.



**PROPOSAL 6****Launch a “Talent Attraction Package”  
to attract high-potential global talent****PREMISE**

In an increasingly competitive global landscape focused on innovation and strategic technologies, the ability to attract qualified human capital is a decisive advantage for a country’s economic development, technological resilience, and industrial leadership.

Italy has introduced tax incentives aimed at attracting high-net-worth individuals and international investors. However, in an economy increasingly driven by innovation, rare skills, and strategic technologies, it is equally essential to attract the “billionaires of knowledge”: startup founders, cutting-edge researchers, engineers, and experts in artificial intelligence, quantum technologies, sustainability, cybersecurity, and biotechnology.

Several European countries have already implemented structured talent attraction tools. France has launched the “Passeport Talent”, while Germany introduced the “Chancenkarte” (Opportunity Card). These models combine tax benefits with streamlined entry procedures, settlement support, and strong international positioning. Italy offers many attractive features, from quality of life to research hubs, from a vibrant entrepreneurial ecosystem to renowned universities, but still lacks a structured, recognisable, and competitive package to attract and retain high-potential global talent.

**RECOMMENDATIONS**

- ▶ Establish a “Talent Attraction Package”: an integrated set of national measures inspired by international best practices, targeting researchers, innovative entrepreneurs, and STEM professionals. Specifically:
- ▶ Simplify procedures for accessing tax incentives for highly qualified workers, broaden eligibility, and enhance international visibility, in synergy with the current “impatriate regime”.
- ▶ Introduce priority entry channels (fast-track) for high-skilled talent, even without a pre-existing job offer, following the “Opportunity Card” model, with streamlined digital procedures.

## STRATEGIC AREA 3: UNLOCKING ITALY'S RESEARCH AND INNOVATION POTENTIAL

### PROPOSAL 7

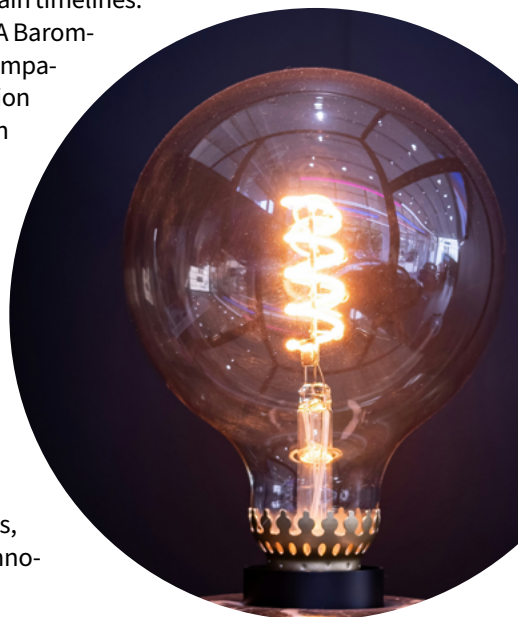
Establish a “One-Stop Shop for experimental research” to simplify authorizations and accelerate innovation

#### PREMISE

A country's competitiveness increasingly depends on its ability to experiment with new solutions, test emerging technologies, and accelerate the transition from laboratory to market. However, in Italy, those seeking to initiate research and development (R&D) experimentation, whether in biotechnology, environmental sensing, autonomous vehicles, AI, or advanced materials, often face a fragmented system, dealing with multiple ministries, agencies, and institutional levels, marked by un-coordinated authorisation processes and uncertain timelines.

As highlighted by the results of last year TEHA Barometer on Innovation 2025, 66.7% of surveyed companies identified bureaucracy and long authorisation times as one of the main barriers to investing in R&D in the country. Currently, there is no system in Italy that allows, through a single access point, the issuance of all necessary permits to launch R&D experiments within a defined timeframe and with clearly identified institutional responsibility.

A relevant international benchmark is the European Commission's Digital One-Stop Shop, launched to simplify energy projects' permitting and shorten approval times. Applying a similar approach to experimental research in Italy could streamline regulatory processes, attract high-tech investment, and accelerate innovation.





## RECOMMENDATIONS

- ▶ Define a vision aimed at making the country attractive for experimental activities, through:
  - ▶ the simplification and acceleration of procedures for launching experiments;
  - ▶ the establishment of a single coordinating body for experimental authorisations – such as the creation of a new public entity or a dedicated unit within an existing agency – with a clear mandate for interministerial coordination in managing technological and scientific experimentation requests.

**PROPOSAL 8****Strengthen collaboration between Industry and Academia and increase the pay of PhD researchers****PREMISE**

Italy faces a dual challenge. On one hand, a gradual demographic decline, with the working age population (15-64) set to shrink by almost 6 million by 2050, this is projected to significantly reduce university enrolments in the coming years, particularly in less attractive regions. On the other, a growing demand from businesses for technical and scientific expertise, as companies struggle to find personnel with advanced skills and seek faster, more effective ways to collaborate with the university system.

Industrial PhDs – designed to foster collaboration between universities and businesses – represent a strategic channel, but remain underutilised in Italy due to fragmented and overly complex procedures. Their activation often involves lengthy, non-standardised bureaucratic steps that vary across universities and are misaligned with business timelines. This limits innovation potential and hinders the match between highly qualified human capital and innovative companies.

A critical factor is remuneration. At the start of their careers in companies, Italian PhDs earn an average gross annual salary of around €36,000, compared to €55,000 in Germany and €45,000 in France. This gap undermines the attractiveness of research careers in Italy and weakens the link between academia and industry.

At the same time, universities will increasingly need to diversify their role by offering new lifelong learning opportunities and shared educational pathways for students and workers, in order to maintain their attractiveness, scale, and socio-economic relevance.

**RECOMMENDATIONS**

- ▶ Increase the remuneration of PhD researchers – for example, during industrial collaboration programmes (“Dottorati industriali”) – to enhance the attractiveness of research careers and strengthen the link between academia and industry.
- ▶ Streamline and standardise the procedures for activating industrial PhD programmes by introducing national guidelines with defined timelines and simplified contract models.
- ▶ Introduce incentives for universities that develop digital training programmes for lifelong learning.

**PROPOSAL 9**

## R&D Attraction Package: provide long-term stability and certainty for companies looking to locate investments in Italy

**PREMISE**

In Italy, total expenditure on Research and Development (GERD) amounts to 1.38% of GDP (in 2024) – a significantly lower level compared to countries like the United States (3.44%) or Germany (3.13%). Even more relevant is the composition of this expenditure: the private sector contributes 57% of the total (BERD = 0.79% of GDP), while 43% is covered by the public sector. In countries with higher innovation intensity – such as Germany, the USA, South Korea, and Israel – the private share of total R&D spending is significantly higher, ranging from 68% in Germany to 94% in Israel.

This highlights a key issue: the Italian public system has a lower capacity to trigger a proportionate response from the private sector compared to international benchmarks. To match the average of the Top 5 EU countries, Italy would need to increase its BERD investments by 189% (+\$35.5 billion), reaching a total of \$54.3 billion. A key international benchmark is the Israel Innovation Authority, which successfully mobilises private resources through a long-term strategy, clear and stable incentives, and support for collaborative projects between businesses and research centres. Italy offers a wide array of instruments (NRRP, Transition 5.0, extended partnerships, tax credits), but the landscape remains fragmented and not always geared toward structural private sector involvement. The solution is not necessarily to increase resources, but to use them more effectively through more efficient national coordination.

**RECOMMENDATIONS**

- ▶ Strengthen governance by coordinating existing instruments and resources within a long-term plan to develop research projects with industrial management and strong private sector involvement.
- ▶ Ensure stability and attractiveness by providing clear, simple, and long-lasting incentive schemes and regulatory frameworks.
- ▶ Promote initiatives to build integrated industrial ecosystems by connecting companies with their strategic value chains through R&D projects led by industry champions and cross-sector collaborations.
- ▶ Promote the attraction of talents in research and development by introducing targeted fiscal measures for both companies and researchers, focusing on both the quantity and quality of human capital.

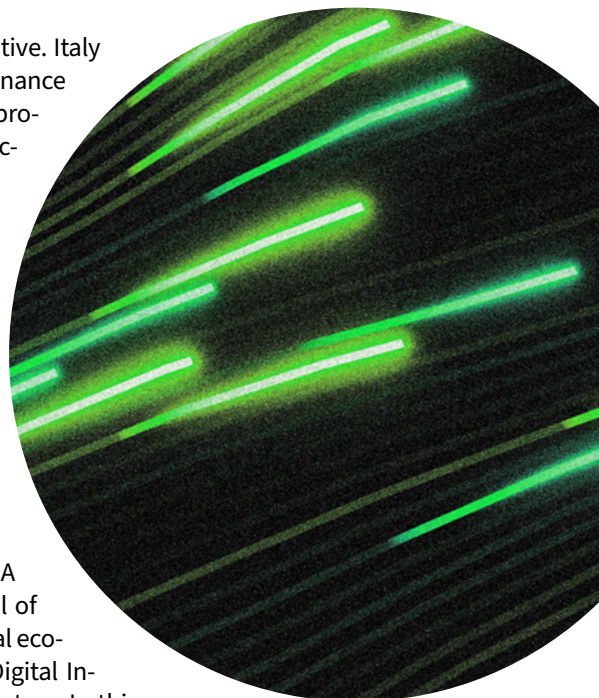
**PROPOSAL 10****Strengthen Technology Transfer in Italy****PREMISE**

Italy produces world-class research but systematically fails to translate it into market value. A telling indicator: Italy transforms only 3% of its scientific publications into patents, compared to 14% in Germany and 12% in France. This gap reflects not a deficit of research quality, but a systemic failure to valorise it.

Currently, 61.0% of Italian Technology Transfer Offices (TTOs) employ fewer than five staff members, while only 13% have at least ten employees. This highlights a significant gap with the European landscape, where TTOs are generally larger and better resourced. For example, looking at patent activity, German TTOs file an average of 20 priority patent applications per year, compared to 8.1 in Italy, underscoring the difficulty of translating high-quality Italian research into protected intellectual property. One of the main obstacles to the growth of Italian TTOs is the lack of personnel with specialised expertise spanning scientific, legal, commercial, and communication competencies.

The challenges are not only quantitative. Italy lacks a coordinated and systemic governance model for technology transfer. Training programmes are limited and not widely recognised, and regulatory barriers remain. Added to this is a cultural issue: the public research system, which is strongly publication-oriented, often neglects intellectual property protection and dialogue with industry.

The traditional linear model of technology transfer – based solely on the transfer of research results from universities and public research centres to businesses – is no longer sufficient to widely disseminate innovation across the Italian productive system. A new peer-to-peer and distributed model of innovation is emerging in various regional ecosystems, particularly within European Digital Innovation Hubs and local technology clusters. In this



model, solution providers are not primarily universities or research institutions, but also startups, IT and deep-tech companies, spin-offs, and specialised consultants – systematically profiled and selected to address the concrete needs of businesses.

## **RECOMMENDATIONS**

- ▶ Establish a unified national governance framework for technology transfer that involves academia, industry, and public institutions on a stable basis, with the task of defining strategic priorities and coordinating initiatives at both territorial and sectoral levels.
- ▶ Invest in the structural growth of TTOs by strengthening their staffing and multi-disciplinary capabilities, creating stable, specialised teams that include scientific, legal, commercial, and communication expertise – aligned with European best practices.
- ▶ Develop structured university and post-graduate training programmes to prepare technology transfer professionals, integrating scientific, managerial, regulatory, and entrepreneurial skills.
- ▶ Identify strategic focus areas in which to concentrate resources and valorisation efforts, avoiding overly dispersed approaches. Priority should be given to domains where Italian research is already highly competitive.
- ▶ Simplify procedures and remove regulatory barriers.
- ▶ Recognise intellectual property protection and engagement with industry as complementary to academic publishing, through incentive and recognition mechanisms – also within academic career advancement.
- ▶ Increase structural public funding for technology transfer.
- ▶ Support the scalability of peer-to-peer and distributed innovation models to enhance the effectiveness and inclusiveness of technology transfer, bringing research closer to businesses and local areas through agile, impact-oriented networks.



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