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Centro Euro-Mediterraneo
sui Cambiamenti Climatici

Investing in Research

A Foundation for Europe's Competitiveness

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Investing in Research: A Foundation for Europe's Competitiveness – CMCC's views

The CMCC Foundation – Centro Euro-Mediterraneo sui Cambiamenti Climatici – welcomes the opportunity to share its perspective on EU funding to bolster competitiveness in the context of the forthcoming Multiannual Financial Framework (MFF).

As Europe faces a complex array of systemic challenges - economic, environmental, technological, and geopolitical, the upcoming MFF represents a crucial opportunity to strengthen European competitiveness by narrowing the innovation and technological gap with global competitors and by addressing disparities within the EU itself.

Closing the R&I investment gap

A fundamental challenge remains the persistent underinvestment in research and innovation (R&I). The Draghi Report highlights that the EU's average R&D expenditure is approximately 2.2% of GDP, falling short of the 3% target set two decades ago, and lagging behind the U.S. and China. To meet the ambition of global leadership in R&I, CMCC joins the wider European research community, in calling for a doubled budget of a minimum of € 200 billion allocated to R&I investments in the next EU budget.

FP10 - driving strategic innovation

Furthermore, given the strategic importance of R&I to Europe's future, it is imperative to maintain a standalone and ambitious EU Research and Innovation Framework Programme (FP10) within the next MFF, as called for among other actors by the European Parliament. This new programme should build upon past experiences and address the key shortcomings of its predecessors, including fragmentation and lack of strategic coherence, excessive complexity and administrative burden, and insufficient focus on transformative outcomes.

FP10 must be designed to support both fundamental and applied research, as well as in low to mid Technology Readiness Levels (TRLs) where public investment is essential to mitigate risk that private investors are often unwilling to take. A results-oriented approach, with greater use of performance-based funding, should ensure that investments lead to tangible societal and economic impacts.

A standalone FP10 can play a central role in enabling implementation of the new European Competitiveness Fund, which is designed to boost strategic technology development and industrial capabilities across key sectors—from AI to space, and from cleantech to biotech. Grounded in a top-down framework of commonly agreed priorities and guided by a strengthened policy steering mechanism, the fund should be implemented in close coordination with FP10 and other strategic instruments.

Earth system science - a strategic priority

In such a context, research in Earth system science, climate change mitigation and adaptation, industrial decarbonization, and the development of future-defining technologies must remain high on the priority list of the EU R&I agenda in the upcoming years. These are the research fields that will help the Union and its member states understand the material context in which their societies, industries and economies will operate and plan for their future. While fundamental research remains important, there will be opportunities to further focus research in these fields towards questions that inform the competitive priorities of the Union.

For example, Earth system modeling can not only effectively inform environmental and economic policy, by predicting and mitigating natural hazards, like floods, droughts, and heatwaves, but, by working with appropriate economic models, it can also inform economic development and growth policies, or examine how Europe, its partners and its competitors will fare over the coming decades, what responses they might engage in, and the implications of those for European competitiveness. By leveraging machine learning advances, it can become a dynamic platform that illuminates not just defensive and adaptive measures in a changing world, but also development and growth initiatives in a competitive world.

Lastly, because Earth systems science and environmental economics are the disciplines that examine our material context and evaluate the effectiveness of its management, they are always at the forefront of technological development with a wide scope for economic and security applications, from satellites to submarine infrastructure and operations. As our material conditions change beyond anything society has experienced before, and do so in an ever more complicated geopolitical context, it is likely that they will once again be crucial companions in the execution of investment and defense policies and strategies.

Strengthening the research ecosystem

A stronger, more agile R&I framework would increase the EU's attractiveness to world-class researchers, help reverse brain drain, and empower European research

institutions to nurture local talent. This aligns with the goal of making the EU an area of free movement for knowledge and talent.

EU funding has played a crucial role in addressing disparities in innovation capacity across Member States. These initiatives have laid the groundwork for globally competitive research and technological infrastructure across Europe. This approach must be scaled up, particularly in key sectors such as climate change science, Artificial Intelligence (AI), and Machine Learning (ML), to accelerate the diffusion and adoption of advanced technologies.

Empowering Research with AI and Frontier Technologies

The CMCC is committed to advancing AI-driven research. CMCC believes this is a game changing innovation that is profoundly affecting not just the execution of existing research agendas, but also expanding scientists' reach towards new problems and questions that were previously impermeable to scientific investigation. The next MFF will be pivotal in ensuring that Europe develops the computational, cloud, and data infrastructure necessary to lead in AI and other frontier technologies. We welcome the European Commission's ongoing efforts to empower EU scientists with access to cutting-edge AI tools and foster a vibrant, sustainable AI ecosystem across the continent.

CMCC firmly believes that investing in research and innovation is not just a strategic necessity but a fundamental pillar for Europe's future competitiveness. By addressing the gaps in R&I funding and prioritizing transformative, results-driven research, while building on a distributed network of distinctive research institutions across member states, Europe can position itself as a global leader in science and technology. Strengthening collaboration, fostering talent, and advancing cutting-edge fields like climate science and AI will not only enhance Europe's economic resilience but also ensure a sustainable future for generations to come.

About CMCC Foundation

The CMCC Foundation – Euro-Mediterranean Center on Climate Change (CMCC) is an international, independent, and multidisciplinary research center dedicated to studying the interactions between climate change and society. Its mission is to produce rigorous and policy-relevant scientific knowledge that supports sustainable development, environmental protection, and the formulation of science-based strategies for climate adaptation and mitigation. CMCC conducts advanced climate research and provides multidisciplinary analyses and datasets, integrating state-of-the-art climate modeling with impact assessments and environmental economics. CMCC is one of the institutions selected by the World Meteorological Organization (WMO) to produce seasonal climate forecasts and collaborates with a network of over 700 partner organizations across 71 countries. Since 2006, CMCC has served as Italy's National Focal Point for the Intergovernmental Panel on Climate Change (IPCC). It also contributes to the Integrated Carbon Observation System (ICOS) European Research Infrastructure Consortium (ERIC), as a member of the ICOS Italy network and coordinator of the Ecosystem Thematic Center (ETC).

At a time of extraordinary change, CMCC is doubling down on its commitment to advanced applied research at the nexus of climate science and socio-economic transformation, powered by a wide adoption of advanced machine learning and data science tools. The central question of the next two decades will be how to sustain broad-based economic growth in the face of rapidly changing material conditions, while continuing to transition to a low carbon industrial base. CMCC intends to answer this question through four interconnected research priorities. First, CMCC aims to transition the suite of climate services and climate prediction tools towards modelling chains that help us predict the socio-economic outcomes, providing tools and insights that inform long-term investment, policy and planning. This includes assessing the economic returns on investments to improve human health, infrastructure, livelihoods, and economies under varying climate scenarios, offering actionable pathways to foster sustainable, resilient communities. Second, CMCC will deepen its focus on global coastal zones, regions that are both increasingly vulnerable to climate change and vital to the global economy. These are highly engineered landscapes, in which environmental stress, high population density, and economic activities intersect. We intend to build portable AI-enabled digital twins to support dynamic management of all coastal infrastructure, both natural and engineered. Third, CMCC will advance a more holistic understanding of the carbon cycle by integrating its industrial, biogeochemical, and physical components. By approaching the carbon system as a unified planetary process, we aim to generate the scientific insights needed to guide effective mitigation strategies and support international climate commitments. These priorities will be supported by a deep integration of artificial intelligence (AI) and machine learning (ML) methods in all research work to enhance every stage of our modeling and analysis

chain, from data assimilation and scenario development to impact forecasting and risk assessments.

The above strategic framework reinforces CMCC's commitment to producing high-impact science that drives informed decision-making and tackles climate change challenges. By doing so, CMCC continues to shape the critical knowledge needed for a more sustainable, equitable, and resilient future.

For further information about the CMCC and our work, please visit www.cmcc.it.

Contacts

CMCC Foundation – Euro-Mediterranean Center on Climate Change
Via Marco Biagi, 5 – 73100 Lecce | TEL +39 0832 1902411

www.cmcc.it | info@cmcc.it | segreteria.direzione@cmcc.it