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IEMed.

The **European Institute of the Mediterranean** (IEMed), founded in 1989, is a think and do tank specialised in Euro-Mediterranean relations. It provides policy-oriented and evidence-based research underpinned by a genuine Euromed multidimensional and inclusive approach.

The aim of the IEMed, in accordance with the principles of the Euro-Mediterranean Partnership (EMP), the European Neighbourhood Policy (ENP) and the Union for the Mediterranean (UfM), is to stimulate reflection and action that contribute to mutual understanding, exchange and cooperation between the different Mediterranean countries, societies and cultures, and to promote the progressive construction of a space of peace and stability, shared prosperity and dialogue between cultures and civilisations in the Mediterranean.

The IEMed is a consortium comprising the Catalan Government, the Spanish Ministry of Foreign Affairs and Cooperation, the European Union and Barcelona City Council. It also incorporates civil society through its Board of Trustees and its Advisory Council.

Union for the Mediterranean
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The **Union for the Mediterranean** (UfM) is an intergovernmental organisation that brings together 43 countries to strengthen regional cooperation and dialogue through specific projects and initiatives that address inclusive and sustainable development, stability and integration in the Euro-Mediterranean area. As a direct continuation of the Barcelona Process, the launch of the UfM in 2008 was the reflection of its member states' shared political commitment to enhance the Euro-Mediterranean Partnership.

The Secretariat of the Union for the Mediterranean, based in Barcelona is the first permanent structure dedicated to the intergovernmental Mediterranean partnership. It ensures operational follow-up of the regional priorities identified and in partnership with key international actors promotes region-wide cooperation projects and initiatives that address the root causes of the current regional security and socio-economic challenges.

PRIMA
PARTNERSHIP FOR RESEARCH AND INNOVATION IN THE MEDITERRANEAN AREA

PRIMA – Partnership for Research and Innovation in the Mediterranean Area is the most ambitious joint programme to be undertaken in the frame of Euro-Mediterranean cooperation. By funding R&I through competitive calls, PRIMA aims to build research and innovation capacities and to develop knowledge and common innovative solutions for sustainable agro-food systems and integrated water provision and management in the Mediterranean area, to make those systems and that provision and management more climate resilient, efficient, cost-effective and environmentally and socially sustainable, and to contribute to solving water scarcity, food security, nutrition, health, well-being and migration problems upstream.

PRIMA also aims to contribute to United Nations' Agenda 2030 through the achievement of the Sustainable Development Goals (SDGs).

PRIMA consists of European Union Member States, Horizon 2020 Associated Countries and Mediterranean Partner Countries on an equal footing basis (co-ownership, co-management and co-funding) with the Participation of the European Commission, under the framework of an art.185 TFEU.

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FOREWORD

Roger Albinyana
Managing Director, European Institute of the Mediterranean

For three decades, the Euro-Mediterranean region has been a hub of research, fostering collaboration among diverse countries and research institutions. Over these years, an evolving network of researchers, policy-makers, and representatives of businesses and universities has worked together to address shared challenges, advance scientific knowledge, and drive sustainable development. This publication, 30 Years of Cooperation on Research and Innovation in the Euro-Mediterranean Region, celebrates this journey, highlighting key achievements, lessons learned, and future aspirations.

The Barcelona Process initially, and the Union for the Mediterranean (UfM) subsequently, have played a pivotal role in fostering this spirit of cooperation with the guidance and support from the European Commission (EC). Since its inception, the UfM has actively supported research and innovation as essential drivers of regional cooperation and prosperity. Through policy dialogues and strategic partnerships, the UfM has provided a platform for collaboration, attempting to ensure that scientific advancements translate into tangible benefits for societies across the region.

This publication brings together three insightful articles and an introductory analysis provided by the UfM. Each contribution explores different aspects of Euro-Mediterranean research cooperation, offering perspectives from policymakers, scientists, and stakeholders actively engaged in shaping the region's research landscape. Together, they present a comprehensive overview of how research initiatives have evolved over the past 30 years and the impact they have had on critical areas such as climate change, digital transformation, sustainable energy, health, and inclusive economic growth.

The introductory article written by **Joan Borrell,** UfM Deputy Secretary General on Higher Education and Research, recalls that the Mediterranean region, despite its rich diversity, faces economic, social and environmental vulnerabilities that hinder integration and collaboration. Recognising the crucial role of research and innovation in addressing these challenges, the Euro-Mediterranean Partnership (EMP) was established in 1995, followed by the UfM in 2008. Against this backdrop, the UfM has since provided a structured platform for dialogue and cooperation, fostering initiatives in key areas such as climate change, renewable energy, and health. Over the years, research networks and collaborative programmes like the Partnership for Research and Innovation in the Mediterranean Area (PRIMA), the Mediterranean Experts on Climate and Environmental Change (MedECC) and BlueMed have strengthened scientific cooperation, contributing to regional stability and development. With a commitment to supporting researchers and leveraging scientific data for policy-making, the UfM continues to promote a forward-looking agenda for innovation, sustainability, and prosperity in the Mediterranean.

The first article commissioned to **Marilena Rossano,** Head of Multilateral Cooperation Section at CNR and UfM National Focal Point, delves into the long-standing cooperation in research and innovation between EU member states and Southern Mediterranean countries that has evolved amid geopolitical shifts and varying levels of engagement. In this vein, the Monitoring Committee for Euro-Mediterranean Cooperation in RTD (MoCo) has played a

key role since 1995 in fostering dialogue, increasing researchers' participation, and strengthening scientific capacities. Despite significant achievements, challenges remain, including limited impact on social and economic development, growing geopolitical competition, and economic constraints favouring bilateral over multilateral cooperation. Moving forward, the author's recommendations include prioritising genuine scientific collaboration, ensuring that regional dialogue includes all countries, and advocating for stronger synergies and targeted funding mechanisms to sustain cooperation.

The second article prepared by **Rafael Rodríguez-Clemente,** Emeritus Professor of Research at CSIC, argues that 30 years after the Barcelona Process, scientific and technological cooperation remains a vital bridge between Euro-Mediterranean countries, helping to address shared challenges like climate change, food security, and migration. However, misunderstandings stemming from differing social values, governance structures, and the role of science in development have hindered collaboration. Despite these challenges, the author warns that scientific networks have fostered strong ties, independent of political divisions. In addition, strategic governance reforms, stronger financial and political support, and improved connections between academia, the private sector, and policymakers are needed to enhance research impact. A co-financed, innovation-oriented approach – similar to the PRIMA programme – could help to translate scientific cooperation into tangible benefits for the region, ensuring sustainability and integration into broader social and economic systems.

Finally, the third article, commissioned to **Ali Rhouma, Antonella Autino** and **Octavi Quintana** from PRIMA, flags the most tangible output of these 30 years of cooperation on research and innovation in the Euro-Mediterranean region by presenting both the milestones and the challenges of this organisation. In this regard, innovation is the process of transforming new ideas into practical solutions that drive economic growth, social progress, and improved quality of life across various sectors. Beyond technology, it encompasses novel business models, process improvements, and problem-solving approaches. In the Mediterranean, PRIMA applies innovation to address environmental and socioeconomic challenges such as water scarcity, soil degradation, and climate change impacts on agriculture. PRIMA funds scalable, research-backed projects, and emphasises real-world applications through demonstration sites and stakeholder collaboration. While PRIMA projects have advanced sustainability efforts, the authors believe that many remain at intermediate Technology Readiness Levels (TRL). Hence, in order to maximise their impact, greater small and medium- size enterprises (SME) involvement, stakeholder engagement, large-scale demonstration sites, and scaling-up mechanisms are needed to transition successful innovations from pilot phases to widespread adoption.

As we reflect on the past 30 years, it is evident that research and innovation will continue to play a fundamental role in shaping the future of the Euro-Mediterranean region. Strengthening cooperation in these fields is not just an academic or economic imperative, it is a necessity for building resilient, knowledge-driven societies that can collectively address global challenges.

We hope this publication serves as both a tribute to past achievements and a

catalyst for renewed commitment to scientific collaboration in the years ahead. Through sustained investment in research and innovation, the Euro-Mediterranean region can continue to foster shared prosperity, stability, and sustainable development for generations to come.

A Lesson from Thirty Years of Cooperation on Research and Innovation: Science Brings Value to Regional Dialogue

Joan Borrell Mayeur
UfM Deputy Secretary General on Higher Education and Research

The **Mediterranean** is a region rich in diversity but also marked by vulnerabilities exacerbated by climate, economic and social crises. It is also an area with limited integration[1] despite potential complementarities between the different shores, such as the presence of a young and highly educated population in the southern countries. In this context, regional dialogue on scientific research and innovation is fundamental for developing innovative and shared solutions that can benefit everyone.

On 28 November 1995, Barcelona, a booming hub nestled on Spain's Mediterranean coast, became a beacon of hope for the broader region, bringing together Northern and Southern Mediterranean countries to establish a new path for dialogue and cooperation: the Euro-Mediterranean Partnership (EMP).

Built on the hope brought forth by the Oslo Accords, its first objective was to promote the emergence of a common area of peace and stability. Domains of cooperation, so-called "baskets" of common interest, were identified. These, significantly, included the recognition of science and technology as catalysts for socioeconomic development and the need to strengthen the capacity and development of scientific research.

In 2008, an expanded European Union (EU) and its Mediterranean neighbours met again, this time in Paris. This meeting established the Union for the Mediterranean (UfM), an intergovernmental framework with a Secretariat in Barcelona, a nod to the historical role of the1995 gathering.

Because research and innovation were understood to be at the core of cooperation policies, the UfM has had a unit dedicated to this field since its inception. Becoming fully operational almost 15 years after the launch of the Euro-Mediterranean Partnership, the establishment of the UfM had the goal of bringing support, focus and structure to sectoral dialogue.

This has been particularly important in the case of research and innovation as many initiatives had already been started and implemented in this domain over the decades, contributing to the creation of a "community of practice" across the region.

Nowadays, the UfM is the only intergovernmental organisation that brings 43 Euro-Mediterranean countries to the same table. Offering valuable opportunities for much-needed long-term dialogue, the aim of this partnership is to promote regional cooperation in strategic areas where research and innovation can create an added value, such as water, the environment, economic development, and more.

Providing structure and continuity to previous efforts, the UfM's institutional dialogue is valuable in and of itself considering the vast differences among and with countries in the region, one of the least integrated in the world. Equitable and fair efforts have contributed to building shared principles and needs, developing a support system for our region's researchers despite the fact that many of the challenges existing back in 1995 still resonate today, including issues relating to academic mobility, training, and the valorisation of research findings.

Sectoral collaboration in the Euro-Mediterranean context is guided by a methodology based on three key pillars: political en-

[1] Overall, while progress has been made, the Euro-Mediterranean region remains one of the least economically integrated globally. OECD. (2021). Regional Integration in the Union for the Mediterranean: Progress Report. Paris: OECD Publishing, https://doi.org/10.1787/325884b3-en

gagement through ministerial conferences and their resulting declarations; policy structures, including regular meetings of senior officials from sectoral ministries; and the implementation of tangible projects and initiatives.

When it comes to scientific cooperation, the UfM strives to build on a very rich ecosystem and a vibrant Euro-Mediterranean dialogue, which had already delivered ministerial meetings and successful initiatives. In fact, cooperation on research and innovation can be singled out as one of the most successful in this region.

Against this backdrop, the Ministerial Declaration of the Union for the Mediterranean on Research and Innovation (Paris, 2022) sent a clear political message thanks to the leadership of the UfM Co-Presidency – the European Commission (EC) and the Hashemite Kingdom of Jordan. It also laid the political foundation for three critical themes for the Mediterranean's future: climate change, renewable energy, and health.

Offering a space for dialogue, the UfM Regional Platform on Research and Innovation invites representatives from ministries from its 43 member states, building consensus and action around the ministerial commitments.

Despite the difficulties the region is facing, namely a shifting global context and complex geopolitical scenario, being able to come together is a testament to the fact that scientific cooperation is a key element of any future our citizens may envision.

To give new impetus to the platform's existing structure, and on a continued quest to improve impact for Mediterranean citizens, the creation of working groups on scientific matters was endorsed in 2024, to be established with Northern and Southern countries on an equal footing in line with the UfM's reigning philosophy.

Supporting the development of new data, results, and innovative solutions also has an added value in facilitating work in other domains. The UfM always strives to embed scientific data in its regional cooperation toolbox by combining it with expertise and diplomatic outreach.

A case in point is climate. When it comes to climate negotiations, the Mediterranean region is typically divided among three continents and different negotiating groups. The work of institutes, initiatives, and individual researchers has created a common wealth of knowledge that has advanced our understanding that in this small semi-enclosed basin, the second fastest warming region in the world, climate change can have devastating regional consequences.

This was possible largelythanks to the knowledge repository that is the **Mediterranean Expert Group on Climate Change** (MedECC), which published the first assessment report on the impact of climate change in the Mediterranean and subsequent studies on its consequences.

Examples of what we can achieve through regional co-ownership of scientific initiatives abound in many areas of interest, such as in the agro-food sector or water. The positive impact of the **Partnership for Research and Innovation in the Mediterranean Area** (PRIMA) would warrant a discussion on its own, while, the **Mediterranean Initiative** (part of Horizon Europe's Programme) also benefits the UfM priorities on research and innovation, climate, energy, and health. The various academic networks such as **UNIMED** or the two Euro-Mediterranean universities, meanwhile, have created a distinct regional identity among higher education institu-

tions, facilitating the circulation of ideas and talent. These are but examples of the potential of **science diplomacy** as a force for good in the Mediterranean.

A strong belief in bridge-building led the UfM to organise the first Euro-Mediterranean Conference on Science Diplomacy in 2023 in partnership with the European Commission (EC), and a similar exercise with the involvement of the League of Arab States in 2024.

This field has been singled out as it builds trust among regional actors and creates a space for cooperation despite geopolitical tensions. It also weaves together delicate human and scientific threads based on trust and mutual understanding.

At a time of heightened tensions, the neutral language of science reminds us that dialogue is always possible. Science, technology, knowledge, and culture can truly connect us in a common drive toward prosperity and sustainability.

In a Mediterranean facing urgent and epochal challenges, researchers can serve as catalysts for positive change. Concrete initiatives can demonstrate the transformative potential of science as a tool for dialogue and stability. Our shared sea, an interface between different continents, is a source of both unique hurdles and opportunities. Science is an unavoidable ingredient in achieving sustainable and shared prosperity, building a positive agenda between our shores.

Thirty years after the launch of the Barcelona Process, the UfM stands committed and steadfast in its support for all efforts to transform the Mediterranean into a laboratory of innovation, solidarity, and shared progress.

The Role of the Euro-Med Forum for R&I: Challenges and Bottlenecks

Marilena Rossano
CNR - Unit for International Relations, Head of Multilateral Cooperation Section and UfM National Focal Point

List of acronyms and abbreviations

BlueMed	Research and Innovation for blue jobs and growth in the Mediterranean area
DIS	Dedicated Implementation Structure
EC	European Commission
EMIS	Euro-Mediterranean Innovation Space
EMP	Euro-Mediterranean Partnership
ENP	European Neighbourhood Policy
EU	European Union
EU-MED GSO	Euro-Mediterranean Group of Senior Officials
IncoNet	International Cooperation Network: FP instrument for bi-regional cooperation
MPCs	Mediterranean Partner Countries
MoCo	Monitoring Committee for Euro-Mediterranean Cooperation in Research and Technological Development (RTD)
NCP	National Contact Points of the EU Framework Programmes for R&I
NFP	National Focal Points of the UfM Regional Platform for R&I
NGO	Non-Governmental Organization
PLO	Palestine Liberation Organization
R&I	Research and Innovation
SRIA	Strategic Research and Innovation Agenda
UfM	Union for the Mediterranean

Introduction

Cooperation on Research and Innovation (R&I) between the European Union (EU) member states and Mediterranean Partner Countries (MPCs) is rooted in the continuous cultural interchanges existing since ancient times between the two sides of the Mediterranean Sea. The flux of knowledge and scientific and technical practices has changed direction several times, due to the geopolitical context and also to the linkages, sometimes strong, sometimes very weak, between the countries concerned. In fact, in most troubled periods, the bilateral aspects of cooperation have been more prominent than multilateral aspects. It has been observed, moreover, that there is always a push from some states or international organisations to become a "principal actor" to renew the regional cooperation process for enhancing R&I. The paper provides an analysis of the results of the regional meetings of delegates from the ministries of university and research to examine good intentions and real achievements, to analyse the role of the European Commission (EC), and to determine how science may be perceived when associated with the word diplomacy.

Executive summary

The Monitoring Committee for Euro-Mediterranean Cooperation in Research and Technological Development (MoCo), later EU-Med GSO, and the

UfM Platform for R&I, here simply referred to as "The Forum for R&I", brings together delegates from EU member states and MPCs and has been evolving along with the changes in the environment of cooperation between the two regions. Its longevity allows reflection in general terms on the results and impact achieved over time and identification of the challenges that it will face in the near future. It is a positive fact that The Forum for R&I has been able to meet regularly since 1995 with a mandate to take stock and evaluate the progress of the Barcelona Process. This is an undeniable sign that, in spite of the difficulties and political turmoil, all countries are aware of the importance of cooperation in R&I.

The question arises as to how efficient it has been in fulfilling its objectives, and finding proper solutions to the issues and needs in the region concerned.

An important element to be taken into account when assessing The Forum for R&I's effectiveness are the contextual conditions (political, financial, programmatic, and so on) in the Northern and Southern Mediterranean Sea countries. In order to examine the degree of implementation of the Forum recommendations, an in-depth analysis of these conditions is required. Moreover, many recommendations need time to mature before initiating the implementation phase.

In any case, the Forum helped to achieve the following:

- high level dialogue between those responsible for R&I policies from Mediterranean and EU countries;
- more participation of researchers from MPCs in the EU Framework Programmes;
- mobilisation of thousands of researchers from both regions to work on joint projects;
- involvement of MPC researchers in international research networks;
- strengthening of scientific capacities;
- co-ownerships of programmes and alignment of part of the national policies for R&I in both the EU and MPCs.

Despite undeniable achievements, there is a general feeling that this cooperation has not achieved its targeted objectives. The main drawback usually pointed out is the failure to have a real impact on the social and economic development in the area, but also on regional integration and dialogue.

At least two of the following can explain this shortcoming:

1. International cooperation is only one element of a global, national and EU strategy for promoting R&I.
2. The rapid expansion of Chinese and Russian influence in Africa since the arrival of the new millennium has facilitated the creation of a truly multipolar geopolitical landscape on the continent that may affect R&I cooperation with Northern Africa and the Middle East, above all when dealing with innovation issues, start up, and business development.
3. The unfavourable economic situation and migration trends, leading the countries and the EC to favour bilateral relations instead of the more demanding and complex multilateral cooperation (with the exception of continuing the on-going main projects).

The recommendations for the future are as follows:

- escape from the rhetoric of science diplomacy: scientists need to continue to do what they are able to do, which means sharing knowledge and know-how based on scientific cooperation and targeted objectives;

- National Focal Points, as delegates of national countries, need to continue to spur the EC and national institutions to strengthen regional cooperation, and find new instruments and synergies between programmes and funding. They need to be a permanent part of strategy-building and ensure that the means to reach the objectives are really targeted for the scope;

- regional dialogue is the sum of all the countries involved. There is a need to recover those countries that for the reasons described in this paper were left behind;

- since the words we use construct reality, it is time to reuse the word "co-operation", i.e. "the action or process of working together to the same end" and not the terms "global strategy" or focused joint research activities, which imply combining efforts to deal with specific challenges, safeguarding and promoting EC values, interests and best practices.

The disruptive initiative

While the final goal in Camp David was a "peace treaty between Israel and Jordan, taking into account the agreement reached in the final status of the West Bank and Gaza," the Oslo negotiations were directly between Israel and the Palestine Liberation Organization (PLO) and aimed at a peace treaty directly between these groups. The Oslo Accords merely aimed at an interim agreement that allowed first steps. This was intended to be followed by the negotiation of a complete settlement within five years. On 13 September 1993, the Declaration of Principles was signed. The PLO recognised the State of Israel, while Israel recognised the PLO as "the representative of the Palestinian people." When, however, a Jordan-Israel peace treaty was concluded on 26 October 1994, it did not include the Palestinians.

As Senén Florensa, President of the Executive Committee of the European Institute of the Mediterranean (IEMed), explained, "the 1990s was a decade of optimism for Europe and of confidence in the future." The idea was to project its progress and stability by attracting the countries of Central and Eastern Europe and the Southern and Eastern Mediterranean to its camp. To those in Eastern Europe, it would offer aid for their transition to a market economy and democratic institutions, together with the prospect of future integration into the EU proper. To those of the South, it would offer association and partnership, through which the shockwave of European progress would reach the other side of the Mediterranean. This was expected to decisively boost the countries of the South so they could take the definitive leap into institutional, economic and cultural modernisation. The undertaking was therefore enormous, a major political project to create a great, pan-Mediterranean area of peace and stability, the Euro-Mediterranean Partnership (EMP), which was to be mainly driven economically by the shared economic progress that a major free trade area would generate.

R&I was one of the chapters of the EMP, which meant giving a Euro-Med dimension to bilateral relations in science and

technology; ensuring exchange of information, views and recommendations on R&I policy in the Mediterranean region; identifying issues of regional importance; and proposing actions to be taken in the interests of the region. This led to the establishment of a permanent forum on R&I, a Monitoring Committee for Euro-Mediterranean Cooperation in Research and Technological Development (MoCo), as was recognised by the Euro-Mediterranean Science and Technology Ministerial Meeting in Sophia Antipolis in March 1995. The Committee was formally set up, in the framework of the Barcelona Declaration, in November 1995. MoCo is formed by senior officials and representatives (delegates) of the ministries responsible for research from both EU member states and MPCs, as well as by EC representatives. Its first meeting was held in Barcelona in 1995, immediately after the Barcelona Conference. MoCo has been convened regularly, usually once a year, first under the responsibility of the EU member state holding the chairmanship of the EU Council and one of the MPCs, which also set the agenda in consultation with the EC in charge of the Secretariat of the Committee. The Co-Presidency system of the Union for Mediterranean (UfM) was established in 2008. In R&I, as on other issues, this provided a more inter-governmental role. The UfM does not provide funds for R&I actions, as they fall mainly under EU programmes, but ensures a framework of dialogue. Figure 1 shows the different structure of The Forum for R&I over time. Today, the delegates of the countries concerned are UfM National Focal Points for R&I, nominated from both the ministries of research and the ministries of foreign affairs, while the senior officials of the UfM are the representatives of the ministries of foreign affairs. Moreover, a bureau has been created to deal with all the activities between one UfM Regional Platform for R&I meeting and the next.

Role, mission and changes of MoCo over time - The search for a common framework to implement R&I in the Mediterranean region

In order to better assess policies and actions for integrating R&I in the Mediterranean area, four different periods are analysed, depending on the main geopolitical issues, EU funds and strategies, as well as the evolution of the Forum:

Period 1995-2008
Period 2008-2012
Period 2013-2019
Period 2020-2024

Period 1995-2008 – Optimism and the first challenges

Many programmes and initiatives have been launched within the EU Framework Programme for RTD to support multilateral cooperation in the Mediterranean area, especially in the period 4th – 7th FP (1994-2013). Some projects, such as ESTIME (2004-2007) and ASBIMED (2004-2006), sought to characterise the R&I system in MPCs and EU-MPC bilateral scientific cooperation. The MED7 (2005-2006) project aimed to identify the topics of common interest between the EU and MPCs to define priorities for EU-MPC international cooperation within FP7. EUROMEDANET (2004-2006) and ERAMED (2008) aimed to support the creation and development of the Framework Programme Information Points (now NCPs) in the MPCs (see Table 1).

Moreover, there were many other important projects for scientific and technological cooperation in the Euro-Mediterranean area,

in the context of other instruments, such as: the MEDA programme; the Short and Medium Term Priority Environmental Action Programme (SMAP); the Euro-Mediterranean Information System on Know-how in the Water Sector (EMWIS); the Euro-Mediterranean Information Society (EUMEDIS) initiative; and Euromed Heritage, a regional programme for Euro-Mediterranean cultural heritage.

Funds were provided by the EC through calls for proposals to both the EU and MPCs to work together on the political framework of R&I: identification of priorities, best instruments to collaborate, and so on. MoCo delegates proposed some meetings on their own initiative to enhance cooperation and try to respond, as well as possible, to new issues arising from a changing scenario:

1. Intensified tensions in the Middle East;
2. Eastward expansion of the EU.

During this period, they had to deal with two new initiatives:

a. Introduction of the European Neighbourhood Policy (ENP) in 2003;
b. Launch of the UfM in 2008.

In particular, the introduction of the ENP by the EC indicated that the EMP was creaking. The ENP was also directed towards the East and was based on the values of democracy, rule of law and respect for human rights. The EU policy of security on integration prevailed: neighbour countries needed to share EU values.

During the MoCo meetings at the time, it was clear that the new ENP was leaving some countries behind, such as Libya, and strengthening cooperation with some Maghreb and Mashreq countries, such as Tunisia, Morocco and Jordan.

Thus, instead of an equal partnership between two distinct blocs of states, what emerged was a "hub-and-spokes" arrangement between the EU, on the one hand, and individual MPCs, on the other, with the EU setting the pace and the Southern states responding bilaterally. The South-South integration needed to be revitalised.

To deal with some of the aforementioned problems and encourage cooperation in the Euro-Med R&I area, some initiatives have been carried out by the Forum:

a. The creation, in the period in which the ENP was under discussion, of an "Ad-Hoc MoCo Group", that is to say, a restricted group of the MoCo, involving the EU and Non-EU Med Countries to be engaged in translating policies in more specific agendas and activities to foster cooperation;
b. The launch of NETRI-Med in 2002 in Antalya to create a network of public research institutions of Euro-Med countries supporting the MoCo actions and policies at a regional level;
c. The firm request for EU Framework Programme Coordination and Support Action to support EC and MoCo actions to address issues of common interest.

The recommendations for the period 1996-2008 were mainly focused on:

- finding synergies and complementarities between instruments (FP, MEDA);
- clustering projects;
- enhancing capacities of RTD institutions in the MPC and favouring training and networking;
- giving European and MPC research

institutions a more prominent role in the Barcelona Process;
- addressing actions responding to specific priority issues of common concern.

An important framework to be considered is the political declaration made at the first Euro-Mediterranean Ministerial Conference on Research and Higher Education, held in Cairo in June 2007, establishing the main framework of objectives to be pursued for Euro-Mediterranean cooperation in research and higher education, such as increasing system capacity, enhancing the participation of Mediterranean countries in EU-funded programmes, and promoting innovation. These objectives became a main frame of reference to orient projects and actions jointly undertaken by the EU and Southern and Eastern Mediterranean countries.

At the same time, there were some bottlenecks:

I) The difficulties faced in organising ministerial conferences on research (as it was envisaged and pursued for other issues of the economic partnership of the Barcelona Process, i.e., for water, energy, etc.) due to political issues at regional but also community level.
II) In 2007-2008, following the Cairo Declaration, a forum of experts and representatives of higher education was convened, and should had adopted a stable and formal shape and established regular relations and complementary activities with MoCo. But, notwithstanding the shared will, the process has not yet been implemented. Hence all the efforts to have two panels, one for research and innovation and one for higher education, are still waiting for new times and better solutions.
III) The need to have additional funds to organise MoCo meetings.
IV) The lack of a secretariat, which could ensure continuity between MoCo meetings. This is a particularly important aspect for a forum where the representatives of the ministries may change over time.

Period 2008-2012 – IncoNet as an instrument to actively involve Euro-Med partners

Since the IncoNet instruments under the FP7 Capacities programme allowed for multi-annual projects acting as dialogue platforms to strengthen and support the bi-regional cooperation on R&I, the MIRA project was designed to support MoCo actions. MoCo acted as a Steering Committee of the MIRA project, assessing needs and priorities, while MIRA provided the Committee with a Secretariat, giving it the possibility to ensure the continuity of its functioning. The FP7 IncoNet Project MIRA developed a dense work programme aimed to: "Promote, organise and contribute to the participation of third countries in the activities of FP7; promote regional integration and facilitate the uptake and use of common identified research areas and the monitoring of performance and impacts of international S&T cooperation across the Specific Programmes of FP7." The MIRA project was followed by the MED-SPRING project that also enlarged the policy dialogue to non-governmental organizations (NGOs) and citizens and, according to the FP Work Programme, focused on three societal challenges: energy, high quality affordable food, and scarcity of resources, including water. The needs and debates around these issues paved the way to the first ERANET for the Mediterranean, and were useful for identifying priorities and gathering consent for the launch of the PRIMA Art.185 pro-

gramme, based on joint co-funding and ownership.

The MoCo recommendations for the period 2008-2012 have been analysed in terms of corresponding typology by using the conclusions of each MoCo meeting. In some cases, the minutes state clear recommendations, while in others they are in the form of an acknowledgement or an agreement to be taken into consideration in the future.

Apart from the recommendations dealing with the functioning of the MoCo, its instruments and status, the main outputs have been divided per year and per object and illustrated in Table 2.

As can be seen in Table 2, some recommendations are replicated two or more times. This reveals their importance as well as the persistence of factors that gave rise to such recommendations. In fact, strengthening the scale, scope and impact of cooperation activities, enhancing complementarities between instruments, and increasing the mobility of researchers and capacity-building were the most important in the period concerned (Table 3).

Period 2012-2019 – Co-funding and co-ownership: a renewed agenda

The 17th MoCo Meeting (Malta, 19-20.11.2012) marks a turning point in the evolution of these meetings in many aspects, but above all one: implementation of a Joint Programme under Art.185 of the Treaty on the Functioning of the EU (TFEU) was taking shape. Many meetings involving the main representatives of the ministries of higher education and research were organised to discuss the feasibility and the programme of an Article 185 for the Mediterranean. At the 17th MoCo meeting, a first draft of the Euro-Mediterranean Ground for Research and Innovation Partnership (EMGRIP) was presented by the representative of Italian Ministry of University and Research. At the end of the meeting, the title Partnership for Research and Innovation in the Mediterranean Area (PRIMA) was agreed upon, but many obstacles remained to be overcome. First, the possibility of having the aforementioned Art.185 during the period of the 7th FP. Moreover, the need for many MPCs to sign a Bilateral Agreement with the EC to have the additional funds from the Programme. It involved a great deal of hard work but all the efforts were worthwhile since PRIMA is the first regional programme co-funded by the Euro-Mediterranean states and the EC.

In the meantime, as mentioned, in continuity with the previous IncoNet MIRA, the IncoNet MED-SPRING (2013-17) was drafted and approved at a particular time in the history of the Euro-Mediterranean region, characterised by the effects of the Arab Spring, on the one hand, and by the strong momentum for strengthening Euro-Med cooperation given by Art.185 of the TFEU, on the other. The project contributed to keeping the Euro-Med dialogue on R&I cooperation alive among different actors: institutions, research managers, researchers, academia, and civil society. In particular, the Euro-Mediterranean Expert Group established up by MED-SPRING project played a pivotal role by bridging and negotiating among the three main stakes involved – civil society, research and policy-makers –, providing recommendations for more effective regional policies, able to enhance a holistic and sustainable approach, for instance, to the Water-Energy-Food nexus.

This dialogue led to the identification of common challenges, gaps, opportunities and priorities. Some of these elements have fed the drafting of the PRIMA initiative, and MED-SPRING has undoubtedly contributed to increasing Mediterranean research communities and institutions' awareness of the importance of an initiative under Article 185 of the Lisbon Treaty.

A strong political impulse also came from the organisation of the Euro-Mediterranean Conference on R&I: An Agenda for a Renewed Partnership (Barcelona, 2-3 April 2012), where the EC and all the stakeholders involved agreed on the recommendations and commitment for stronger Euro-Mediterranean cooperation in R&I. Moreover, the experience of ERANET-MED paved the way to PRIMA since it was the first time different countries from the Mediterranean region pooled money from their national research funds to co-fund joint R&I projects. They also experienced the coordination of multilateral projects, bearing in mind the EU project had been coordinated by EU member states, with some exceptions. During these years, the main results included the creation of a Task Force in April 2013, the mapping of cooperation activities, the decision on the location of a Dedicated Implementation Structure (DIS) for PRIMA, and the appointment of a PRIMA Chair. Multilateral activities and South-South cooperation seemed to be the pathway for regional integration and shared benefits from R&I activities.

During those times, multilateral cooperation was also strengthened by the EC in other geographical areas, and, according to the naming of other regional Fora, MoCo became the Euro-Mediterranean Group of Senior Officials (EU-MED GSO), starting from the 18th EU-MED GSO (formerly MoCo) meeting held in Brussels, on 18 December 2013.

Another paradigm shift is worthy of mention here: the increasing role of the EC. The signing of agreements for PRIMA, the result of the EU co-funded actions, gave prominence to its role, as member states were part of this policy and personally involved in drafting the Strategic Research and Innovation Agenda (SRIA) in the framework of the MED-SPRING and ERA-NET MED projects.

The recommendations aiming at "strengthening scale, scope and impact" of the first MoCo period were taken into consideration and turned into policies and strategies by the EC. But the focus on "enhancing complementarities between instruments" and programmes resulted in greater participation of different EC-DG representatives in the EU-MED GSO agenda (and in the envisaged speeches), who illustrated different programmes and instruments and reduced, in reality, the space for the debate from the EU-Med partners. In fact, the political role of the EC grew very much as a result of negotiations for the PRIMA programme and the holding of a conference for the 20th anniversary of the Barcelona Process. Moreover, the meetings with the exception of the last, were always held in Brussels.

Innovation, as one of the key results of scientific cooperation, became a key word. The conclusions of the Euro-Mediterranean Conference of April 2012 called for a renewed partnership, based on the principle of co-design, co-ownership and co-funding but also on deep involvement of stakeholders and innovation representatives; in other words, business associations, SMEs and others.

The decision to establish a Common Euro-Mediterranean Innovation Agenda was taken at the meeting of the EU-MED GSO in R&I, in December 2013, and, with the support of the MIRA Project, a document

was prepared which resulted in a framework for a Joint Regional Action addressing the Euro-Mediterranean Innovation Agenda, approved at the 19th meeting of the EU-MED GSO (Brussels, 24 September 2014).

As illustrated in Table 4 and Table 5, the main results of the Forum were focused on support for PRIMA, BlueMed, while migration was emphasised many times as an issue that should also be addressed in R&I activities.

Period 2020-2024 - Working and thinking at a distance

The 24th meeting of the Forum held in Barcelona (after many meetings organised in Brussels), and the Covid-19 pandemic, which came shortly after, opened a new framework of R&I cooperation in the Euro-Mediterranean area:

– Changes in governance: Since the UfM is an intergovernmental institution embracing 43 countries from the EU and Mediterranean area, the representatives of the national ministries of foreign affairs are UfM Senior Officials. This is why in the renewed Platform for Euro-Mediterranean Cooperation in R&I (formerly the EU-MED GSO), the members of the EU and MPCs are delegated not only by the ministries of higher education and research but also by the ministries of foreign affairs. They are the National Focal Point (NFP) of the UfM Platform for R&I in the Mediterranean area.

– Priority sectors and key instruments: The Covid-19 pandemics and the subsequent lockdown showed to the world three main R&I aspects: a) Science is needed for the wellbeing of humanity; b) data and knowledge exchange at global level are essential to advance in R&I; c) R&I results have to be better communicated to citizens, who need to be really involved as stakeholders from the outset. Access to medical data and cooperation on a global level was extremely important during the Covid pandemics. The Covid crisis has led several UfM countries to experience cooperation among the ministries of higher education, ministries of health and the private sector to cooperate at national and international level to develop vaccines and innovative treatment methods to cope with the disease. The integration of the health dimension in future priorities based on opportunities – already afforded by the mandate of the Valletta Declaration (2017) – have been unanimously agreed.

As far as the priority topics are concerned, the results of PRIMA and BlueMed have been useful to address some of the main priorities established for the region in the 2020s: climate change, renewable energies and health, as agreed during the 25th meeting of the UfM Platform for R&I held in June 2020, which also established an Expert Group (EG) made up of leading academics in the fields, in order to:

- develop a set of Roadmaps/Theories of Change and Impact Pathways (TCIPs) addressing key challenges and opportunities in each of the three priority areas of the platform;
- prepare an assessment of horizontal linkages between these areas.

An open consultation has been launched to have the contribution of all the Mediterranean stakeholders as far as possible to share ideas and joint results.

The Roadmaps and the Action Plan for the Mediterranean area were endorsed at the UfM Ministerial Conference on Research and Innovation (27 June 2022).

The evidence of the changes in the governance of the former MoCo, the renewed agenda for the Mediterranean by the EC and the increased focus on interdisciplinary cooperation in R&I are among the main results of this period.

The UfM played an important role in fostering dialogue and cooperation in the area concerned and keeping the interest in the Mediterranean very high, also inviting the delegates of the ministries of university and research in other Fora and meetings addressing the sustainable development of the Mediterranean.

The term science diplomacy has been brought to the fore, now more than ever. If it is true that the main Steering Group for R&I at bi-regional level (MoCo) is now under the umbrella of an intergovernmental institution represented by the ministries of foreign affairs - besides representing ministries of research -, the science and the diplomacy concepts should be separated each other. The risk is that foreign policies, instead of being supported by the number of scientific collaborations, may prevent participation of scientists from conflict areas to relevant R&I projects and fora.

The Ukraine conflict, started in 2021, and the Hamas attack and Israel's military response in Gaza in 2023 have further given prominence to the Science Diplomacy term.

However, in the case of Ukraine, some EU universities and research centres were asked to stop their activities with Russian partners, which is the contradiction in terms of science diplomacy.

As far as Israeli-Palestinian relations are concerned, there are instead many projects that clearly show how culture goes beyond geographical and political borders and researchers cooperate in spite of conflicts.

The concern today is whether this cooperation can really help bring about a sustainable and peaceful world. Migration is associated in the Mediterranean renewed agenda under climate change and related issues. Can it be mitigated by an effective science diplomacy in this field? How far do security reasons affect the mobility of researchers and underpin hostility and raise barriers? The presence of Israel and some Southern and Eastern Mediterranean countries is a fact in several scientific projects; R&I fora should try new ways of involving those countries missing in the debate for too many years.

Notwithstanding the recent geopolitical scenario, or perhaps because of it, communication of the effects of cooperation in the region are at the maximum level. This can easily turn into a rhetoric of cooperation, which science and scientists should always avoid.

As far as MoCo is concerned, a mapping analysis of the projects has been agreed and announced. The EC provided a Mapping/Portfolio of Euro-Med R&I cooperation projects in January 2023, with reference to H2020 (155 projects), PRIMA (60 projects) and ENI CBC (37 projects) funded actions in three main areas: health, climate change, and renewable energy. The analysis was presented both in the 29th and 30th UfM Regional Platform meetings, as reported in Table 6, following the agenda and the results for the period 2020-24.

What the results do not indicate is the decreasing participation of EU member states in the forum meetings. The UfM cover the expenses of MPCs to join the

meeting, so we are not able to compare the participation of the EU and MPCs on an equal footing. Moreover, it is organised back-to-back to other events. And it is very strange that the fewer people take part, the more emphasis is placed on the forum.

The economic crisis and the wars affecting countries after the Covid pandemic greatly reduced funds for cooperation and trust in a better future, while the presence of the EC, acting for EU member states, and the UfM, as an intergovernmental institution, partially remove the responsibility to take an active part. The role of the EU and MPCs delegates and NFP needs to be revitalised, not as a right arm of the EC but as relevant stakeholders of the countries concerned, with their culture, their bilateral relations with many of the MPCs, their capacity to criticise or to emphasise the role of the EC and Euro-Med strategy for cooperation. The role of the MPCs needs to be revitalised too. Many scientists from southern and eastern Mediterranean Countries would like to cooperate more on Artificial Intelligence (AI), physics, applied maths, as many bilateral programmes based on a bottom-up approach can attest. The challenge will be listening to the new generation of scientists and go out by the schemes we are confident with. Moreover, small international teams, as said by some experts of Science of Science (SciSci), are more willing to disrupt science and technology drawing on less prevalent ideas, instead of developing popular R&I ideas obtaining high, but often short-lived, impact.

Without the engagement of the new generation, a heartfelt, joint, in-person debate around a common table, there will be no real progress towards important objectives and a true integration.

Conclusions

The UfM policy and the new role played by the EC should be directed to support cooperation while spurring South-South cooperation. It should be stressed that no cooperation can really cope with the future challenges if there is no shift from a vision based on economic competitiveness to an approach towards “social well-being”.

Until R&I competitiveness is not combined with social, environmental and employment-creating programmes, it will only contribute to increasing a disenchanted social perception of the benefits of scientific practice, both in the EU and MPCs.

The knowledge environment and R&I will play a role only if political and social dialogue start to share the same comprehensive language at both national and international level.

There is a need to get away from the rhetoric and think about a common feature with a renewed vision that includes different cultures, ideas and values. Integration is not harmonisation. The national members of the Regional Forum for R&I need to be principal investigators of solutions and strategies, as they were at the beginning, and avoid the temptation to delegate policies to the EC and dialogue to the UfM.

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Annexes

Figures, boxes and tables

Figure 1. The Forum for R&I over time - Rossano, M. (2024)

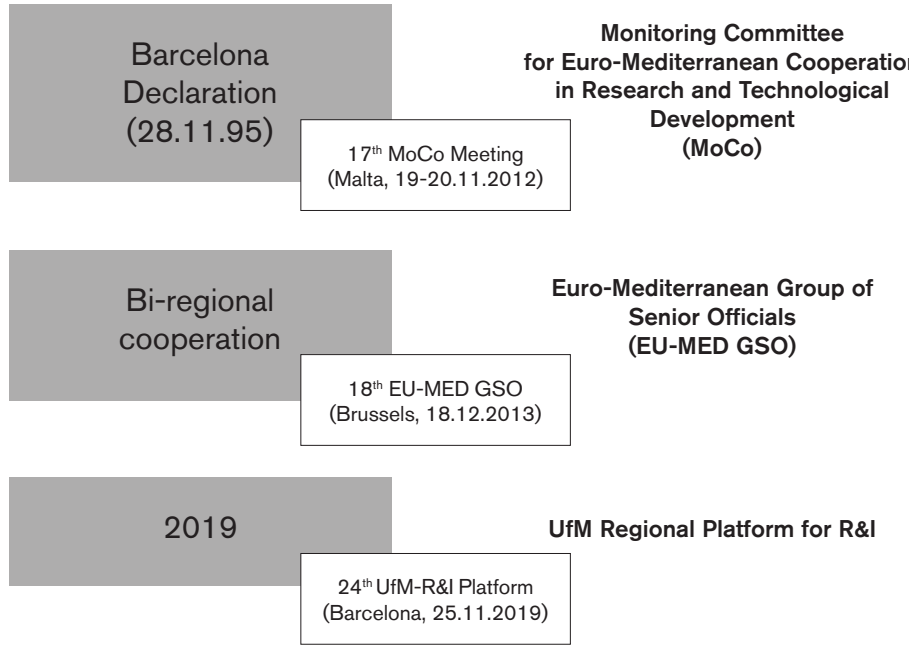

Table 1. Project co-funded by EC supporting the MoCo strategies and activities

Acronym	Title	WEB-SITE
RTDI2000	Euro-Med Forum on Scientific and Technological Research as a tool for regional integration and for the development of the Euro-Mediterranean Partnership	*www.cordis.eu*
ANTA2001	The Second Forum of the High Representatives of Euro – Med RTD Public Institutions as a tool for the development of the Euro-Mediterranean Partnership	*www.ist-world.org/*
ASBIMED	Assessment of the Bilateral Scientific Cooperation between the EU Member States, Accession, Candidate and Mediterranean Partner Countries	*www.estime.ird.fr/article80.html*
ESTIME	Evaluation of Scientific and Technological capabilities in Mediterranean countries	*www.estime.ird.fr/*
EUROMEDA	Opening up the European Research Area to the Mediterranean Countries.	*www.euromedanet.gr*

NET	Creation of NCP in the Mediterranean countries	
INNFORMED	Innovation foresight for MEDA Partners in European Research Area	*www.innformed.org*
ERA-MED	Strengthening the European Research Area in Mediterranean Countries	*www.eramed.gr/*
MED7	Thematic workshops for the definition of the science and technology Euro-Mediterranean policy within FP7	*www.ist-world.org*
EUMED CONNECT	To accelerate the rate of connection between Research and Universities in euro-med area	*www.eumedconnect.net/*
INCONET MIRA	Mediterranean innovation and Research Coordination Action	*www.mira.eu*
INCONET MED SPRING	Mediterranean Science, Policy, Research and Innovation Gateway	*www.cordis.eu*

Table 2. MoCo recommendations for the period 2008-2012 - Bonfim, J. (2013)

Year	Recommendation	WEB-SITE
2008	Develop competence building activities in the scope of the Capacities Programme (FP7)	Capacity Building/ FP7 tools
	Strengthen research activities in universities and research organizations	Capacity Building
	Identification of regional priorities	Defining Priorities or establish a Research Agenda
	Preparation of joint activities between EU and MPCs	Strengthening scale, scope, impact
	Increase complementarities between EU and national programmes	Enhancing complementarities between instruments
	Favour the use of European Neighbourhood and Partnership Instrument (ENPI)	Enhancing complementarities between instruments
	Favour use of available FP7 tools	FP7 tools
	Reinforce FP7 National Contact Points	FP7 tools
	Reinforce the e- network	Infrastructures
	Favour the participation of MPCs in the People programme	Mobility
	Develop specific programmes aiming at facilitating the brain circulation	Mobility
	Implement mobility programmes linked to the development of centres of excellence in MPCs	Mobility
	Promote balanced exchanges of researchers	Mobility
	Reinforce the role of RTD in the Barcelona Process	Role of RTD in the Barcelona Process

	Assess MIRA activities	Steering MIRA
2008	Identification of good practices in the frame of bilateral and multilateral cooperation	Supporting Good Pratices in cooperation programmes
	Develop competence building activities in the scope of the Capacities Programme (FP7)	Capacity Building /FP7 tools
	Identify measures for strengthening of research activities in the universities and research organizations of the MPCs	Capacity Building
	Building on S&T priorities of regional nature	Defining Priorities or establish a research agenda
	Favour implementation of joint activities between EU and MED Countries	Strengthening scale, scope and impact
	Increase complementarities between EU programmes and national programmes	Enhancing complementarities between instruments
	Pay attention to interactions with Higher Education Polices	Enhancing complementarities between instruments
	Building on existing bilateral cooperation programmes as a basis to the prepare multilateral activities	Enhancing complementarities between instruments
	Favour the use of European Neighborhood and Partnership Instrument (ENPI)	Enhancing complementarities between instruments
	Launching of calls targeting specifically the MPCs	FP7 tools
2009	Increase the use of all available FP7 tools such as SICAs, target calls, twinning, etc.	FP7 tools
	Sustain and reinforce the FP7 Contact Points in the MPCs	FP7 tools
	Reinforce electronic network	Infrastructures
	MPCs more actively engaged into the ERA activities	Integration of MPCs in ERA activities
	Preparing a document detailing bilateral and multilateral regional cooperation achievements since 2007	Ministerial Conference
	Support the preparation of the Ministerial Conference	Ministerial Conference
	Stimulate the participation of MPCs in the PEOPLE programme and particularly in the IRSES scheme	Mobility
	Implement mobility programmes linked the development of centres of excellence in the MPCs aiming at the reintegration of researchers in their respective countries	Mobility
	Promote balanced exchanges of researchers	Mobility
	Reinforce the role of RTD in the Barcelona Process	Role of RTD in the Barcelona Process
	Reinforcing the role of the MoCo in identifying regional priorities	Role of MoCo
	Share good practices identified in the scope of bilateral and multilateral cooperation	Supporting Good Practices in cooperation programmes
	Support the activities of MIRA project, and above all those aiming at developing the Euro-Mediterranean Innovation Space	Steering MIRA
	Invite the countries to provide brief information on national developments in the research sector that are in line with the Cairo Declaration	Ministerial Conference
2010	Prepare a brief paper on the stocktaking of achievements since the Cairo Declaration	Ministerial Conference
	Assess and Support activities of MIRA	Steering MIRA

2011	Encourage the evolution of bilateral cooperation between UfM Member States to Regional (Multilateral) cooperation	Enhancing complementarities between instruments
	Support to demand driven and impact driven cooperation based on the principles of co-ownwership and co-funding.	Strengthening scale,scope, impact and Enhancing complementarities between instruments
2012	Optimize the use of all relevant programmes and instruments (national, bilateral, EU, regional, bi-regional as well as those of international financial institutions)	Enhancing complementarities between instruments
	Establish a medium to long term R&I agenda building on the report of the Barcelona Conference	Defining priorities or establishing a research agenda
	Support to the networking of NCPs in FP	FP7 tools
	Invite MIRA to self-evaluate the project	Steering MIRA
	Move from bilateral approaches to a more strategic "region to region" approach	Strengthening scale, scope and impact
	Support to the importance of a ERA-NET/ERANET PLUS focusing the South Mediterranean region	Strengthening scale, scope and impact
	Develop joint activities in view of implementing the R&I agenda	Strengthening scale, scope and impact
	Support to a joint bi-regional programme based on Art 185 of the EU Treaty	Strengthening scale, scope and impact
	Explore the feasibility of a joint bi-regional programme based on Art 185 of the EU Treaty	Strengthening scale, scope and impact
	Contribution of International Financing Institutions to common research agenda	Strengthening scale, scope and impact

Table 3. Number of occurrences of main typology of recommendations for the period 2008-2012 - Bonfim, J. (2013)

Focus/Objective	Number of occurrences
Strengthening scale, scope and impact (of cooperation activities)	9
Enhancing complementarities between instruments	8
FP7 tools	7
Mobility of researchers	7
Capacity building	4
Supporting Ministerial Conferences	4
Steering MIRA	4
Defining Priorities/Research Agendas	3
Infrastructures	2
Supporting good practices in cooperation programmes	2
Role of RTD in the Barcelona process	1

Table 4. Recommendations for the period 2013-2019

Year	Information	Results
2013	• The role of 5+5 dialogue and of the UfM Secretariat • A new political agenda launched by EEAS • Working Group on a Common Innovation Agenda • Presentation of PRIMA	• Synergies • Further elaboration of the concept note on Innovation Agenda and concrete proposals to move forward. • Support from EC to PRIMA programme
2014	• Presentation of the "Report on the implementation of the strategy for international cooperation in research and innovation" • Info on PRIMA • Information on EMEG – Med Spring project	• Roadmap for cooperation in Research and Innovation • Support to PRIMA programme
2015	• Celebration of 20th anniversary together with the Euro-Med Industrial Cooperation Working Party Coordinators and DG Growth, DG NEAR, Middle East and North Africa Business Angels, European Investment Bank	• Co-funding actions of Innovation • Support for PRIMA programme • Synergies of programmes/instrument for Innovation
2016	• The discussion was built around three big pillars, in line with the proposed agenda of the foreseen Ministerial conference: PRIMA, BlueMed, Migration	• Preparing the Euro-Mediterranean ministerial conference on R&I, scheduled in Malta, on 3-4 May 2017 • PRIMA: links of sustainable water, farming and food systems for socio-economic development and involvement of many stakeholders in the process • Addressing the causes of migration by developing a common, clear vision towards the migration challenge and encourage academic mobility, brain circulation, education and employment opportunities for migrants • R&I for blue jobs and growth in the Mediterranean (BLUEMED): to engage further, including through Horizon 2020
2017 **2018**	• Illustration of Horizon and other programmes from EC (cultural heritage, Industrial technologies, MSCA). Assessment of MEDSPRING; ERANETMED; 5TOI-4WES	• Preparation and follow up of the Ministerial Conference • Innovation actions • Climate Change • Migration related research • Supporting PRIMA and BlueMed
2019	• Update on Southern and Eastern Mediterranean Participations in Horizon 2020 & Opportunities by EC (DG RTD, DG EAC, DG CONNECT, DG NEAR, JRC), MEDEC, PRIMA	• Reinforce cooperation for human capital development, notably through an increased participation of South Mediterranean countries in both Erasmus+ and Marie Sklodowska-Curie Actions (MSCA). • Further exploit synergies and closer cooperation between EU-funded programmes in the region • Agree on the need to revitalise the GSO Secretariat • Role of the UfM

Table 5. Number of occurrences of main typology of recommendations for the period 2013-2019

Focus/Objective	Number of occurrences
PRIMA	12
Strengthening Innovation	12
Defining Research Agendas and Roadmaps	10
Co-ownership and co-funding	9
Enhancing complementarities and synergies between instruments ad programmes	8
Roots of migration	7
Blue Med	7
Mobility	7
Supporting Ministerial Conferences	4
Capacity building	4
Supporting nexus and complementarities	2
Climate Change	2
Role of the UfM	2

Table 6. Recommendations for the period 2020-2024

Year	Information	Results
2020	• Collection of new priorities and initiatives for the Euro-med area • Setting up of a Bureau, assisting in the planning, preparation and continuity of work between the plenary meetings of the Platform • Policy Report, Draft Roadmaps and document for Strategic R&I Cooperation Priorities: finalise the Roadmaps for adoption in mid-2021	• Three pillars: Renewable energy, Climate change, Health sector. These priorities should be presented taking a broad approach, such as crisis management or natural disasters management, as well as other crosscutting topics, like, smart specialisation, artificial intelligence, social sciences or eco-innovation in addition to the cross-cutting domains set out in the strategic paper, which were open science, human capital development and technology transfer and innovation • Tools and programmes useful to advance with the Roadmaps
2021	• Acknowledgement of the set of R&I Roadmaps and recommended actions adopted on 7 July 2021, according to the three pillars: Climate Change, Health, and Renewable Energies, also including the horizontal approach and inter-linkages between the three identified priorities	• Preparation of the Ministerial Conference • Set of R&I Actions agreed and proposal to reach the agreed objectives
2022	• Endorsement of the Implementation Plan, a living document, agreed by the UfM R&I Platform (09.06.22). IP comprises: 1) Mapping/Portfolio Analysis of EUROMED R&I Cooperation	• The UfM Ministerial Conference on R&I, (27 June 2022), endorsed the R&I Roadmaps, as well as the Implementation Plan.

	2) Integration of needed actions into existing programmes 3) Stakeholders' Communication and coordination R&I platform in the region 4) Monitoring , Evaluation and Learning	
2023	• Support actions agreed with Ministerial Conference, including the IP, emphasize the importance of capacity building and reliable data	• First results of IP-Mapping/Portfolio Analysis • Assessment of initial outcomes of the Horizon Europe 'Mediterranean Initiative' and the African Initiative II. • Assessment of PRIMA projects and future perspectives • Stakeholders' Communication and Coordination R&I Platform
2024	• Proposal to strengthen linkages with other platforms. • Implementation of the roadmaps towards the next ministerial meeting • Greater engament of the countries	• The possibility of inviting Arab League representatives as permanent observers to the UfM Platform. • Better sharing of information • A "working group" methodology suggested, where Member States could lead on a specific topic and working on it.

Euro-Mediterranean Collaboration in Research and Innovation, the Hard Transition from Past to Future: A Reflection on the Social Context

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List of acronyms and abbreviations

EU	European Union
EMP	Euro-Mediterranean Process (Barcelona Process)
ICT	Information and Communication Technologies
IPR	Intellectual Property Rights
MENA	Middle East and North Africa
MPC	Mediterranean Partner Countries
RE	Renewable Energies
RTDI	Research, Technology, Development and Innovation
SMC	Southern Mediterranean Countries

Introduction

The thirtieth anniversary of the Barcelona Process is a good occasion to contemplate the evolution of an historical and continuous process of collaborations between the riparian countries and people of the Mediterranean in the domains of science and technology, which was included for the first time as a priority in the interregional, European Union (EU) and Mediterranean Partner Countries (MPC) collaboration framework defined in that Process, and to think about the opportunities, results and hurdles encountered over time, in order to prepare the future, which is now here, given that the shared challenges dominating the social, economic and political landscape, such as climate change, food security, demography, information society, migration and several others, pose the need for stronger and focused collaboration, regardless of the political context. This reflection attempts to bring together experiences of experts on the problems detected and contexts, and argue for cooperation in science and technology as a unique bridge between countries and people to cope with the common challenges.

Executive summary

The relationship between Europe and its neighbours from the Southern and Eastern Mediterranean has been flawed by the absence of a clear agreement on the common interests, the lack of mutual understanding of social values, the way public structures function and, last but not least, the different role that science and technology play in the respective social and economic development. These mismatches make scientific and technological cooperation difficult, but they are counterbalanced by the common desire of their scientific and technological communities, well connected by scientific and technological networks, to cooperate, as they share concerns about the challenges for health, environment, food security, and so on. They represent a bridge between the people and institutions of our regions that do not depend on political, racial or religious divides.

A common complex past and present

The Mediterranean Sea has been a bridge between Asia, Africa and Europe since hu-

mans developed the means to navigate its waters. It has also been a battlefield between riparian powers in search of hegemony. But perhaps the most important function of this space has been to facilitate trade between its shores and the interchange of ideas and information, technical knowledge, products, and social forms throughout known history. Historically, knowledge has flown to and from all sides, from East to West, and from West to South and East, mostly in the last two centuries (Charfi, 2014). Thus, cooperation in knowledge interchange has been a constant at all times. However, the framework of these interchanges has always been affected by mutual consideration or by the dependence/domination relationship between the Mediterranean societies, as many authors point out (Gozzi, 2018; Kurubbas, 2013).

The recent relationship between Europe and its neighbours from the Southern and Eastern Mediterranean has been flawed due to some misunderstanding (Amirah et al., 2021; Provenzano, 2016): the Barcelona Process established in 1995 between the EU countries and the MPCs, known as the Euro-Mediterranean Process (EMP), brought about a new EU policy on the Southern and Eastern Mediterranean riparian countries based on the implementation of three broad objectives:

- Definition of a common area of peace and stability through the reinforcement of political and security dialogue (Political and Security Basket).
- Construction of a zone of shared prosperity through an economic and financial partnership and the gradual establishment of a free-trade area (Economic and Financial Basket).
- Rapprochement between peoples through a social, cultural and human partnership aimed at encouraging understanding between cultures and exchanges between civil societies (Social, Cultural and Human Basket).

But the achievement of these objectives has unfortunately faced a number of difficulties, which now, 30 years later, could be attributed to some misconceptions about the situations and interests of the cooperating parties (Gozzi, 2018).

Common and divergent interests

"Throughout history, the climate has shown that it has a direct influence over the people's habits and customs. In fact, even though nature and climate does not represent a strong unifying factor, it still constitutes a joint landscape culture" (Affaya, 2019). The Mediterranean has always been a melting pot of genes (from all domains of biota), cultures, including science and technology, and natural resources from distant horizons.

Despite the positive-sounding language of the Barcelona Process, it was clear from the outset that the old European preference for "stability" and securitisation of their neighbours over democracy and freedom of doing political opposition still prevailed, potentially hampering its agenda (Provenzano, 2016). Moreover, the relationship between the EU and its Southern and Eastern Mediterranean regional partners in both political and economic terms was asymmetrical, with the presence of some authoritarian political regimes in the region, not to mention the other internal security issues resulting from internal cultural and religious differences or between neighbouring countries in the regions. This situation makes any attempt at cooperation difficult (Bendebka, 2021), and undermines the real objective of social cultural exchanges and stability, thus creating an unresolved debate between the EU's pur-

pose of supporting democratisation processes in those countries with authoritarian regimes and the need to seek a security objective in the whole region. As Skoutaris (2013) writes, "to put it differently, it is recalled that interregionalism is marked by the interaction among supposedly diplomatic equals. However, in the case of the multilateral dimension of EuroMed, the Commission and the Council act as 'central points' channelling the interests of the EU Member States (*even if they are not always so aligned in strategies and views [author's opinion]*). But no such channelling exists on the other side, since the non-EU Mediterranean partners have not formed a *forum* that would allow for something similar.... Despite the existence of a long-term goal that points to region-building, the Barcelona Process (EMP) is chiefly a bilateral process that involves the EU on the one side and the relevant partner country on the other. This is apparent if one looks at the mechanism that the Union has used in order to realise the vision of an increasingly closer relationship with the neighbouring countries and a zone of stability, security and prosperity for all."

Science and technology are bridges

Turning to the subject of this article, there is an invisible historical continuous line in scientific cooperation between both sides of the Mediterranean Sea, regardless of the kind of political or dependence relationship between the European countries and the Southern and Eastern Mediterranean countries, even when this dependence was colonial and the cooperation topics were decided by the colonial power and based on its own interest. Scientific cooperation does not depend on security arguments; neither does the Mediterranean Diet, a common cultural product (Mediterra, 2012). In fact, in recent times there has been a sort of "discovery" of the diplomatic potential of scientific collaboration (similar to the ping-pong strategy between China and the USA used to break a deadlock situation), while the scientific community has always collaborated. Science is a tool to address security concerns not based on political, ideological or territorial struggles, such as health, water management, climate change, urbanism, demography, food security and others. It is not concerned with sovereignty matters or religious principles, but with talent and ideas to deal with questions shared by the local and global scientific community. As Limouris (2009) pointed out: "Despite the fact that academic cooperation can contribute a lot to creating mutual respect through cooperation and across frontiers, the issue of education and Research, Technology Development and Innovation (RTDI) has not accepted the sufficient attention it merits in the Euro-Mediterranean Partnership up to now. Only at the 2012 Barcelona Summit, Euro-Med Partners have recognized, for the first time in the Five-Year Work Program, the crucial role of education for political, social and economic development, as well as the major importance of the research, innovation and Human Resources Development as a key to modernization."

A concluding remark on the above arguments is that scientific cooperation is a bridge between peoples and nations, regardless of their civilisations, religious roots or character of their political systems, either democratic or authoritarian and, therefore, is an intellectual and social tool to be used to cope with the common challenges that we all are facing, beyond the political debate between states, ideological backgrounds, religions, and other social divides (Charfi, 2014). The only real question in these turbulent times is if a rational approach to reality, the domain of science, has a social and communication space in a fragmented Mediterranean context,

where wars and social fractures divert resources and cooperative efforts from the intensifying challenges such as climate change, water, food and energy scarcity, or demography, to mention a few.

The divergences in social perception and the role of science

Perhaps the structural problem of the low consideration of science in some Mediterranean countries comes from the framing of the social discourse in religious arguments (Charfi, 2014), which we saw is not limited to our common Mediterranean space, but strongly affects even the education discourse in the USA. Moreover, the weak connection of the social and economic elites to scientific elites in the Mediterranean countries is another serious obstacle. The ruling elites of different Mediterranean countries face the same or similar structural problems (Albrecht et al., 2004), but they scarcely use the advice of the most competent talents addressing these problems in their own countries and also in other countries where they could be connected through the scientific networks. The elites seem to ignore the enormous capital that knowledge represents, and the benefits of its use as a political instrument, which could be a key element in the perception of their legitimacy (Kurubbas, 2013). Often, these elites do not acknowledge the hidden capital of their own country: talent is very democratic, it existed everywhere but its use and character as a basic socioeconomic resource is limited to advanced societies, where social dialogue and public interactions cover the entire spectrum of the population, including business and public operators, and their capacities. So, the basic question is: how can scientific talent be exploited in Mediterranean countries and have an impact on their development agenda? When needs determine the agenda, such as in the case of the Covid pandemic, this question is easily resolved: the countries try to use their knowledge capital to cope with the problem, the hidden capital in the Mediterranean suddenly appears, and scientific cooperation becomes integrated into the political discourse; consequently, the marginal presence of scientific cooperation passes from an invisible asset to a central element, at least during the emergency period. Nevertheless, research in science and technology, and its use, has always been an active asset of Mediterranean societies, but its continuous cultivation was limited by the social needs (water management is more efficient in dry Mediterranean countries) or the individual interest of scientists and engineers, not by the demands of industrial or public authorities. Continuity of the efforts in these domains, unfortunately, is not guaranteed.

The construction of a science- and technology-based society

The construction of a science- and technology-based modern society is a slow process founded on a progressive assumption by the social and economic forces of a given country of the importance of knowledge as a driving force of economic and social development, and education is the key component of this construction. In the Mediterranean area, there is a strong willingness to move in that direction, but its achievement cannot depend exclusively on political voluntarism, as it will face the weight of traditions and hurdles and internal contradictions, especially in the education system, and it will not yield the expected results of empowering the population in the short term. Moreover, the weak link between scientific practice and economic development in the Mediterranean countries is, perhaps, the

most important obstacle to achieve a knowledge society (Chaabouni et al., 2021;Lymouris, 2009) and a sustainable development of Mediterranean societies (The Blue Plan, 2005). Luckily, the individual adventures of Mediterranean scientists cultivating their scientific domains spontaneously and with few resources maintain a link with the advance of science globally, even if, paradoxically, the public discourse always claims its support for science. Education systems in the Southern and Eastern Mediterranean countries respond in many cases to religion-based societal values and, in most cases, do not favour scientific (critical) thinking and practices, which hampers the socioeconomic convergence with EU partners (Provenzano, 2016) and makes the achievement of the agreed Free Trade Area between the two regions difficult.

Why is cooperation needed?

Why is cooperation needed? Global challenges are the main driving force for cooperation: pandemic, climate change, overpopulation, food security, and so on. The international collaboration in RTDI is a win-win process that benefits all the partners and involves very dedicated and goal-oriented individual scientists in all countries (Gaillard et al., 2013). Proposals of solutions do not come from a single source, but from an open dialogue incorporating all stakeholders: academia, enterprises, administrations and other social actors, and the interactions between the scientific world community, whose worldwide cooperation takes place on a common footing. Nowadays scientific dominance by a few is over. Interdependence, rather than conditionality (Gozzi, 2018), is the new reality in all domains: from security to access to resources, scientific cooperation or labour mobility.

A good example of the strategy to cope with the acute problem of food security is the food-water-energy nexus, which tries to simultaneously consider the trade-offs between these three sectors in order to get a comprehensive and synergetic approach to the handling of food, energy and water security (Bollino et al., 2020). But, as Okay et al. (2023) pointed out: "One major challenge hindering progress in translating nexus thinking into action is the inherent *tension between the level of integration required by nexus responses and long-standing institutional approaches.* The lack of adequate incentive structures fostering multi-sectoral integration continues to prove difficult, particularly in operational terms."

Common problems must be identified but solutions must be local, even using the same knowledge but adapting it to local circumstances. Knowledge transfer is not a right, especially in these times of knowledge economy, but a need in order to tackle the common problems and adapt the solutions to the local context. Knowledge has a value, but sometimes the holders of this knowledge are not conscious of this value, particularly in the traditional societies not regulated by the market economy. A solid private sector can guarantee a fair exploitation of local knowledge and its bargaining power.

Another important common issue in the Mediterranean area is how a sustainable future could be a guarantee for the next generations, which largely depends on how the riparian countries address the common sustainable development challenges, particularly those related to climate change, water management, food security and agriculture, coastal management, impact of tourism, and others. As The Blue Plan Book on A Sustainable Future for the Mediterranean (2005), indicates: "Technological progress, well controlled and tar-

geted to exploit the strong points of the Mediterranean region, can play a major role in shifting toward more sustainable development. This is especially true when combating pollution and promoting the rational use of natural resources. In many countries important efforts, including normative measures, would be necessary in order to introduce and disseminate advanced technologies in the field of vehicles, construction, thermal plants, cleaner technologies in industry, waste and wastewater treatment and prevention of noise from infrastructures. It is also important to develop technologies able to exploit the strong points of the region (solar and wind power, the quality of unique products) and that are adapted to the specific constraint of the eco-region (climate, urbanization, unique village lands)."

Sometimes, global crisis is the argument that fosters scientific cooperation between people and countries. As Moneer (2020) argued in her paper dealing with possible actions to cope with the impact of climate change in the Mediterranean, one of the four pillars to consider is RTDI: "Covid-19 has revealed that science and technology are essential to humanity's collective response to the Covid-19 pandemic. The pandemic has revealed the need for an approach that goes beyond national borders and strengthens regional integration based on Science and Technology systems in order to find a vaccine and treatments that would alleviate the health impacts of the pandemic. Likewise, climate change can't be contained by national borders and there is a pressing need for a regional approach that combines the lessons that have been reinforced by the pandemic crisis: the importance of being united in terms of both a commitment to and reliance on scientifically driven solutions… Key concrete measures include establishing comprehensive, open access knowledge platforms; maximizing existing research capacity; and encouraging cross-fertilization between research and industry." Covid-19 also showed the need to harmonised measures and solutions among countries, stressing the need for a sound science-politics-economics nexus.

Scientific cooperation takes place regardless of social and political confrontation. In general, cooperation is based on mutual trust, but as the Go-EUROMED project (2008) report indicates: "In the Arab Mediterranean countries building trust is not easy, despite the region's cultural homogeneity represented by linguistic, religious, socio-cultural, and historical traditions. In Arab countries trust is often produced and shared on the basis of personal relationships. The rules are generally tacit, abstract and unwritten. Culture does not divide MPC societies, the problem is rather the political conflicts that feed on misunderstandings between societies. Obstacles to building confidence are more political than cultural, as conflicts are aggravated by a lack of trust among Arab leaders rather than the general population in the 'Arab street'." This problem does not exist among the scientific community as trust in the other´s claims, "Bona Fides", is the basic principle of cooperation, and this "Bona Fides" is almost always verified by the peer-review system in publications and career promotion actions…, but the cooperation between states is a necessary step to fully profit from the potential of the capacities in the MPCs. As also stated in the Go-EUROMED Report (2008), "The Cairo Declaration of June 2007 entitled 'Towards a Euro-Mediterranean Higher Education and Research Area' stated that it was necessary to increase MPC standards in education and research by modernising research and development policies. This aspect of the social and cultural partnership appears to be highly promising for institu-

tion-building, both from the demand side and from a political feasibility perspective. This underlines the importance of research cooperation for two reasons: first, it creates ties and common understanding between the EU and MPCs; and, secondly, because this has an impact on the development of social capital." Collaboration in common problems denies the perception by some people of a neo-colonial and asymmetric scientific relation between Europe and its MPCs, centred solely on topics of European interest. Working together dilutes the dependence perception and puts all partners on a common footing but, unfortunately, the particular national institutional environment and regulations produces mismatches, mostly in the Southern and Eastern Mediterranean countries, and also in some European countries, making it difficult to work together and exploit the results to the benefit of their economic system (Montero et al., 2010). Moreover, a fundamental part of this working together purpose should be a better coordination and collaboration between the higher education systems with a permanent programme of student and professor interchange (Lymouris, 2009) based on the experience of the ERASMUS Programme.

The need for a long-term strategy for RTDI

As Zou`bi (2023) pointed out, the evaluation of the Arab countries' information and communications technology (ICT) ecosystems indicates their weakness incorporating into the global wave of the 4th Industrial Revolution linked to ICT development. This is probably due to the lack of national RTDI policies, the lack of a critical mass of researchers, the low investment in research and, especially, the lack of interest in the policy-makers on the results of their national research.

EUMESCO Policy Report no. 18 of March 2021 (Choucair, 2021) posed the question of the feasibility of a Euro-Mediterranean Green Deal leading to a green economy in the Southern Mediterranean, and the synthesis of the document argues that: "Like their neighbours to the north, Southern Mediterranean Countries (SMC) are far from mainstreaming green and sustainable development principles into their economies, despite the progress made. In terms of planning, almost all SMC have developed national strategies and priorities regarding green growth, driven both by their comparative advantage in certain sectors, such as renewable energy (RE) production, but also by resource scarcity that is already tangible, specifically water stress in most countries and high dependence on energy imports. Yet even those countries that have made the greatest strides in planning – Jordan, Morocco and Tunisia – struggle acutely with implementation and evaluation, due to problems of governance (lack of buy-in, coordination and communication among stakeholders), as well as more technical obstacles (such as underperforming quality infrastructure systems and underdeveloped skills in the labour market)."

Most of these problems of governance and technical obstacles in most Eastern and Southern Mediterranean countries are strongly related to the absence of a long-term strategy to advance in some fields of science and technology addressing a comprehensive coverage of knowledge demands from all sectors of the economy and public governance, such as food and water security, energy efficiency, health, and environment protection (Zou´bi, 2023), to mention a few very important ones. The practice of research is at this moment mostly spontaneous, depending on particular interests and without long-term financial support. However, an effect of the EU programmes aimed at fostering

scientific cooperation between the EU and the MPCs has been to also facilitate South-South cooperation networks, which were weakly supported by the MPCs states in spite of the abundant agreements for free trade and interchanges signed by several of the Southern and Eastern Mediterranean countries (Martin, 2010). The evolution of the system, based on the EU-Med programmes mostly financed by the European Commission (EC), reached a turning point during the Euro-Mediterranean Conference on Research and Innovation held in Barcelona on 2-3 April 2012, where the principles of co-design, co-financing, and co-ownership were added to the co-performing RTDI cooperation programmes and projects. A new form of scientific practice and cooperation should be designed, particularly in terms of governance and accountability, which are not simple issues (Arvanitis et al., 2013). This new perspective of co-design and co-financing led to the creation, among others, of the Partnership for Research and Innovation in the Mediterranean Area (PRIMA) programme. But co-ownership is strongly related to the definition of intellectual property rights (IPR) and industrial policy in each of the cooperating countries' legal systems.

How culture shapes the present and future

The so-called clash of civilizations (Huntington, 1993) never applies to science, as scientists all over the world share a common sense of identity based on the use of a common methodological approach to problems or intellectual challenges. This collaboration is not and should be never conditioned by any political, ideological or religious conditionality, as science can practically develop in any social environment because its main driving force is curiosity and its practitioners are members of a global network of interested people. Nevertheless, it is worth mentioning the Middle East and North Africa (MENA) Paradox (Al-Khatib, 2019), which happens in Jordan, where despite the high level of education attained by females (slightly higher than men), their participation in the labour force is still much lower than in males, including in the scientific environment. The practice of science must be careful to respect social values, in order to avoid clashes with practices and convictions or relying on rational approaches to reality, as is the case of science, but we cannot support the waste of talent represented by the lack of massive participation of women in scientific activities. These points are especially sensitive as it is easy to promote anti-scientific attitudes faced with some events or situations created by economic or technological developments. The social networks, instruments of communication without control or filters, can be the vectors of campaigns blaming science and its outcomes or can be used to pass the right message created by the scientific community. Having a Communication and Social Interaction Policy and Acting Structure for this purpose is essential for the scientific community in the current social context.

A way forward

The EU-MPC dialogue launched by the Barcelona Process and its continuation with the Union for the Mediterranean (UfM) has faced many problems in addressing the institutional setting and the political dialogue, which was poisoned by the unsolved problems of the Palestinian question and the security concerns on both sides of the Mediterranean. However, by focusing this dialogue on concrete items of mutual concerns, such as the priorities defined by the UfM, especially scientific and technological cooperation, concrete actions and results could be ex-

pected. The entering of science as an actor of social and economic development poses the problem of its sustainability and governance. Being based on curiosity, experimentation and merit, it is difficult to manage science with the instruments of a classical public administration, while, on the other hand, the scientific system is used to evaluate and control (peer reviews), which, paradoxically, facilitates monitoring of public action and its accountability. New methods of governance should be designed, especially in the MPC, to include scientific practice within a national and/or regional strategy, where the results can be evaluated against the expected outcomes. Moreover, strategic management can favour the transfer of these results to the social and productive systems.

In a nutshell, a few actions can be envisaged to facilitate the introduction of science and technology as the desired actor of development:

1.- Design and support politically and financially an overall national strategy in each country, and also in the EU-MPC political and financial cooperation instruments, dealing with the great challenges posed to the national system of science and technology by the different economic and social sectors in an integrated approach (nexus methodology), with a focus on specific topics where all sectors, academic and economic, reflect their competences and interest. This is an important issue, as other international actors are entering in the Mediterranean arena, including scientific and technological cooperation matters (Furness et al., 2008).

2.- Create a forum of dialogue between the economic, social and academic sectors, which could act as an advisory element to the political decision-makers, and follow the development of the RTDI strategy.

3.- Similarly to how the PRIMA Programme is co-financed by all Mediterranean participants and supported by the EC, a similar approach should be developed for the co-ownership and co-exploitation of the cooperation results, moving from a rhetorical formulation to a new common instrument, which will facilitate making the expected benefits of cooperation a reality. Better instruments of exploitation of research results must be established and channels of connection with the business environment must be developed.

4.- Education and communication at all levels should be the main instrument to make scientific knowledge available to the population, facilitating its absorption capacity regarding scientific information related to social and natural challenges, not forgetting the need to improve the absorption capacity of knowledge at the industrial and social level.

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Innovation Potential of PRIMA-Funded Projects in the Mediterranean

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Introduction

Innovation is the process of developing and implementing new ideas, methods, products, services or solutions that deliver significant value and positive impact. It involves transforming creative concepts into practical outcomes that enhance efficiency and effectiveness or address unmet needs. Innovation is defined as the "implementation of a new or significantly improved product, service, or process, emphasizing its critical role in economic growth, social progress, and improved quality of life (OECD, 2005).

Beyond technological advances, innovation encompasses novel approaches to problem-solving, process improvement, organisational practices, and business model transformation (HBR Editors, 2015). At its essence, innovation challenges the status quo, encourages creative thinking, and involves taking calculated risks to drive progress and achieve breakthroughs (Drucker, 1985).

Innovation is a cross-cutting, multi-disciplinary field that spans diverse areas, including sustainable agriculture, green growth, the circular economy, sustainable urban development, smart cities, management, international development, health, and social welfare (Downs & Mohr, 1976; Rogers, 1995; Kelly & Kranzberg, 1978). This broad academic interest arises because innovation has the potential to impact every aspect of society. When effectively implemented, innovation can yield new solutions to urgent challenges and enhance the efficiency and effectiveness of policies, products and services (Van de Ven, 1986; Thompson, 1965, Schumpeter, 1942).

The Partnership for Research and Innovation in the Mediterranean Area (PRIMA) is dedicated to leveraging innovation to address the region's pressing environmental and socioeconomic challenges. With its unique ecosystem and complex climate, the Mediterranean faces critical issues: water scarcity, soil degradation, and the rising impact of climate change on agriculture and food security. To tackle these challenges, PRIMA funds a diverse range of projects that not only target sustainable solutions but also prioritise scalable, research-backed innovations capable of making lasting impact.

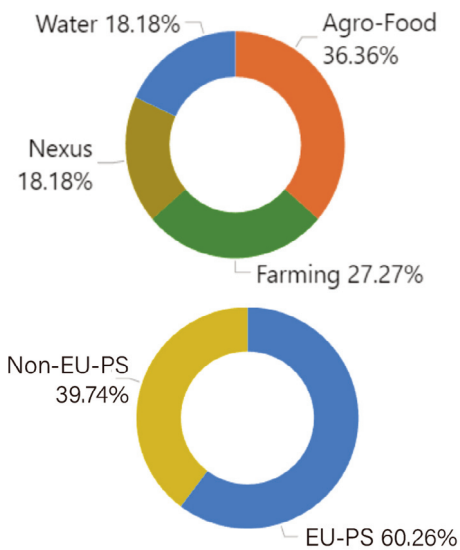
PRIMA's approach to innovation is to implement demonstration sites that showcase real-world applications and clearly illustrate the benefits of innovative solutions, with active involvement from end users. By engaging end users directly in the demonstration phase, PRIMA ensures that the solutions are tested in practical, relevant settings and are tailored to meet actual needs. Through these demonstration sites, PRIMA focuses on collaboration and stakeholder engagement. By involving local communities, farmers, policy-makers, academic institutions, and private-sector partners, PRIMA ensures that each project is not only scientifically robust but also aligned with the socioeconomic realities of the region.

This article examines PRIMA's impactful projects, exploring how the innovative solutions implemented in the Mediterranean could have economic, environmental and scientific impacts.

Overview of the Innovation Actions funded by PRIMA

PRIMA has funded a total of 238 projects, with the majority (194) classified as Research and Innovation Actions (RIAs) that achieve an intermediate Technology Readiness Level (TRL) of 5 upon completion. In

contrast, only 44 projects are categorised as Innovation Actions, allocated a combined budget of €117.53 million, and are intended to reach more advanced TRLs of 6-7. The Innovation Actions engage a robust network of 533 participating entities from various sectors and countries, and focus on areas vital to the region's ecological and agricultural resilience, including agro-food, farming, water management, and the Water-Energy-Food-Ecosystem Nexus approach.



The Innovation Actions funded by PRIMA are strategically categorised to target specific sectors. Agro-food receives the highest focus, accounting for 36.36% of the projects. This emphasis reflects PRIMA's commitment to food security and sustainable agricultural practices, which are essential in a region heavily dependent on agriculture. Farming, with 27.27% of the projects, follows closely, highlighting PRIMA's focus on sustainable farming practices that conserve resources and enhance productivity. Water and Nexus projects each represent 18.18% of the funding focus, addressing the urgent need for water conservation and integrated approaches to managing interconnected resources.

The projects span various countries, with significant involvement from both European Union (EU) and non-EU entities. Notably, 60.26% of the participating entities are based in EU countries, while 39.74% come from non-EU countries, underlining PRIMA's inclusive approach to innovation across the Mediterranean region. This cross-regional engagement fosters a collaborative environment, enabling knowledge transfer and resource sharing between entities in diverse geographical and socioeconomic contexts.

Innovative breakthroughs emerging from PRIMA-funded projects

PRIMA-funded projects are fostering significant innovative breakthroughs across the Mediterranean, addressing complex regional challenges in sustainable agriculture, water management, and climate resilience. Many of these projects are advancing high TRLs, with several reaching moderate to high TRL 5-7, where technologies and methodologies are thoroughly tested in relevant environments in Southern and Northern Mediterranean countries.

One area where PRIMA's impact is particularly visible is in precision agriculture, where high TRL solutions like Internet of Things (IoT)-based irrigation management systems allow for the efficient use of water resources. These cost-effective technologies optimise irrigation based on real-time data, ensuring water is used only where and when it is needed. This is crucial in a region where water scarcity remains a top concern.

PRIMA-funded initiatives in circular economy models are demonstrating robust TRLs by converting agricultural waste into valuable resources like bio-based fertilisers and sustainable packaging. By reaching moderate-high TRLs, these technologies are ready for wide-scale adoption, offering practical solutions to reduce waste, improve soil health, and lower dependency on synthetic materials.

PRIMA's projects in non-conventional water treatment, such as those focusing on wastewater reuse and desalination, are achieving intermediate TRLs, where technologies have been tested in field conditions and are proven to be effective, safe, and scalable. These projects address both the ecological impacts of wastewater disposal and the growing need for alternative water sources in the Mediterranean.

Innovation in the agro-food sector, particularly in traceability and authenticity platforms, is transforming the Mediterranean's approach to food safety, quality, and supply chain transparency. PRIMA-funded projects are advancing digital platforms that track the journey of agro-food products from farm to table, ensuring that each step in the supply chain is documented and verifiable. These platforms use technologies like blockchain and IoT to authenticate product origins, enhance food safety, and build consumer trust, addressing growing demands for transparency in the agro-food sector. Furthermore, many of these platforms have reached high TRL, indicating that they are nearly market-ready and poised for commercial deployment at the conclusion of their development phase. By focusing on the traceability and authenticity of products, these innovations not only strengthen consumer confidence but also enhance export potential for Mediterranean agro-food products. The readiness of these business models and digital platforms to reach the market post-project underscores PRIMA's role in fostering commercially viable, scalable solutions that can drive significant economic impact across the region.

Innovation is not limited only to technologies

Innovation transcends technological advancements, encompassing holistic approaches that address social, economic and environmental dimensions. PRIMA exemplifies this by funding projects that focus on organisational innovation, such as new cooperative models for small farmers, which emphasise collaboration, resource sharing, and community-driven decision-making. These cooperatives enable farmers to pool resources, reduce costs, and expand market access, helping to meet the unique needs of Mediterranean communities.

PRIMA supports solutions that enhance soil health, promote agroecological practices, and encourage the use of drought-resistant crop varieties. These innovations, backed by field testing, empower farmers to adapt to climate variability while maintaining productivity and soil quality. PRIMA is funding a range of projects that focus on agroecology practices, recognising that innovation extends beyond purely technological solutions to include sustainable agricultural methods that are deeply rooted in ecological principles. These projects emphasise practices such as crop diversification, soil conservation, organic amendments, and integrated pest management, which are designed to work in harmony with local ecosystems.

By supporting these agroecological practices, PRIMA aims to reduce the water footprint, carbon footprint, and chemical usage in the agriculture sector, contributing to more sustainable and resilient food

systems. Once adapted and widely implemented, these practices have the potential to create a significant impact at various levels, from individual farms to national agricultural policies. They help to improve soil health, increase biodiversity, and make farming systems more resilient to climate change, benefiting both the environment and rural communities. The adoption of these best practices can shift the agriculture sector towards a more sustainable model, reducing dependency on external inputs and enhancing long-term productivity and environmental health across the Mediterranean region.

The implementation of Water-Energy-Food-Ecosystem (WEFE) Nexus solutions in the Mediterranean offers a pathway to policy cohesion by showcasing integrated approaches that yield economic, environmental, and social benefits. Through community-based practices and demonstration sites, the WEFE Nexus model can provide policy-makers with tangible examples of sustainable resource management, helping to align regional policies and encourage cross-sector collaboration.

Furthermore, PRIMA's commitment to social innovation is key to building resilient and inclusive agricultural systems. In many rural areas, agriculture is the backbone of the local economy, yet challenges such as limited resources, market isolation, and vulnerability to climate change often persist. PRIMA targets these issues by fostering inclusive models that prioritise the active involvement of women and young people, who are frequently underrepresented in agriculture.

PRIMA's initiatives empower women by providing pathways to leadership and economic independence through training, resource access, and decision-making roles. These opportunities allow women to gain technical knowledge, participate in cooperatives, and lead community-driven projects, significantly impacting local food systems. This involvement improves household incomes, strengthens community resilience, and drives social progress by challenging and transforming traditional gender roles.

For young people, PRIMA makes agriculture an attractive and viable career path by providing access to modern, sustainable practices, and innovative business models. With opportunities to learn agroecology, apply digital tools, and explore environmentally friendly technologies, young farmers are better equipped to adapt to a sector in transformation. These programmes help to overcome economic and social barriers, fostering a forward-thinking agricultural workforce prepared to meet evolving challenges.

Innovation and science diplomacy

Innovation and science diplomacy are complementary forces, particularly in regions like the Mediterranean, where shared challenges transcend borders. Innovation drives the development of solutions to complex problems, while science diplomacy builds bridges between nations, fostering collaboration necessary to implement these solutions at scale. Together, they provide a powerful approach for tackling issues like water scarcity, food security, and climate resilience.

PRIMA exemplifies this intersection by fostering cross-border partnerships that integrate research, technology, and knowledge-sharing. Through its projects, PRIMA brings together scientists, policy-makers, and stakeholders from diverse backgrounds, allowing countries to work together on shared priorities even in a conflict context. PRIMA's work in precision

agriculture and the WEFE Nexus model illustrates how science diplomacy provides a neutral platform for tackling regional challenges.

In this way, PRIMA's commitment to science diplomacy through innovation contributes not only to technological advancement and economic growth but also to regional stability and peace by building lasting connections among countries with common goals.

Inspiring success stories in PRIMA-driven innovation

PRIMA-funded projects showcase inspiring success stories that highlight how innovation is transforming agriculture, water management, and resource sustainability across the Mediterranean. The SUPROMED project, for example, is addressing climate change adaptation through a holistic crop-livestock water management system. This project has integrated advanced modelling tools and remote crop monitoring across demonstration sites in Spain, Tunisia and Lebanon, achieving impressive results, such as a reduction in water use by up to 28.4% and increased profitability by up to 21%. SUPROMED's digital platform provides farmers with actionable insights, making water management more efficient and sustainable, while tailored training programmes ensure that end users can maximise the platform's benefits.

The 4CE-MED project is another PRIMA success story, advancing climate adaptation through biodiversity by implementing double-cropping systems with camelina, a high-value cover crop rich in Omega-3, protein, and oil. This project has been implemented in diverse locations, including Algeria, France and Tunisia, showcasing how double-cropping can reduce soil erosion, increase biodiversity, and improve farm revenue, making it both economically and environmentally beneficial.

The AWESOME project has achieved a breakthrough with the implementation in Egypt of an aquaponic system that reduces water use by up to 90%. With lower capital costs and higher yields, this soilless agriculture solution is accessible to Mediterranean growers, opening up long-term market opportunities and off-season profit potential.

PRIMA projects are also fostering circular economy practices within the agro-food sector. For example, the NEWFEED project has introduced sustainable livestock feed derived from food industry by-products like grape stems, orange peels, and olive oil cake. This initiative not only reduces waste but also provides a more affordable and resilient feed source, supporting livestock sustainability in Spain, Greece and Egypt. In another innovative move, dairy Small and Medium-Sized Enterprises (SMEs) in Mediterranean countries are leveraging circular economy principles by repurposing cheese whey, a by-product with high nutritional value, into new products like whey protein for infant formula. These success stories illustrate how PRIMA's projects are not only enhancing resource efficiency and climate resilience but also driving economic growth and sustainability through integrated, scalable solutions tailored to the Mediterranean region's unique needs.

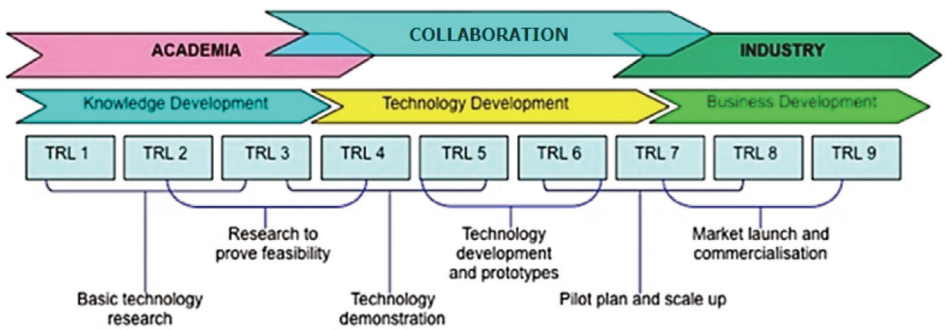
Among PRIMA's inspiring success stories, SUREFISH stands out as a project focused on advancing traceability and authenticity within the Mediterranean seafood sector. Recognising the growing demand for transparency in food sourcing, SUREFISH has developed a digital traceability platform that uses blockchain and IoT

technologies to authenticate fish products at every stage of the supply chain. This innovative system enables consumers, suppliers, and regulatory bodies to track the journey of seafood from the catch point to the marketplace, ensuring product authenticity and building consumer trust.

The innovation chain: role of stakeholders and socioeconomic partners

The role of stakeholders and socioeconomic involvement is essential throughout the innovation process, as it ensures that scientific discoveries are transformed into viable market solutions with real-world impact. Early-stage collaboration between academia and diverse stakeholders including policy-makers, funding agencies, and end users aligns research efforts with societal needs and regulatory standards, creating a foundation for meaningful applications. As projects progress, industry involvement becomes crucial in bridging the gap between research and commercialisation, bringing expertise in prototyping, scaling, production, and market readiness. Industry partners help to refine prototypes, optimise production methods, and ensure that the innovations meet practical demands and regulatory requirements. This collaborative approach makes innovations not only scientifically robust but also economically viable and socially relevant, paving the way for sustainable growth, competitive advantage, and lasting impact in the marketplace.

The Innovation Chain: Converting Science into Wealth



Source: uk-cpi.com

Role of SMEs in driving innovative solutions

With a total budget of around €21 million across 40 projects (Innovation Action type), SMEs are playing a pivotal role in fostering innovation in the Mediterranean. In terms of thematic focus, agro-food leads with 50% of the beneficiaries, followed by farming at 22%, water at 15.5%, and nexus projects at 15.5%. This distribution highlights the emphasis on advancing food security, sustainable agriculture, and integrated resource management within the region.

SMEs play a critical role in driving innovation within PRIMA-funded projects by serving as technology providers, implementation partners, and facilitators of dissemination and communication (Rhouma, 2023). As technology providers, SMEs contribute specialised tools and expert-

ise, enabling projects to integrate cutting-edge solutions tailored to local needs, such as IoT-based precision agriculture, water management technologies, and traceability platforms. In the implementation phase, SMEs often lead the practical application of these innovations on the ground, ensuring that solutions are adapted to real-world conditions and are accessible to local communities. Moreover, SMEs are instrumental in disseminating project results, using their networks to communicate findings and best practices to a broader audience, thus maximising the reach and impact of the projects. Through focused communication strategies, they engage with stakeholders, including local governments, farmers, and other SMEs, fostering community buy-in and creating awareness about sustainable practices. Finally, in the exploitation phase, SMEs play a crucial role in transforming project outcomes into commercially viable products or services, ensuring that innovations have a life beyond the project's end. Their agility, local knowledge, and market-oriented perspective make SMEs invaluable contributors to PRIMA's mission of promoting sustainable, impactful, and scalable solutions across the Mediterranean.

SMEs: role in sustaining the impact of PRIMA projects

SMEs play a vital role in sustaining the impact of PRIMA-funded projects in the Mediterranean even after project completion. By continuing to develop, adapt and scale up innovations introduced during the projects, SMEs ensure that the benefits of these initiatives extend far beyond their initial phases. Often, SMEs take ownership of new technologies, practices or business models, integrating them into their operations or offering them as commercial services to local communities. This not only creates a ripple effect of knowledge transfer but also promotes the adoption of sustainable practices among other stakeholders, including farmers, local businesses, and policy-makers. Furthermore, SMEs actively engage in market development by refining and promoting project outcomes to meet evolving local needs, which increases the likelihood of widespread adoption. Their agility and close connections to regional markets allow them to quickly respond to feedback, improve solutions, and drive continuous innovation, thereby reinforcing the long-term impact of PRIMA projects on sustainable development, economic growth, and resource efficiency across the Mediterranean.

In non-European PRIMA participating states, national regulations pose significant challenges, resulting in low participation of SMEs in innovation-driven activities. These regulations often limit the resources available for SMEs, which in turn restricts their expansion and reduces their contribution to boosting innovation. As a result, SMEs struggle to engage effectively in essential areas, impacting the sustainability of projects after completion. Without adequate support and resources, it becomes difficult for SMEs to maintain and build upon the outcomes of PRIMA projects, undermining long-term development and growth.

Challenges of scaling up innovation in the Mediterranean region

Scaling up innovation is a complex process that requires both adaptability and strategic alignment with socioeconomic and policy frameworks. According to Rogers' Diffusion of Innovations theory, successful scaling up is not just about broadening the use of a technology but also about ensuring it meets the needs of diverse users

across different contexts (Rogers, 2003). Effective scaling requires robust partnerships, infrastructure investment, and capacity-building to ensure that innovations can be applied in various environments (Cooley & Kohl, 2006). In addition, creating policy environments that support innovation adoption is essential. For instance, policy incentives can facilitate the transition from pilot projects to broader applications, especially in areas like renewable energy and sustainable agriculture where public-private cooperation is critical (Bloom et al., 2019). Scaling up also benefits from community engagement and local buy-in, as stakeholders who perceive value in the innovation are more likely to contribute to its diffusion. This holistic approach, combining policy alignment, investment, and stakeholder engagement, is essential for moving innovations from experimental stages to impactful, sustainable solutions that address pressing global challenges (Murray et al., 2010).

Scaling innovation within PRIMA projects presents several challenges, given the unique socioeconomic, environmental, and policy landscapes across the Mediterranean region. One significant barrier is the variability in infrastructure and resources among Mediterranean countries, particularly between EU and non-EU members. Many innovations require reliable infrastructure, such as advanced irrigation systems, IoT-enabled devices or renewable energy grids, which may not be accessible or affordable in some regions. Additionally, scaling innovation demands substantial financial investment to support the transition from pilot projects to large-scale operations. While PRIMA projects often receive initial funding, long-term financial support from both public and private sectors is crucial to ensure that innovations can be widely implemented and maintained.

Another key challenge lies in adapting innovations to diverse local contexts. The Mediterranean region encompasses a range of climates, soil types, water availability, and farming practices, each of which influences how technologies and methodologies perform. A water management solution effective in Spain, for example, may require significant adaptation to work in the arid conditions of North Africa or the differing socioeconomic contexts of Eastern Mediterranean countries. Scaling up also requires strong policy alignment and regulatory frameworks that support innovation; however, regulatory environments vary widely across the Mediterranean, and the lack of harmonised policies can hinder cross-border collaboration and knowledge sharing. In addition to regulatory issues, cultural factors and community readiness play essential roles in the adoption of innovations. Innovations in agriculture, water management or cooperative models may encounter resistance if they disrupt traditional practices, making community engagement and local training crucial to fostering acceptance and ownership of new approaches.

Scaling up PRIMA innovations often involves building collaborative networks of stakeholders, from government bodies and research institutions to local communities and industry partners. Coordinating these diverse stakeholders can be complex, as each brings different priorities, resources, and timelines to the table. Effective scaling up requires not only stakeholder collaboration but also ongoing support for capacity-building, technical training and monitoring to ensure the continued success and adaptation of innovations in diverse Mediterranean settings. Addressing these challenges is essential for PRIMA projects to achieve widespread impact, transforming initial successes into sustainable, region-wide solutions.

Conclusion

In conclusion, while PRIMA projects have made significant strides in addressing sustainability issues across the Mediterranean, most of the funded projects remain at an intermediate stage in terms of TRLs. To advance these projects toward higher TRLs and achieve greater impact, several factors are essential: 1) greater involvement of SMEs, which bring agility and market-driven insights; 2) active engagement of stakeholders and end-users to ensure that innovations align with real-world needs; 3) establishment of large-scale demonstration sites to validate technologies in practical settings; and 4) implementation of robust scaling-up instruments to transition successful innovations from pilot phases to widespread adoption. Together, these elements can strengthen the pathway from research to commercialisation, maximising the socioeconomic and environmental benefits of PRIMA projects across the region.

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