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Moving forward in the Euro-Mediterranean Research and Innovation partnership
The experience of the MIRA project

Edited by:
Chiara Morini, Rafael Rodríguez Clemente,
Rigas Arvanitis, Refaat Chaabouni

Research and innovation (R&I) offer significant opportunities for Mediterranean Partner Countries (MPCs) to develop and exploit their assets for the benefit of their economies and of their peoples, as drivers of economic and social development. In this spirit, this book presents the main outcomes of the MIRA project, a coordination and support action acting as a "think-tank" and an implementation actor of the Euro-Mediterranean Cooperation in Science and Innovation in the Mediterranean area. The book presents the efforts, analyses, reflections on the past and future of the EU - MPC cooperation in research and technology development, as well as models and challenges of structuring this cooperation, and a compilation of the lessons learnt along the development of the project. It contains a reflection on policy aspects, analyses and concrete proposals to support the implementation of a future road map of scientific and innovation cooperation for the mutual benefits. The book reflects the internal and external dialogue of the MIRA project consortium on the targeted objective of supporting the EU-MPC dialogue on scientific and innovation cooperation.

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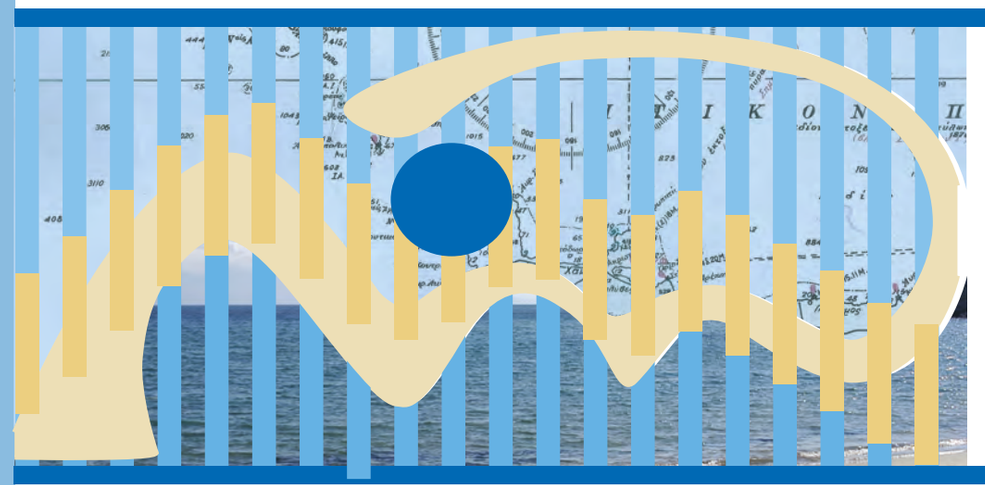

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Third part
The Euro-Mediterranean Innovation Space

Acronyms and abbreviations

BAU	Business as Usual
BILAT	Bilateral programmes
CBC	Cross-Border Cooperation Programme
CERN	European Organization for Nuclear Research
CNRST	Centre National pour la Recherche Scientifique et Technique - Morocco
CRIA	Common Agenda for Research and Innovation
CSP	Concentrating Solar Power
DG	Directorate General
EC	European Commission
EMIS	Euro-Mediterranean Innovation Space
ENP	European Neighbourhood Policy
EPO	European Patent Office
EU	European Union
FEMIP	Facility for Euro-Mediterranean Investment and Partnership
FP	Framework Programme
GDP	Gross Domestic Product
ICT	Information and Communication Technology
INCO	International Cooperation
IRD	Institut de Recherche pour le Développement - France
MoCo	Monitoring Committee
MPC	Mediterranean Partner Country
NCP	National Contact Point
R&D	Research and Development
RI	Research and Innovation
RDI	Research, Development and Innovation
RTD	Research and Technological Development
SICA	Specific International Cooperation Action
SME	Small and Medium Sized Enterprise
ST	Science and Technology
STI	Science, Technology and Innovation
TFEU	Treaty on the Functioning of the EU
TT	Technology Transfer
TTO	Technology Transfer Office
USPTO	US Patent and Trademarks Office
WP	Work Package

Presentation

Over the last years, the Mediterranean region has experienced a peculiar moment in its history due to the economic crisis blowing in the North and the socio-political changes in the South, with their repercussions on the whole area.

In the southern Mediterranean countries, the Arab uprisings have profoundly changed the political, economic and social situation, calling for dignity, justice and freedom. These historical changes need a focused, innovative and ambitious response. Key ingredients for greater prosperity and stability in the Mediterranean region are education, research, social and technological progress. Thus, a renewed, closer partnership in research and innovation is needed between the EU and its Mediterranean neighbours, embracing and encouraging policy dialogue, cooperation in research and innovation.

For many years, the Barcelona process and related Euro-Mediterranean Partnership have been the main cooperation framework between the EU and Mediterranean Partner Countries (MPCs). And this until the declaration of Marseille (2008) that launched the "Union for the Mediterranean" (UfM). The UfM sets Research and Higher Education high on the agenda, as one of the six key initiatives that should develop into concrete actions.

The latest EU Communications have paved the way for a more strategic and reinforced EU-MPC cooperation on research and innovation, calling for a closer partnership and dialogue on scientific research and innovation. The importance of scientific research for the socio-economic development of MPCs and the need to develop adequate international cooperation activities and increase knowledge building and research capacity are also under the spotlight.

As reiterated during the Euro-Mediterranean Conference on Research and Innovation of Barcelona (2012), reinforcing local-regional dialogue and networking on research and innovation, strengthening research cooperation and adopting an integrated and interdisciplinary approach are strategic efforts for governmental institutions, researchers, policy makers, private enterprises and relevant stakeholders in Europe as well as in the Mediterranean neighbours.

In this context, the CIHEAM, actively involved in the Mediterranean area for fifty years, plays a significant role in supporting the efforts locally carried out by the Mediterranean Countries in the process of institutional and economic adaptation to seize the development opportunities offered by globalization and, at the same time, to cope with strategic challenges like enhancing regional ST dialogue in the region, as furthered through FP7 by the INCO-NET MIRA coordination and support action.

In this spirit, this publication reports the main outcomes of the MIRA project, coordinated by CSIC (Spain), acting as a "think-tank" and an implementation actor of the Euro-Mediterranean Cooperation in Science and Innovation. This publication presents the efforts, analyses, thoughts on the past and the future of EU-MPC cooperation in research and technology development, as well as models and challenges of this cooperation, and a compilation of the lessons learnt along the development of the project. It contains a reflection on policy aspects, experiences and tangible proposals to support the implementation of a future road map of scientific and innovation cooperation for mutual benefits. It also mirrors the internal and external dialogue of the MIRA project consortium on the targeted objective of supporting the EU-MPC channel of communication on scientific and innovation cooperation.

Undoubtedly, a new opportunity has emerged for the Euro-Mediterranean Partnership. Its success will depend on the EU's capacity to readapt its strategy by listening to and taking on board the needs and demands of the Arab civil society. This ability to empathize will be particularly

challenging in times like these, when Europe is becoming increasingly self-concerned about the economic hardships it is going through.

Research and innovation policy are at the heart of regional employment, stability and prosperity. All the Mediterranean countries will benefit from it if cooperation becomes easier for individuals, research institutes, universities and companies.

Education, research and innovation are key elements for a better mutual understanding and coexistence. In a time of increased global competition, Europe and southern Mediterranean countries have to pool their resources of talent and knowledge for a better and shared future.

Cosimo Lacirignola
CIHEAM – General Secretary
CIHEAM – IAMB Director

Foreword

The Euro-Mediterranean cooperation in research and innovation was institutionalized in 1995, when a Euro-Mediterranean Committee in Research and Technological Development (MoCo) was established in the context of the Barcelona process. However, long before that, people, countries and organizations from both shores of the Mediterranean had realized that they did not simply share common geography, history and culture but that they were faced with common challenges that needed to be addressed jointly and in the spirit of mutual respect and understanding. These challenges vary from water scarcity, health and energy concerns to brain drain, job creation and human development in general. It is already universally recognized that most of them can only be tackled through an innovative and knowledge-based approach involving the drivers of change in the region - the researchers and the entrepreneurs.

In this context and following its priorities for future development, the EU has launched during the recent years a number of vectors of cooperation and initiatives with its Southern neighbours in the sphere of research, technological development and innovation. In its most recent communication - A New Response to a Changing Neighbourhood - the EU has set itself the goal to work together with its neighbours towards the creation of a Common Knowledge and Innovation Space. It holds reinforced bilateral dialogues based on science and technology agreements with a number of countries from the region, bi-regional policy frameworks like MoCo and important regional projects funded under the EU FP7 such as the International Cooperation project for the Mediterranean INCO-NET MIRA (Mediterranean Innovation and Research Coordination Action).

No doubt that regional multilateral projects like MIRA give a particular value-added to the Euro-Mediterranean cooperation in research and innovation. They serve as indispensable multilateral working platforms where experts and researchers from the region can meet, discuss and even outline the way forward. With 30 partners across the Mediterranean, including policy-makers and research entities, this 4 million euro project has provided a five-year functional dialogue and action platform to support the Euro-Mediterranean cooperation by raising creative and experimental ways of generating opportunities for win-win collaborations. In a way it has represented an illustrative sample of the Euro-Mediterranean Research community, its needs, potential and ability to engage also with important industry stakeholders and the international financial institutions active in the region.

MIRA acted as an “umbrella” of project results coming from more than 40 ST networks and feeding into the dialogue held in the framework of MoCo. As a result, MIRA encouraged a structuring effect of the Euro-Mediterranean Science, Technology & Innovation policy dialogue thereby promoting the importance of research and institutional capacity-building vis-à-vis other EU policies.

MIRA is carrying out a huge analysis on the impacts and recommendations coming from more than 40 research projects related to water and decontamination -fields financed for 10 years in the Mediterranean region. The outcomes of this analysis will support the decision-making process for shaping the next financial orientations of the Horizon 2020 Steering Group.

In this sense, MIRA is not the first regional project funded by the EU in the sphere of research but it definitely brings a new dimension to this dialogue and cooperation, namely the contemplation on how to transfer the knowledge into actions. A group of MIRA experts was mandated by MoCo to elaborate on a future common Euro-Mediterranean research and innovation agenda. This contribution was drawn alongside the conclusions of the Euro-Mediterranean conference in research and innovation held in Barcelona on 2 and 3 April 2012. It was acknowledged as a base for further discussions on the priorities of the Euro-Mediterranean cooperation in research and innovation and the way they should be implemented.

In view of all this the MIRA book offers not only a glance at the various MIRA activities, challenges and achievements but also a reflection on the lessons learnt, taking stock of present and past actions and proposals for a better future of the Mediterranean region.

Elisabeth Lipiatou
Head of Unit 'European Neighbourhood, Africa and the Gulf'
DG Research & Innovation
European Commission

Introduction

Research and innovation are two of the most important assets for European and Mediterranean Partner Countries (MPCs); they contribute to the improvement of the living conditions of their peoples, and to the sustainable development of their economies.

In this spirit, this book gives new insight into the state of the art of Euro-Mediterranean cooperation in the field of research and innovation.

This work is based on some of the main outcomes of the MIRA project, the Mediterranean Innovation and Research Action funded by the 7th EU Framework Programme bringing together partners from the main political institutions dealing with science and innovation in the Mediterranean Area, research communities and other stakeholders. This "think-tank", coordinated by CSIC (Spain), has worked for five years and has contributed to the implementation of the Euro-Mediterranean Cooperation in Science and Innovation in the Mediterranean area.

The book "*Moving forward in the Euro-Mediterranean Research and Innovation Partnership. The experience of the MIRA project"* reports the efforts, analyses, reflections on the past and, maybe, the future of EU - MPC cooperation in research and technology, the challenges of structuring this cooperation, and the lessons learnt during the project development.

It offers food for thought on policy aspects and tangible proposals to support the implementation of a future road map of scientific and innovation cooperation for mutual benefits. The book also mirrors the internal and external dialogue of the MIRA project Consortium with other stakeholders in the Euro-Mediterranean area designed to develop and support the dialogue between the EU and MPCs on scientific and innovation cooperation.

The European Commission and the different Scientific Officials that have guided the MIRA Project are acknowledged for their continuous support to the project.

As Project Coordinator, I am pleased to present this editorial effort, the outcomes of five years of project activities. I thank all the partners of the Project, and the authors of the chapters, my colleagues and friends, for their contribution to this original and systematic afterthought on the EU - MPC cooperation. They have shared their knowledge and experience which are the most valuable "hand luggage" for moving forward in the tangle of new opportunities for the Euro-Mediterranean Partnership.

Rafael Rodríguez-Clemente
MIRA project Coordinator
CSIC

First part

General vision on the EU-MPC cooperation

What scenarios for the Euro-Mediterranean in 2030 in the wake of the Arab spring?

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Abstract. In the aftermath of the Arab Spring events, the Southern Mediterranean region has reached a turning point in its history, presenting as many opportunities as challenges for the EU. In this MEDPRO Policy Paper, the authors explore various possible scenarios that could play out in EU-Mediterranean relations over the next two decades but find, lamentably, that the EU has set itself on a 'business as usual' course, leaving the region open to further polarization and the involvement of other external players.

Keywords. Euro-Mediterranean partnership – Euro-Mediterranean 2030 – Arab Spring.

Quels scénarios pour la région euro-méditerranéenne en 2030 aux lendemains du printemps arabe?

Résumé. *Aux lendemains du Printemps Arabe, le Sud de la Méditerranée est à un tournant historique, présentant autant de défis que d'opportunités pour l'UE. Dans ce Policy Paper de MEDPRO, les auteurs explorent les différents scénarios qui pourraient se matérialiser dans les relations euro-méditerranéennes au cours des vingt prochaines années. Malheureusement, les auteurs trouvent que l'UE privilégie un scénario de « business as usual » laissant la région en proie à une polarisation croissante ainsi qu'une implication toujours plus importante d'autres acteurs extérieurs.*

Mots-clés. *Partenariat euro-méditerranéen – Euro-Méditerranée 2030 – Printemps Arabe.*

I – Introduction

The South Mediterranean region has reached a turning point in its history, following the unprecedented uprisings that brought to an end decades of repressive authoritarian rule. Before 2010, the year of the start of the Arab revolts, the prevailing *'business as usual'* (BAU) scenario in EU-Mediterranean relations consisted of a blend of state un-sustainability and regional cooperation dominated by inter-governmental relations and increasing depoliticization and securitisation. In terms of economic development, it is important to note that the South Mediterranean region would account, under this scenario, for a mere 3% of global GDP in 2030 (up from 2% in 2010, with 90% of the wealth creation originating from Turkey and Israel). During the last decade, indeed, European policy-makers seem to have equated stagnation with stability, choosing to cooperate with autocratic regimes. Political reform and human rights were sidelined, while issues such as combating terrorism and containing migration dominated the policy agenda. The final step in this process was the creation of the Union for the Mediterranean (UfM), which was revealed to be a fragile edifice, dominated by France's determination to inter-governmentalise Euro-Med relations. Unsustainability coupled with phony stability were believed to offer the basis for a solid future for the countries in the south Mediterranean, as no credible prospects for radical democratic political change were foreseen; on the contrary, a deterioration of political freedoms and the rule of law was the norm rather than the exception.

Unsatisfactorily, the European Union's policies towards the region equally appeared to drive the region towards an unsustainable future. With the Arab revolts, however the future has suddenly become uncertain as radical domestic changes are being prepared and external actors' are

rethinking their policies towards the region. While the BAU scenario has clearly been eliminated by the events of the Arab spring, other scenarios may materialise in a 2030 perspective (see diagramme below), depending on the interaction of relevant political and socio-economic developments that could plausibly lead to one or another future.

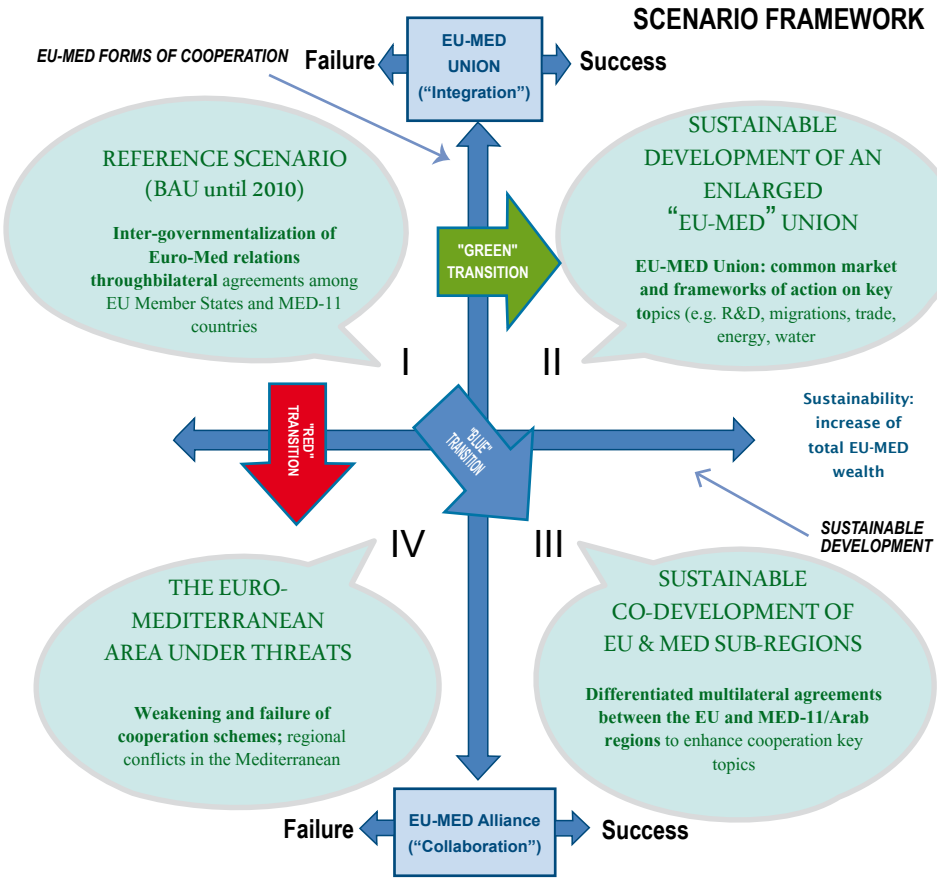

Figure 1. Alternative scenarios of Euro-Mediterranean policy in 2030.

In a highly fragile and uncertain political and socio-economic context in the South Mediterranean region pre and post Arab revolts, a scenario analysis appears to be the best strategic tool to drive appropriate policy reforms towards a more sustainable socio-economic future. Such scenarios were derived from a comprehensive political and socio-economic reflexion on what determines the wealth of nations on one hand and the role of the European Union as a historical political and economic partner of the South Mediterranean region. These scenarios were first identified, tested and agreed between the senior experts and finally simulated using a state of the art economic model.

Let us start with the most disastrous scenario, expressed simply as 'The Euro-Mediterranean Area under threat', in which the Mediterranean Sea would become a dividing line between conflicting

civilisations. Sporadic conflicts would become long-lived and would spread from one country to another leading to deeper political uncertainties and mounting economic and social difficulties. The non-resolution of the conflicts in the Middle East and the Western Sahara would exacerbate tensions in the Mashreq and the Maghreb. These uncertainties and tensions would offer new opportunities for terrorist organizations and radical movements to take power.

The absence of cooperating authorities would undermine the EU's and other geopolitical actors' capacities to achieve the necessary cooperation on key sectors, such as migration programmes, research, science, technology and education, agriculture, security and energy. As a result, in 2030, the Mediterranean would become a border zone of broad conflicts, which, if not contained, would spread to the Northern frontiers. This is indicated in the diagramme above as the 'red' transition towards a widening gap and increasing tensions and conflicts between the two shores of the Mediterranean.

The consequences of this scenario must not be underestimated for they will plague the Euro-Mediterranean region for generations to come.

One can envisage two alternative scenarios of long-term growth and sustainability, however, each following a different path of Euro-Mediterranean cooperation, if the necessary political and economic will can be summoned. The Arab revolts can be taken as the point of departure which become launched on one or possibly both of these paths.

In a perspective of a *'Euro-Mediterranean Union'*, recognising their shared past and believing in their common future, the European and the South (and East) Mediterranean countries would form an integrated region with a common market. The integration scheme could be inspired by the European Economic Area (EEA) model, establishing deep and comprehensive economic relations with full participation in the EU's Internal Market, as it now exists for Iceland, Norway and Switzerland. This path would result in the adoption of the EU *acquis* and would thus lead to more convergence and ultimately to furthering the economic integration.

Under such a scenario, the current tensions and conflicts in the Euro-Mediterranean region would be settled. Since not all of the countries have reached the same level of political and socio-economic development, the differentiated approach of the EU as outlined in its response to the Arab spring, the so-called 'renewed neighbourhood policy' might give rise to a number of countries fulfilling the requirements to become part of the EU economic bloc quicker than others. At a later stage, this renewed neighbourhood policy would need to be fundamentally reoriented towards the philosophy of the EEA model or any other similar model that would give a stake in the EU Internal Market. The Union for the Mediterranean could play a role in fostering and speeding regional cooperation, thus deepening the economic integration between all countries of the region. However, the importance of the UfM would diminish over time when all south Mediterranean countries would have a stake in the EU single market. In this scenario, the UfM is seen as a mechanism to revive trans-Mediterranean relations.

The creation of a larger and powerful Euro-Mediterranean community would influence the global scenario for the year 2030, with the emergence of a tri-polar world, dominated by the US, China and Euro-Med. This prospect is indicated in the diagramme above as the 'green' transition, because it entails the expansion of the 'green-growth' strategies that currently underpin most of the EU's policies on energy, environment and other key sectors to include the South Mediterranean. In practice, however, this scenario would still reflect a Euro-centric vision of the future.

Another scenario that is worth considering – referred to as the *'Euro-Mediterranean Alliance(s)'* – would keep the two regions separate: the EU on the North (which may or may not be enlarged to include the Balkan States and Turkey) and the Southern Mediterranean countries on the South (which may or may not include other African and Middle Eastern countries). Under such a scenario, there would be no perspective (or need) for pursuing integration models such as

the European Economic Area or similar models. On the contrary, most indications point to an increasingly heterogeneous region, where distinct but related countries and sub-regions (e.g. Western Mediterranean, South Mediterranean, Eastern Mediterranean) would work in *association* towards the same aim of sustainability within an increasingly interdependent world. Bilateral EU policies, such as the European Neighbourhood Policy (ENP), would shed their 'enlargement-like' approach, while multilateral policies, such as the UfM, would need to be revised to account for a more heterogeneous southern Mediterranean and increasing economic partnership with other regions such as the Gulf. The latter would also feature its own forms of multilateral cooperation (e.g. the Arab League, the Arab Maghreb Union, etc.). The North and South would enter into cooperative contractual relations, featuring trade and co-development, political dialogue, security, as well as specific initiatives pertaining to youth education and employment opportunities, circular migration schemes, research, science, technology, innovation and infrastructure (energy, transport and ICT), agriculture, food and water security, and mitigation and adaptation to climate change (Tocci, 2011).

In this scenario of differentiated multilateralism, regional cooperation schemes would be applied in a more selective way with regard to participating actors and subject areas, fully recognising that Western Mediterranean, South Mediterranean and Eastern Mediterranean are distinct geographical sub-regions (even if there may be some overlap) each with its own specific problems, opportunities and challenges. Given its inherent heterogeneity, in all likelihood, this scenario would not entail a resolution of the protracted Arab-Israeli and Western Sahara conflicts, which may continue to be with us up to and even after the 2030 horizon.

However, this scenario may also develop towards a more stable and peaceful environment, with the EU and the South Mediterranean countries establishing a *Euro-Mediterranean Alliance Treaty*, which would cover a number of common key areas of interest, such as peace and security, co-development, shared citizens' rights, youth, education, research, innovation, science and technology and intercultural dialogue. Such a vision is coherent with a multi-polar world envisaged for the year 2030. Both the European Union and the Southern Mediterranean will play separate roles on the global stage, maintaining preferential relationships of co-development on some key areas of common interest. This perspective is indicated in the diagramme as the 'blue' transition, because it is based on common policies built with the active contribution of people, civil society and policy-makers on both sides of the Mediterranean, without the emergence of a dominant partner (the process is symbolically centred in the 'blue' Mediterranean Sea).

According to Tocci (2011), the signals emitted in the pre- and post-Arab spring appear to point to a more polarised Mediterranean. Two years since the eruption of the Arab revolts, countries are still reeling from sporadic open conflict and political uncertainty. With no clear target or direction, they alternate between pressures and tensions to continued un-sustainability and hopes for achieving sustainability, while trying to cope with new realities and dynamics. The EU's stance as reflected in the Commission's Communication on "Partnership for Democracy and Shared Prosperity" issued in March 2011, and complemented soon thereafter by "A New Response to a Changing Neighbourhood" issued in May 2011, has been generally timid and focused on the short term, with no major visionary change foreseen in the state of affairs in the region.

The EU recognises the need to offer more assistance to its neighbours, ranging from more financial benefits (Ayadi and Gadi, forthcoming 2013) to more targeted help in developing and sustaining political parties (through the Endowment for Democracy) and civil society (through the Civil Society Facility). It also recognises the need to embark on deep and comprehensive free trade agreements (DCFTAs), which can be expected to open the door to more access to the EU's single market. Moreover, it has promised more 'mobility partnerships' with the Southern Mediterranean region, which are designed to better manage migration flows between the EU and third countries, and in particular to fight illegal migration, in partnership with the EU, in exchange for enhanced possibilities of mobility between their countries and the EU for their citizens, in terms

of legal migration opportunities and of short-term movements (short stay visa issues). In parallel, conditionality and differentiation will be reinforced.

These commitments to change are welcomed but they remain trapped in the logic of enlargement, security, vagueness, insularity and bilateral relationships with the South Mediterranean, as emphasised by Tocci (2011).

On the multilateral dimension, the UfM role has not yet been reinforced in the post-Arab spring, although it has the potential to implement the sustainable development objectives in the region within its inter-governmental philosophy.

Looking ahead to the 2030 horizon, the EU's response to the challenges in the region appears to reflect neither a vision towards the 'green' transition nor towards the 'blue'. Instead, it remains trapped in the 'business as usual' scenario while the region is moving towards further polarisation and the involvement of other external players.

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The policy framework of Euro-Med cooperation on research and innovation
Effects on research collaborations

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Abstract. This article analyzes the policy framework that affects the Euro-Mediterranean research cooperation, since the Barcelona declaration of 1995 until the more recent Neighbourhood policy of the EU. We examine the policy orientations and its changes, the effect on scientific collaborations in terms of publications and number of collaborations as measured by the MIRA Survey. We try to examine the effects in terms of governance of research collaborations. We also compare the EU sponsored research programmes to the bilateral collaborations. Finally we identify a series of proposals in order to generate a co-funded and co-decided partnership.

Keywords. Research policy – Research collaborations – Barcelona process – Neighbourhood policy – Bilateral collaborations – European Union.

Le cadre des coopérations Euro-méditerranéennes de recherche et innovation. Effets sur les collaborations de recherche

Résumé. *Cet article analyse le cadre politique Euro-Med qui affecte les coopérations en matière de recherche depuis la déclaration de Barcelone jusqu'à la politique de voisinage. Nous examinons les orientations de politique et ses changements, les effets qu'ils ont sur les collaborations scientifiques en termes de publications et de gouvernance de la recherche en utilisant les données de l'enquête MIRA sur les collaborations scientifiques. Nous comparons aussi les programmes financés par l'Europe et ceux financés par les coopérations bilatérales. Enfin nous identifions des propositions pour générer des partenariats co-financés et co-décidés.*

Mots-clés. *Politique de recherche – Collaborations de recherche – Processus de Barcelone – Politique de voisinage – Coopérations bilatérales – Union Européenne.*

I – Introduction[1]

The EU policy toward the Mediterranean Countries was defined in the so-called 'Barcelona Process' launched in 1995, where the Member States of the EU and the Mediterranean Partner Countries (MPC) expressed a shared wish of a Mediterranean space of security, economic development and socio-cultural exchanges. The policy instruments were mainly the Association Agreements (AA) between the EU and each MPC. This was followed by some new policy instruments, with a regional scope which ended up in the European Neighbourhood Policy (ENP) in 2003. These instruments had accompanying financial instruments : the MEDA programmes (until 2004)[2] and ENPI since 2004. More recently, the Union for the Mediterranean (UfM) was launched in the summer 2008, with the intention of rebuilding the EU-MPC partnership on the basis of a EU-MPC Co-Presidency.

The Euro-Mediterranean Ministerial Conference on Higher Education and Research held in Cairo in June 2007 (Euromed Ministers, 2007) stressed the need to move toward the creation of a Euro-

Mediterranean Research and Innovation Area, through, *inter alia*, modernizing R&D policies, promoting innovation and supporting institutional capacity building in the southern Mediterranean countries. The Declaration also called upon favouring the mobility of researchers and enhancing the participation of Mediterranean Partner Countries (MPCs) in the EU Framework Programme for Research.

The EUROPE 2020 strategy, which is the overall plan of the EU in science, technology and innovation, mentions, as a key issue, the cooperation with neighbourhood countries on societal challenges, and the European willingness to help their own reform efforts. Scientific cooperation between the EU and MPCs with community funding has had its own identity since 1992 with the INCO programme, which was created during the 3rd Framework Programme (FP) and carried on through successive FPs. So far, some 500 million Euros have been spent on over 600 joint projects in areas dealing with issues of common interest, from health care to the development of Information and Communication Technology (ICT). In May 2011, addressing the ongoing transformation in the Mediterranean, the EU issued a Joint Communication "*A new response to a changing Neighbourhood"* (2011) stressing the need for a new approach to strengthen the partnership between the EU and the ENP countries. Working towards the development of a "common knowledge and innovation space" is underlined as a cooperation priority. The EU member states and MPCs share the responsibility and commitment of putting these words into action.

The recent revolutions in the south Mediterranean have driven the region in the throes of major political, economic and societal transformations, the effects of which will extend beyond the Mediterranean region. Education and research policies, sustainable development, democracy and citizens' empowerment and viable economic, industrial and employment models, among others, are emerging as fundamental areas of transformation in the region. Rethinking the EU-MPC cooperation agenda is a necessity to address such dynamic transformations.

This article aims to review the political framework and outcomes of the Euro-Med cooperation in Science, Technology and Innovation (STI) in an attempt to rethink the course of this cooperation in response to the recent socio-political changes in the southern Mediterranean.

II – The policy framework

Research was part of the initial "Barcelona declaration" with the objective of "strengthening scientific research capacity and development, contributing to the training of scientific and technical staff and promoting participation in joint research projects based on the creation of scientific networks".[3] The mandate given to the European institutions was to create joint research projects. Innovation was not part of the declaration (nor was, for example agriculture). The European Commission proposed with its partners to create a joint committee that would define these common actions. Thus, the Monitoring Committee on ST policy (also known as MoCo) was created. Science and technology were included in the Association Agreements (Table 1) after 1999 (the Egyptian agreement was the first to have a part in science and technology). In the meanwhile, the science and technology cooperation was mainly driven through the meetings of this MoCo and, in Brussels, through the International Cooperation direction (INCO)[4] of DG Research. It should be underlined that the mandate to create research networks and joint research programmes was also the objective of the Framework programmes (since 1984) which apply to cooperation between European Member states. But international cooperation with 'third countries', in particular with developing countries, was part of a specific design of 'research for development'. Until the 4th Framework programme, cooperation in research with Africa, Asia and Latin America was very much influenced by the 'science-for-development' idea which, in Europe, was embodied in specific institutions (ORSTOM and CIRAD in France, SIDA in Sweden, ODS in the United Kingdom, the USAID in the USA and JICA in Japan). Research for development policies was profoundly affected by the globalization

process and, since the nineties, was progressively integrated in more general schemes of cooperation (Gaillard, 1994; Gaillard, 1999).

Table 1. Negotiation of Association Agreements and science and technology agreements.

Partner country	End of negotiations	Signature of Agreement (SA) and Day of Application (DA)	Science and technology agreement
Turkey * +	Accession to EU Under negotiation		Signed 1/06/2007 Entry into force: 29/06/2007
Tunisia	June 1995	SA: July 1995 DA: March 1998	OJ, L 37/17 10/2/2004 (Entry into force: 13/04/2004). Draft Roadmap 2010-2011. July 2010 creating co-funding mechanisms.
Israel *	September 1995	SA: November 1995 DA: June 2000	L220/3 25/08/2007 (International S/T Association Agreement) Entry into force: 17/12/2008 The Agreement was applied from January 2007
Morocco	November 1995	SA: February 1996 DA: March 2000	OJ, L 37/9 10.2.2004
Palestinian authority	December 1996	SA: February 1997 DA: July 1997	No S/T agreement
Jordan	April 1997	SA: November 1997 DA: May 2002	OJ, L 159/108 17/6/2011. Entry into force 29/03/2011
Egypt	June 1999	SA: June 2001 DA: June 2004	(OJ, L 182/12) 13 July 2005 + Draft Road map 2007-2008 creating RDI
Lebanon	June 2001	SA: January 2002 Interim agreement	No S/T agreement
Algeria	December 2001	SA: April 2002 DA: September 2005	19/03/2012 provisional application from signature.
Syria	October 2004	Pending signature and date of application	No S/T agreement

Notes: *Associated country with 7th Framework programme. The country makes a financial contribution to all or part of FP7 and enjoys the same rights as member states.
+ Turkey is a candidate country for membership of the European Union (EU) as of 1999. Accession negotiations started in 2005, and on 18 February 2008 a revised Accession Partnership was adopted.
OJ: means official journal where EU legal documents are published.

The European Union also progressively changed its idea about research and international cooperation. The focus in Brussels progressively became scientific collaboration, that is networking of partners considered to be equal in capacity. The living example was Europe itself (Callon *et al.*, 1995; Vinck, 1995). Very early, the European Commission understood that the Framework programmes were going far beyond the initial objective of creating 'networks' (Callon *et al*., 1992). Technological programmes became relatively common (Larédo, 1997) and they changed profoundly the main orientations of the successive FPs. Progressively, the idea was

that, since the 'Third World' had 'disappeared' (Busch and Gunter, 1996), the only objective was to collaborate with those countries (the emerging ones) and actors that could contribute to strategic alliances toward competitive technologies. Innovation became the buzzword. As opposed to the Barcelona process, that had a socio-cultural and political orientation, profoundly affected by the political instability of the Middle-East and the menacing trends of the North-African neighbourhood for Europe, the European research policy was oriented towards reaching the knowledge economy and strengthening the competitiveness of Europe (mainly against the US, Japan and the emerging economies). The Euro-Mediterranean research cooperation had to face a contradictory and difficult equilibrium: the policy of the EU wishing to open its programmes to any 'third country' (since the 6th FP) under the argument of universality of knowledge and the need to strengthen the competitiveness of the European economies which was *de facto* difficult to combine with the need to have a specific policy towards the Mediterranean because of the political context of the region.

The European Commission's International Cooperation division (INCO) was particularly aware of this situation and was in the midst of a series of demands expressed by the Med countries in the MoCo sessions. Some policy-oriented projects were funded in order to draw a state of the art on science, technology and innovation systems in the region (ASBIMED and ESTIME, as well as other projects on forecasting and innovation in MPCs).

Thus, the urgency of tackling global societal challenges in the Euro-Med area has opened the discussion on global research programmes also based on diplomacy, historical and cultural ties between countries, and political objectives. In addition to this very specific regional context, the new global hierarchy, based on a multi-polar world (Arvanitis *et al*., 2012), exacerbates the opposition between "science for science's sake" – and the predominance of "excellence" criteria mainly in hegemonic countries – and "science for development" – and the defence of "pertinence" understood as useful knowledge.

Of course, excellent research does not necessarily bring about good development, and development is not always linked to excellent research. It is rather a question of defining a clear strategy and enabling an environment that satisfies developmental needs and that gives an impulse to new ideas and knowledge. Thus, "science for development" or "science for innovation" can in no way be opposed to "science for academic excellence".

It seems that epistemological issues have a concrete translation in the practice of cooperation projects: the types of funding, the importance of capacity building, the administrative rules, in brief the practical march of the projects is the expression of these issues. The inequality of partners, in terms of initial resources and access to equipment and instruments in a project, is also related to the structuring of the project with the social and economic context. And the larger context is quite complex.

International scientific collaborations are now part of a world science system that has profoundly changed in its 'governance': decisions are no more limited to the official authorities (governments, international agencies, EU) but include the players of the new learning economy. Final users of science (diseased people in medical research, rural population in agricultural science projects, enterprises in innovation policy, and so on) intervene actively in the definition of the research agendas. Large funding agencies act at the global level and are no more limited by the national boundaries (Losego and Arvanitis, 2008; MIRA Observatory, 2011).

In the case of the Euro-Mediterranean region, one can wonder on how this competence market is structured, who the main actors are, how this new hierarchy of competences is expressed and how it is translated into policies and the actual dynamic of science. Given the history of the Mediterranean basin, it is not surprising to find a multiplicity of competing agendas, agencies and organizations in research, as well as a wealth of research programmes in the Mediterranean area, executed by foreign and local research teams. Bilateral cooperation has usually been the product

of former historical circumstances such as the post-colonial linkages and the advent of a national science system in South and East Mediterranean countries as a product of independence. Most scientific relations in the region have been embedded in this political framework.

Just over the last 20 years, the European Union has appeared as the main player in this institutional space which is literally saturated by institutions that aim at promoting cooperation (Arvanitis, 2012).

The financial weight of the intervention of the EU explains this situation. Its principal instrument of cooperation has been the European Neighbourhood Policy Instrument (ENPI) with almost €12 billion for the period 2007-2013, which replaced the MEDA funding in the Mediterranean area. Additional to the research activities, the European Commission has assigned substantial funding through the so-called "structural programmes". A Cross-Border Cooperation (CBC) Programme for the Mediterranean Sea basin has been also defined which is funded by the ENPI, and the European Regional Development Fund (ERDF). The funding available for 2007-2010 was € 583 million, of which € 275 million from ENPI, and € 308 million from ERDF (Data from Euromed Expert Group Report). It is not here the place to judge the impact or efficiency of these decisions. We just want to indicate that the European Union has a strong commitment in the region and it is no surprise to see the research activities to be part of this political and cooperation framework. The EUROPE 2020 strategy also mentions as a key issue the cooperation with neighbourhood countries on societal challenges. It is worth mentioning that a recent expert group, EuroMed 2030 (2010), also points out to science and innovation as a critical resource to address social and political challenges as well as the needs of industry and the transformation of the production methods, even if research is not yet fully perceived as a need by the industry in the MPCs. One can still wonder why the process has been so slow, either institutionally or why it is perceived rather as a disappointing process.

The first regional political response has been the Euro-Mediterranean Ministerial Conference on Higher Education and Research held in Cairo in June 2007 (Euromed Ministers, 2007). It stressed the need to move toward the creation of a Euro-Mediterranean Research and Innovation Area, by promoting:

- Modernizing the R&D policies in the MPCs;
- Supporting institutional Capacity Building;
- Enhancing the participation of the MPCs in the FP, while taking into account their particular needs and the mutual interest and benefit;
- Promoting Innovation in the MPCs by enhancing exploitation of the RTD outputs by society and Industry;
- Favouring mobility of researchers.

Following this declaration, the process of S/T agreements (Table 1) has been accelerated and the Commission has created a series of types of 'instruments' for project funding that address the institutional and capacity issues. A series of specific 'instruments' specifically designed for international cooperation in science (INCONET, BILAT, ERAWIDE, SICA…) were introduced in this last period of the 7th Framework Programme. The network of National Contact Points for EU-MPC scientific collaboration and in Egypt and Tunisia specific co-funding mechanisms have been created.

In May 2011, addressing the ongoing transformation in the Mediterranean, the EU issued a Joint Communication "*A new response to a changing Neighbourhood"* (2011) stressing the need for a new approach to strengthen the partnership between the EU and the ENP countries. Working towards the development of a "common knowledge and innovation space" is underlined as a cooperation priority. The EU member states and MPCs share the responsibility and commitment of putting these words into action.

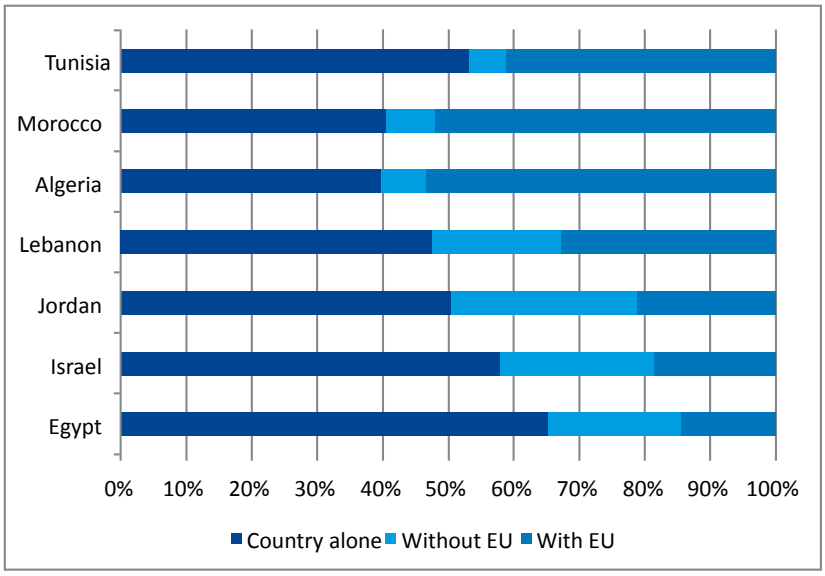

Figure 1. Publications and co-publications of some non-European countries of the Mediterranean region.
Source: SCI Extended - Thomson Reuters. Treatment PL Rossi, IRD.

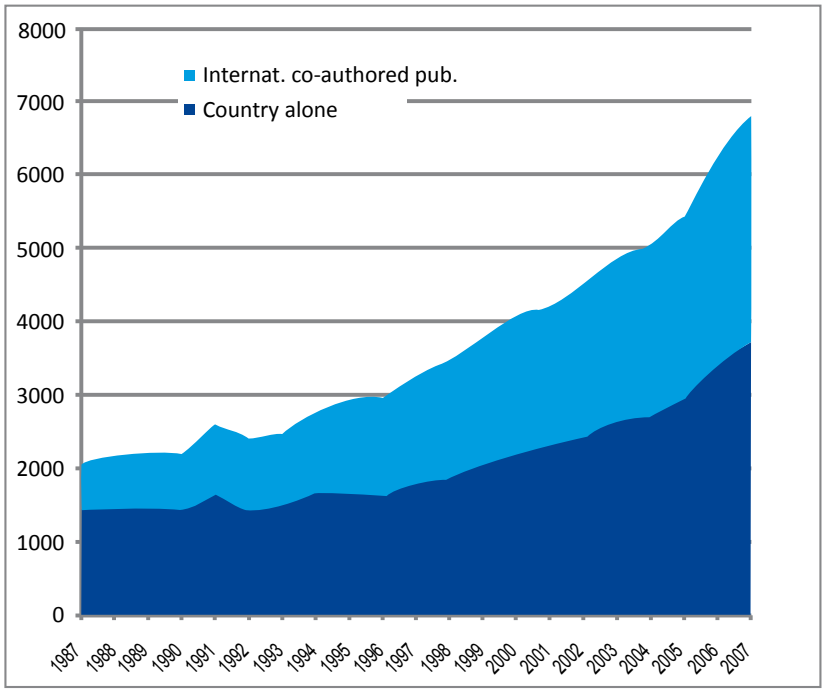

Figure 2. Publications and co-publications of some MPCs with or without EU partners (2007).
Source: SCI Extended - Thomson Reuters. Treatment PL Rossi, IRD. This figure contains the publications of Morocco, Tunisia, Algeria, Egypt, Jordan, Lebanon, Syria and Israel.

The aspirations of the MPCs were also highlighted in the 15th meeting of the Euro-Mediterranean Monitoring Committee for RTD (MoCo) in June 2011 in Szeged (Hungary) where the principles of *demand-driven and impact-driven* EU-MPC cooperation based on co-ownership and co-funding were outlined. As a result of these evolutions, the EC now underlines the news for a '*renewed partnership'* in science, technology and innovation. It was fully addressed in the Euro-Mediterranean Conference on Research and Innovation held in Barcelona on 1-2 April 2012, which proposes a new frame of cooperation based on a renewed partnership according to the principles mentioned above.

III – The state of play

Up to now we have seen the policy framework; it is now necessary to insist on the actual research programmes where collaborations take place. As we already mentioned, until the 6th Framework programme, most funding for scientific cooperation between the EU and MPC researchers were taking place through the INCO programme, created in 1992 during the 3rd Framework Programme (FP) and continued through successive FPs. So far, some 500 million Euros have been spent on over 600 joint projects in the Mediterranean in areas dealing with issues of common interest, from healthcare to the development of Information and Communication Technology (ICT). It is again important to underline the key role played by the MoCo formed by senior officials from the 27 EU Member States and ten Mediterranean countries that form the Euro-Mediterranean association.

Finally, a recurring issue in the region is the difficulty to connect the bilateral cooperation activities between EU member states and MPCs, and actions funded by the European Union through various means, mainly the ENPI and the EU Framework Programme (FP) for Research. As reported in the last section of this article, a clear political mandate is needed to advance in the search for synergies between the various forms of support to scientific research.

A simple manner to measure scientific collaborations –although not a complete or unique one– is by measuring co-authored articles (Gaillard, 2010). Co-publications in the region, as seen from the south and eastern shores of the basin, are reported in Figure 1. As we can notice, the overall production has grown considerably and co-publications of most countries with researchers from the European Union (analysis done on the first seventeen EU member countries) have grown in even higher proportions (Arvanitis, 2012).

This is true for all countries, but co-authorship patterns are very different from one country to the other. Egypt (with 35% of co-publications) in 2007 has still a low proportion of co-publications. Israel is a very open scientific community with 42%. Smaller countries like Jordan (49%) and Lebanon (52%) have higher levels of co-publications with researchers from foreign countries. Maghreb countries have higher proportions, mainly with France. Tunisia, the fastest growing scientific-producing country in the region has the lowest level of co-publications (47%) of Maghreb countries; on the contrary, Morocco and Algeria with a proportion of 60% of co-authored articles, can be considered as open to cooperation (Fig. 2). Even growing in numbers, co-publications tend to diminish relatively (but not in absolute terms). In fact, the overall pattern of French-speaking Maghreb countries is similar: co-publications with France have grown but proportionally less rapidly than the overall production and new partners are appearing from outside Europe (USA, Canada mainly) and from inside Europe (Spain, Italy and Germany).

It is interesting to note that the specialisation pattern of publications of some of these countries, largely oriented towards chemistry, physics and engineering, is different from that in the European countries. This is the case of Egypt, Syria and Algeria. A rather distinct profile is given by Tunisia, Morocco, Lebanon and to a lesser extent Jordan, which tends to emphasize rather biological sciences and agriculture, as well as medical sciences (clinical or more research oriented domains such as neurosciences and immunology). They also favour mathematics, mainly in Maghreb and Lebanon. And, by contrast, they also under-publish in life sciences (biology, bio-medicine)

(see ESTIME report (Arvanitis, 2007, Pasimeni *et al.*, 2007). Israel, Tunisia and Lebanon are exceptions in the MPCs, since they have a relatively strong medical and biomedical basis. This orientation in favour of basic, biological and bio-medical research is also the general tendency of many European countries. We note also a recent up-surge of environmental sciences and we think this is directly related to scientific cooperation with the EU, since a sizable portion of Framework Programmes, in particular related to international cooperation, include environmental objectives and sciences.

Moreover, European countries seem to deploy more research activities in 'basic' science, whereas MPCs seem to prefer quite clearly technologically-oriented and applied research, as confirmed by the MIRA Survey on International Collaborations (Fig. 3). Thus the expectations of MPCs researchers are more "applied", technology-oriented than for Europeans. The same survey shows also that access to equipment and use of equipment is also a stronger motivation for MPC researchers than for Europeans.

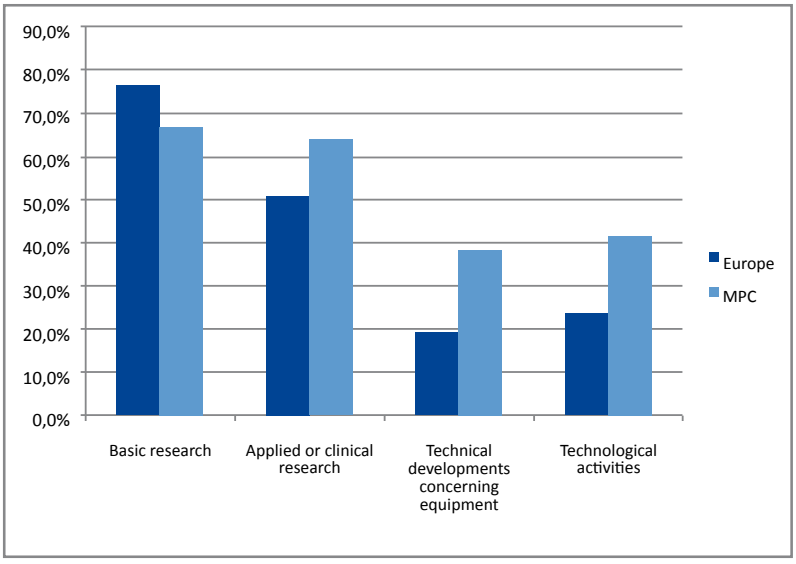

Figure 3. Type of research in research collaborations (MIRA survey).

Source: MIRA Survey Percent responses to the question "Could you indicate the relative importance of each type of research in your collaborations?" as "important" and "major contribution to this type of research" (See article in this issue by Gaillard et al.)

The analysis of specialization patterns is very important for two reasons: a) countries usually tend to reinforce their specialization over time rather than diversify, and b) research and technological development are activities that are "path-dependent', thus feeding on previous work and accumulated competences. It might be more cost-effective and efficient to enter specific domains by favouring areas of competence where the local scientific community has already an advantage. Today, nobody has the ability to orient in such a fine-grained way the scientific cooperations. It would take a certain type of indicators at a very fine level (and not macro-indicators as we present here) in the way it has been proposed by Waast and Rossi for Morocco (Rossi and Waast, 2007; Waast and Rossi, 2009; Waast and Rossi, 2010). It would also take a better knowledge of the organization of the research activities on the ground, by way of impact analysis of the scientific funding as has been proposed by the MIRA Observatory in its White Paper (see in this collection).

1. Bi-lateral cooperation between European countries and Mediterranean non-European countries

Bi-lateral cooperation concerns activities (in research or else) that involve two countries under some legal agreed framework. Usually some general cooperation agreement exists, at a "higher" diplomatic level, and specific agreements are later proposed and signed as needs appear. Figure 4 shows the number of bilateral agreements after a census made in 2007 (Rodríguez-Clemente and González Aranda, 2007). It tells the story of cooperation agreements in science and technology that were still in force at the time of this survey. This is a unique survey that has not been renewed.

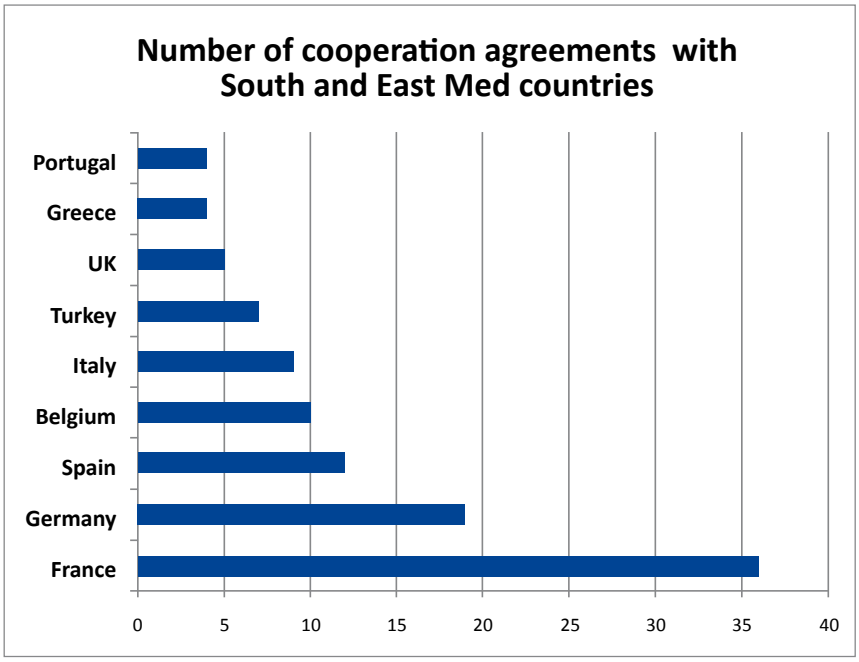

Figure 4. Bi-lateral cooperation agreements as seen from the side of European countries.
Source: ASBIMED Final Report. The figure represents 124 agreements as of June 2006.

The number of these agreements (124 agreements) is relatively high. Most agreements are those made by public entities, involving universities and governmental structures. But many more agreements that are signed between universities for example, or between private entities in both shores of the Basin, are absent from this statistic. One of the difficulties concerning these agreements is their scope and their duration. The agreements are usually not very specific: they just name a domain and some general conventions on possible means that can be mobilised (mobility of researchers, students, co-direction of doctoral thesis, budgeting and so on). As can be seen, the main players are France, Germany, Spain, Belgium and Italy. It is worth mentioning that France has a custom of signing framework agreements – not only in the Mediterranean region – and that its research institutes (CNRS, IRD, INRA…) active in the region are public research institutes whereas other countries usually mobilize universities.

On the side of the MPCs (Fig. 5) we see the large presence of Israel and Morocco, followed by Tunisia as the main countries. Algeria, Lebanon (mainly with France) and Turkey have more or less the same number of agreements.

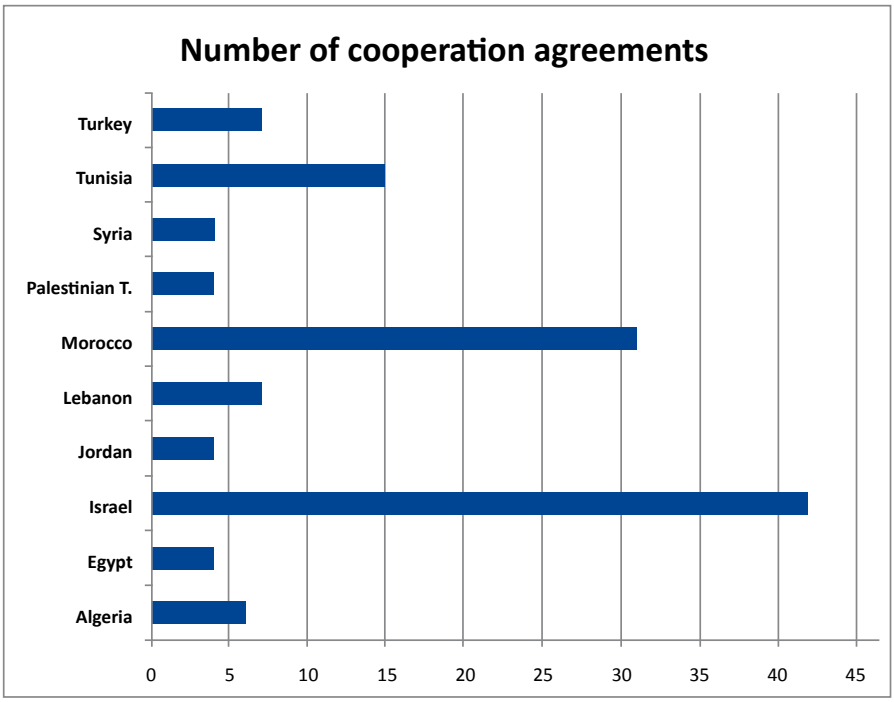

Figure 5. Bi-lateral cooperation agreements as seen from the side of Partner countries.
Source: ASBIMED Final Report. 124 cooperation agreements.

Morocco has been trying since the late nineties and early 2000 to give a priority for research (Waast and Kleiche-Dray, 2009). Moreover, as we already mentioned, Morocco has a history of collaborations with France; it is now extending its cooperation to other European countries and to Canada. Morocco is driving a policy of close relationships with Europe mainly through 'Twinning projects': one of these twinnings concerns science and technology and another concerns Intellectual Property Rights.

2. EU-sponsored research programmes

At the project level, research is mainly funded through the 7th Framework programme. A recent report (European Commission 2012) indicates a total amount of € 430 millions in 168 projects in the region. However, this amount covers the expenditures of both European and Mediterranean units. On a slightly more limited sample concerning 151 projects, we have determined the distribution of funds as reported in Figures 6 and 7. Mediterranean countries receive € 43 millions (10%) out of € 426 millions. The differences in personnel costs of the cooperating countries are partially responsible for this huge difference. The percentage of participation would even be smaller if we put aside some "institutional" or capacity-building projects that are not research projects but policy-oriented platforms, as is the case of international cooperation projects (known as "INCOnets", "BILATs" and "ERAWIDE" projects).

Thus, FP7 projects are mainly oriented to funding European teams working with Mediterranean partner countries. This seems a normal outcome for an instrument that was designed to serve European research. We are still far from the principles that have been laid by the Euro-Mediterranean common research policy.

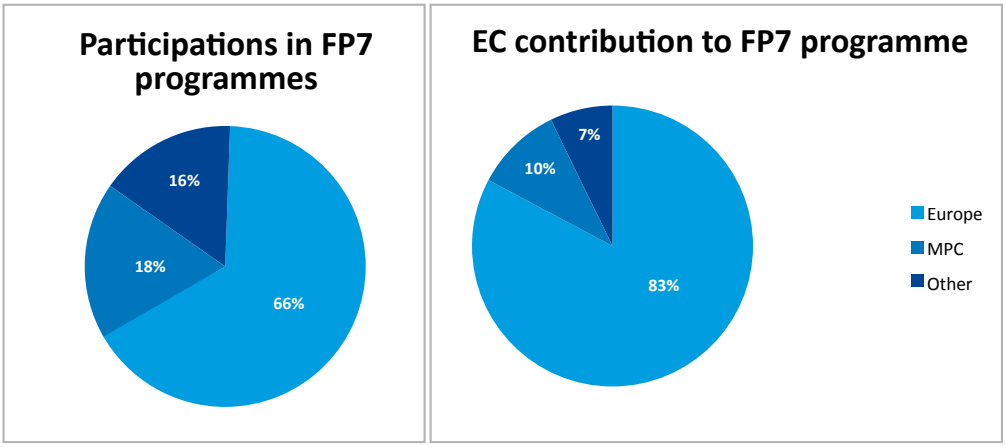

Figure 6a/b. EU-funded projects under the FP7 programme: participations and European Commission contribution.

Source: CORDIS database as of November 2011. 151 projects for a total amount of € 426M of which MPC represent € 43 millions.

Research fields where active cooperation takes place can be easily identified (Fig. 7). We should remark that the domains where the EU contribution received by the MPCs is higher is different from the number of projects by domains. This is an important result because it denotes a discrepancy between what is programmed and considered important by the EC and the actual participation of the non-European partner countries.

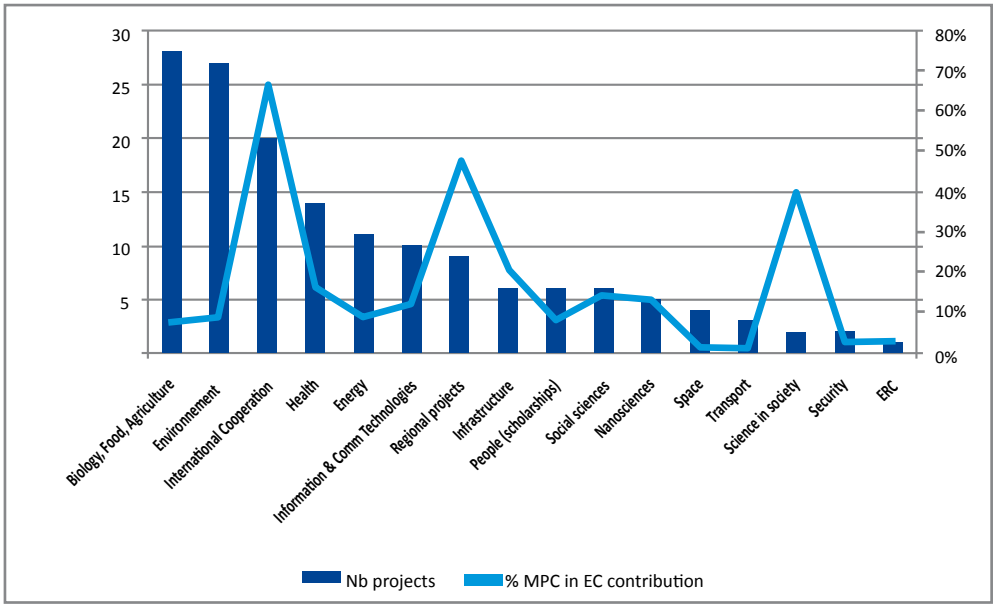

Figure 7. EU-funded projects under the FP7 programme: participations and EC contribution by theme.

Source: CORDIS database as of November 2011. 151 projects for a total amount of € 426 millions of which MPCs represent € 43 millions.

When looking backwards at the whole process, that involved substantial amounts of time and resources, the exchanges between the EU and the Mediterranean countries have remained at a political level and there has been little leverage effect with stakeholders outside governments or public institutions. Simultaneously, the diplomatic effort that has been deployed under the umbrella of the Union for the Mediterranean has been rather slow and has not had the boosting effect that was expected by creating such a wide policy framework.

3. Some opinions of users from the MIRA survey

In order to understand the relative importance of the collaboration frameworks, we can refer to the results of the MIRA survey (www.miraproject.eu) on scientific collaborations (a more detailed presentation of the survey will be made in another article of this collection).[5] As can be seen in Table 2, more than half of scientists mention that their collaborations have been taking place outside any official framework. Practically half of the respondents also mention they have had a collaboration within a bi-lateral framework. EU projects account for one fifth of the responses. The survey also suggests that 61% of Europeans and 49% of South and East Mediterranean scientists are responding to calls for projects, thus making project funding a common practice.

Table 2. Framework of collaboration of scientists from Mediterranean partner countries.

Framework of collaboration	N	%
Without official framework	1104	58,5%
Bilateral co-operation	920	48,8%
International project	461	24,4%
EU project	402	21,3%
Foreign public project	234	12,4%
Foreign private project	51	2,7%
Arab funded project	90	4,8%
Total responses to the question	1887	

Source: MIRA survey on collaborations - Multiple answers possible.

As stated recently in a semi-official document of the 2012 Barcelona Conference (2012), “A pending issue is how to connect the two core components of this cooperation: bilateral cooperation activities between EU member states and MPCs, and actions funded by the European Union through various means, mainly the ENPI and the EU Framework Programme (FP) for Research. A clear political mandate is needed to advance in the search of synergies, as there is a generalized view that the tools and resources available to scientific cooperation policies do not yield the expected results.”

The MIRA survey confirms this statement. Figure 8 shows the opinions expressed by both European and Mediterranean partner countries’ researchers concerning the factors limiting their participation in international scientific calls for proposals/funding.

Thus, ‘bureaucracy’ is considered the main burden and, paradoxically, is believed to be a more limiting factor by Europeans than by the Mediterranean partner countries. We have anecdotal information from the National Contact Points (NCP) which keep the contact between the EU programmes and the local scientific personnel, of a progressive retreat of MPC excellent scientists from the Framework Programme due to their impossibility to handle the administrative aspects

of participating in a project. We can also see that they get very little technical and administrative support from their administrations, even if this aspect is slowly progressing, and the enormous amount of effort and time that implies the reporting and attentions to audit and other activities not related to the strict scientific activity is discouraging.

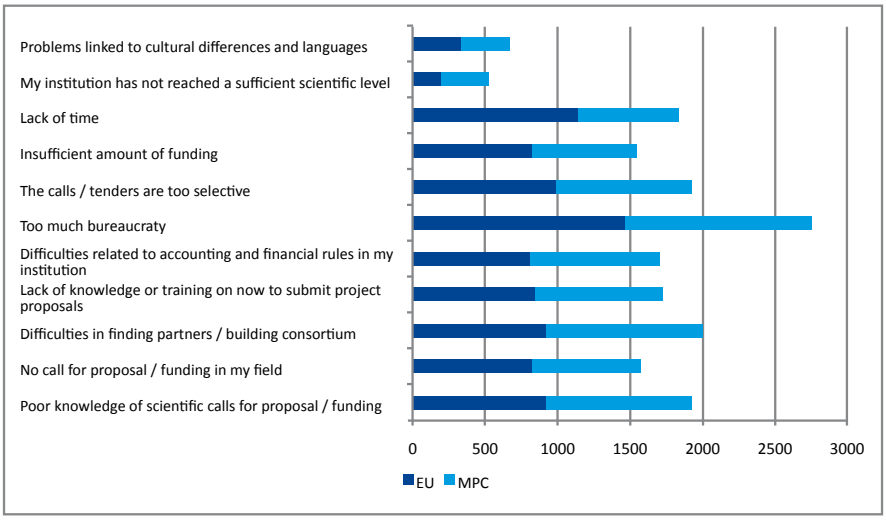

Figure 8. Main factors limiting participation in international projects.
Source : MIRA survey on collaborations - Multiple answers possible.

The information from NCP contradicts partly the results of the survey (the situation is very similar from one country to the other). The administrative burden does not eliminate the enthusiasm and advantages of participating in internationally funded projects. In effect, 48.5% MPCs scientists considers their contribution as “essential for the conduct of the project”; while 40.2% of their colleagues from Europe have the same opinion. Their very positive opinion of their participation in the project is almost the same in Europe as in MPCs when adding “essential for the conduct of the project” and “important for the progress of the project” (85.8% for the MPCs and 85% for Europe). Similarly, a high majority of the respondents (85% for the scientists working in Europe and 83.8% of those working in the MPCs consider that they were able to get involved as much as they wanted in this project.

To interpret these data, we need to go beyond this expressed satisfaction. To begin with, partnerships are not that easy to create, let alone manage. MPCs express a stronger difficulty in finding scientific partners than Europeans. Moreover, we have asked in the survey about international projects and not exclusively EU funded projects. Furthermore, we believe that all scientists (and this is confirmed from the interviews we could have with participating scientists) the situation is not symmetrical for Europeans and for MPCs.

When asked if they had participated in the definition and distribution of tasks and budgets, scientists in the survey answered yes in 82% of the cases as far as tasks are concerned and 61% for budgets. Clearly, budgets are less “democratically” discussed in the management of projects (which is quite understandable, we don’t necessarily interpret this as a problem). But the answers are quite different if we split them between the EU and MPC partners.

Table 3 shows the answers of the survey on this question. As we can observe in the MPCs, 33% were not involved in task distribution and 48% were not involved in the budget discussions. This is significantly higher for EU scientists (8% and 35% respectively) and much more than the whole

sample of the survey. Nearly half of the MPC scientists do not discuss the issues of budget (only one third for EU scientists). We see here a lack of "symmetry" which is, to our understanding, the main obstacle for a structured scientific cooperation.

Table 3. Tasks and budget distribution as discussed (or not) by one's team/lab.

Tasks distribution	EU		MPCs	
	Count	%EU	Count	%MPCs
Your lab was involved	836	91,67%	498	66,14%
Your lab/team was not involved	76	8,33%	255	33,86%
Total	912	100	753	100
Budget distribution	EU		MPCs	
	Count	%EU	Count	%MPCs
Your lab was involved	594	64,78%	382	51,69%
Your lab/team was not involved	323	35,22%	357	48,31%
Total	917	100	739	100

Source : MIRA Survey. See chapter by Gaillard et al., infra pp. 79-102.

We refer to symmetrical systems when a set of management procedures of both systems are known and accepted by each other. The cooperation system is complex, and includes, besides the scientific recognition and common interests, the recognition of the administrative procedures. The main consequence of this lack of connectivity between the cooperating systems is the subordination of the scientific cooperation to the pace of the slowest process that affects it. This lack of swiftness in the practical launching of cooperation actions results in loss of "freshness" and motivation of the partners. More must be done to improve the process of cooperation in its multiple dimensions: scientific, administrative and financial.

IV – Issues for the future

The situation we have described has different facets and it is usual to identify, when actually engaged in the cooperation programmes, the most severe administrative burdens. But these are probably hiding more serious shortcomings. These range from general policy orientation to practical functioning of the projects under EU funding. We will go through them from the most mundane to the most strategic.

1. Amendments to practical issues

The administrative issue would need more capacity building of administrators in the MPCs (management, auditing, etc.). Moreover, the EU financial rules must take into account the specific characteristics of the international cooperation. The "Third Parties" concept, i.e. support structures or companies handling the funding received by MPCs, must be developed and stimulated. In general, we should all benefit from a professionalization of the managerial tasks of accounting, reporting and providing services to the MPC participants in the cooperation projects. At this moment, there is a perception that the opportunities offered to the MPCs by the European Programmes for ST cooperation are much more difficult to handle than the Chinese, American,

Brazilian or Russian programmes, and there is a net transfer of partnership from the traditional European partners to those coming from other countries.

The obstacles to mobility represent an important hurdle for cooperation. We cannot talk of a Euro-Mediterranean Research and Innovation Space, with the actual system of Visa delivery to the scientific partners from the MPCs. The real implementation of the Scientist VISA Directive is a must. It is simply unacceptable that scientists participating in cooperation projects that must often travel to Europe, request several visas within a single year, and suffer the time delays and bureaucratic barriers. Similarly the students visas are still difficult to obtain. These asymmetries in the cooperation, together with the inappropriate travel allowances to Europe for the MPC participants, further add to the hurdles of this cooperation.

2. Linking research to innovation

A recurring demand is to link research to the problems and challenges of the industry, usually SMEs in the MPCs, or even, the acquisition of emerging new knowledge by these companies can be addressed by the research system. This is a fundamental question because, typically, the intellectual interest of the Higher Education and the Research organizations should be directed toward identified global challenges to be studied by the scientific community. The point here is how common interests between the industrial sector and the scientific community can be created or developed. There are two key issues: the conceptual and 'language' barriers between the two sectors and the shared benefits for both of them. The first issue must be addressed by considering the chain of stakeholders in the knowledge transfer process; technical sectorial laboratories are very useful in interpreting the needs of the industry, particularly the SMEs, in terms understandable by the scientific community. The other point is that the expected benefits have to be shared. Universities and research institutes should take profit, including economic profit, from this interaction. The advantages must be at the individual level, for faculty members of the Universities and need to be included in the "curricula" of the Academia. Many times the interesting product is not just a patent, difficult to produce and to defend, but also the "know-how", the knowledge necessary for the productive process and more largely to the business sector, and the possibility to rely on scientific support. The setting-up of this cooperative frame and the building of trust between the actors are fundamental steps in the creation of a national innovation system. They are a strategic need and also a difficult endeavour.

There is no simple solution for the setting-up of an innovation system since it does not depend upon the sole commitment of the public sector, or the willingness of some companies and faculty members or research centers. Incentives need to be constructed, the actions have to be minimally monitored. The scientific community engagement is not sufficient. Nor is it possible to generate a demand based solely on the national authorities' action: this has posed analytical challenges to the economic analysis of economic development.[6]

There has been relatively little analytical effort on the measures needed to promote innovation in the region either through EU support (for example in the form of up-grading programmes) or through national authorities. No real effort has ever been made to measure the impact of the quite numerous schemes of support to innovation and technological development. A few countries have performed innovation surveys and even less have identified specific studies that could explain the relative disdain on the side of enterprises (or bad knowledge) of the current support schemes. In great part this analytical gap is ascribable to the fact that innovation usually depends upon the ministries of industry and telecommunications rather than on the ministries of research and higher education. MIRA has made a serious effort in order to open a debate on these aspects by promoting the Euro-Mediterranean Innovation Space (EMIS) (See last section of this collection of articles).

The effort of linking research (funded through competitive grants) and innovation-oriented actions, although it is an objective of EU Mediterranean policy and EU research policy as expressed in "Europe 2020" flagship has been practically lacking in the last years, despite a real willingness of the EU and national authorities of MPCs.

The EU has recently emphasized the importance of innovation in tackling contemporary societal challenges. Innovation is essential for the transition of economies towards resource-efficient and competitive knowledge-based societies that ensure sustainable and inclusive growth and jobs. The Council's conclusions underline the need to stimulate the culture of creativity, science and entrepreneurship, particularly among young people. It also recognizes the multidisciplinary nature of innovation and the potential of social and public-sector innovation to improve services and engage a wider and more inclusive community. The MPCs, with their recently empowered populations demanding to explore their potential, aim to share this vision of a common innovation space with the EU.[7] However, for this vision to thrive, it should be constructed on the basis of mutual interest and shared benefit. The question of how research can support innovation in the MPC productive sectors is still open. ESTIME, MEDIBTIKAR and MIRA projects addressed this issue. Some organizations exist around the Mediterranean basin. The Euro-Mediterranean charter for enterprise is designed to make the Euro-Mediterranean region a vast area of free trade and economic prosperity, with strong development perspectives for entrepreneurs in order to play the globalization card and make the most of the opportunities offered by the opening up of the Euro-Mediterranean economic area in 2010. The questions of how to remain competitive and create a sufficient number of jobs for newcomers on the labour market, and to define strategies to create value and achieve complementary economic development are central to the research and innovation chain.

3. Coordination between EU-funded programmes

The Strategy EUROPE 2020 states the need of streamlining the different EU instruments to tackle the societal challenges that Europe is facing. A number of actions are underway to support the EU-MPC scientific cooperation, including the full participation of the MPCs in the European Framework Programmes. The development of the Association Agreements between the EU and the Mediterranean countries (see Table 1) has provided the legal and political framework to discuss the common interest at a bilateral level between the EU and the MPC. Since then, various bilateral programmes (BILAT) have been developed and implemented, from which lessons have to be learnt in terms of coordination and synergies. The European institutions are quite aware of the possibilities that could be offered by using more intensely the 'instruments' that we mention here. The "Strategic Forum for International ST Cooperation" (SFIC) created by the European Council in 2008, mandated to drive forward the European partnership for international ST cooperation recommended (among other issues) after a review of cooperation policies of the EU, to strengthen the networking of Member States Science Counsellors in the MPCs in a systematic way. More can be done along this way, as for example sharing bilateral programmes for scholarships or grants for research that are provided by the EU member states: we saw above that these bilateral schemes are quite numerous and effective. This pooling of resources could make a big difference. Political decisions are needed to go along this direction.

All the current European facilities and initiatives should find a common place to interact and generate synergies. Similarly, the MPCs should establish their own coordination mechanism to develop a common perspective towards the EU. This would ensure a sustainable and balanced approach based on a common vision and shared responsibility. We believe that it is not a question of funding but rather a matter of political willingness.

The EU is promoting the full participation of MPC partners in already existing instruments. A number of experiences already exist in at least two ERA-Net initiatives such as Forest Research

in the Mediterranean Region (FP7-ERANET-2011-RTD/KBBE) and Coordination of Agricultural Research in the Mediterranean Area (ARIMNET, FP7-ERANET-2007-RTD/KBBE).

The Research Development and Innovation (RDI) Programmes, financed by DG DEVCO (through the ENPI funding) have been launched in Egypt, Tunisia and Jordan. The RDI programmes aim at linking the academic and industrial communities to embark on a fruitful cooperation, translating the research results into innovation by the industry.

With the INCO-Net MIRA, synergies and coordination have been facilitated between these bilateral platforms and similar objectives and difficulties have been identified at a bi-regional level so as to be able to speak "one voice". Also under the FP7 Capacities programme, another type of project (ERA-WIDE) directed to the MPCs was launched aiming, among others, to build the capacities of the research institutes to develop their competitive strategies based on their comparative advantage/disadvantage in the region (see article in this collection).

The various initiatives need some coordination, including some synergy between the RDI programmes themselves. Much could be done in this sense, including initiating a certain "smart" specialization of the capacity building at national level that could aim at establishing a regional leadership in the Mediterranean open to participation of all the countries. Synergizing the RDI programmes could address this challenge. RDI-Egypt and the Tunisian RDI program have had actions in line with the thematic regional recommendations of cooperation defined by MIRA. However, both programmes are yet to establish bilateral coordination and synergies.

Similarly, valuable lessons could, and should be drawn from the ongoing BILAT and ERA-Wide projects. Clustering these BILAT and ERA-WIDE projects could provide best practices and define common experience on sharing platform for the MPCs.

4. Creating a permanent space for coordination of EU-MPC cooperation

The Work Programme of the Barcelona Process, approved in the Euro-Med Summit of 2005 for the period 2005-2010, identified eight thematic priorities for cooperation, including the environment, the Millennium Development Goals, South-South regional integration and several other social and political objectives, such as mitigating the illegal immigration. Some of these priorities are implemented by means of Calls for Tenders such as the EUROMESCO Network that gathers foreign policy institutes and produces reports on policy issues. Other similar networks are supported by the ENPI, such as FEMISE (network of Economic Sciences Institutes). No such network of research institutes was created in the fields of scientific research, in spite of the formal engagement of ENPI to support the participation of the MPC in the 7th FP. Part of the issue is also related to the lack of coordination between non-EU Mediterranean countries.

5. Defining common research agendas

The identification of common priorities in regional cooperation must start with the analysis of the national research programmes of the different countries, and the finding of the common areas of interest and their similarity with European priorities. Only by this means can the sustainability and long-term maintenance of research programme be guaranteed.

Another important factor, particularly emerging with the recent changes in governance in the Mediterranean, is that international cooperation with southern Mediterranean countries should be impact-driven and demand-driven. The fact that the results of this cooperation should be addressed to and perceived by the MPCs' societies should not be overlooked. It should be noted that it is the people and not the rulers, like before, who are currently driving the political and socio-economic agendas in the MPCs.

V – Toward a regional programme for research and innovation

The previous description of the state of play and issues to be tackled shows a diversity of actions pointing to the same direction but ruled by different instruments, mechanisms and decision-making fora. A possible way to go beyond the scattered situation we face today is to engage in a global strategy. The new landscape in the southern Mediterranean offers a unique possibility to unlock the potential of research being a leading instrument for development in a democratic environment.

In effect, the EU-MPC cooperation in research and innovation is not fully satisfactory at this moment. Research is not a priority yet for most MPCs as well as for the European Union countries. As the ESTIME project found, most research teams, with the notable exceptions of Tunisia, Turkey and Israel, have a hard time obtaining the necessary legitimacy in their institutions, usually universities, which are devoted to training rather than to research. In the MIRA survey, through which we got data on the time devoted to both research and teaching (see chapter on the MIRA survey), the comparison between European researchers and Mediterranean countries is quite illuminating. In Europe, we find more researchers totally devoted to research and, among university researchers, we find more persons spending time on research. On the contrary, researchers from South and East Mediterranean countries spend more time on average than they do on teaching, administrative tasks and clinical practice.

This lack of recognition of research is translated in an insufficient level of capabilities, not so much in human resources as in research environment. Moreover, as the deceiving results of the Union for the Mediterranean have shown, research is probably one of the very few areas in which one finds actual and effective linkages and real cooperation between the “North” and the “South” shores of the Mediterranean.

As far as the EU-Med research cooperation is concerned, everything shows the necessity to design a *regional programme for science, technology and innovation* where the different components could be fitted in a global strategy. Building on the successful experience of some EU-sponsored bilateral programmes, a dedicated regional initiative that would aim at developing the collective capacity to address socioeconomic challenges would significantly contribute to the achievement of a shared vision. To the benefit of the EU, it is necessary to stress that the Commission is actively seeking a way to implement such a regional programme today as reported in the Conclusions of the last Euromed Conference on Research and Innovation, which took place in April 2012 in Barcelona. Moreover, a clear need was expressed in various political arenas (interministerial meetings, MoCo, bilateral programmes, etc…) in finding a bridging mechanism between the needs of South and East Mediterranean countries and EU countries concerning innovation.

The overall objective of the regional programme would be to support the MPCs STI policy formulation and their RDI performance. This could be implemented through a cooperative scheme for granting innovative, economically feasible, demand-driven projects bridging the gap between applied research and real regional industrial and economic development needs. Another component would be to provide technological assessment for restructuring the governance of research and innovation programmes and formulating policies, which, together with funding cooperative innovation projects, would act as a catalyst to boost the EU-MPC STI eco-system.

The experience of scientific and business cooperation and the evolution of the economic systems along these years (Arvanitis and M’Henni, 2010; MEDIBTIKAR, 2010) also provide arguments for the need of a deep analysis of the actual frame of relations, and the search for a new one based on a clear perception of where the benefits are and where the political, social and administrative hurdles create dis-functionalities and impede benefiting from the opportunities offered by the proximity and cultural similarities on both sides of the Mediterranean.

The experience of the last 20 years clearly shows that the Agenda defined in Barcelona in 1995, for the Euro-Mediterranean partnership, cannot be attained due to the huge political and social constraints (EUROMED Expert Group, 2010). On the contrary, scientific cooperation, driven by curiosity and sharing a common language and long-term interests, has always been maintained, even between hostile countries, and has considerably improved along these years reaching a stage where further developments are blocked mainly by procedural obstacles.

EU common actions are subject to the legal imperatives shared by the member states; building a shared vision for partnership needs to tackle the even more difficult issue of including the non-EU member states into common decision-making and management facilities. It is necessary to identify a legal structure where common priorities and funding mechanisms can find a practical expression, independent of the national frames but respecting the national legislation in international cooperation mechanisms, the expenses control, and the auditing requirements. Proposals were made in Barcelona in April 2012 as well as within the MoCo (the same year).

Integrating European partners and MPCs in a common research and innovation strategy could also aim at creating a Euro-Mediterranean Innovation Space. It would be in line with the commercial activities between both sides of the Mediterranean: more than 50% of the trade of the MPCs is with the EU, and for some countries the EU represents the destination of more than 70% of their exports. Europe is the largest direct foreign investor (36% of total foreign direct investment) and the EU is the region's largest provider of financial assistance and funding, with nearly € 3 billion per year in loans and grants. Moreover, recent surveys on industrial innovation in Morocco and Tunisia show that industry is knowledgeable about innovation and sustainability issues. More generally, Maghreb countries have been very actively involved in testing these policy measures that support networking of competences. But the most important reason why research and innovation should be jointly developed in a long-term strategy relies on the specialization pattern of MPCs which is very much oriented toward engineering and applied sciences. A regional strategy needs to build on these capabilities and not only on those developed by European countries.

This Euro-Mediterranean research and innovation space should thus create shared research-oriented activities on both sides of the basin. Whatever its actual name, or political backing are, hope should be instilled in creating such a regional initiative that could play an important role in addressing the urgent demands of the population, of the youth and the aspirations for more democratic societies on all sides of the Basin.

Notes

[1] This article draws heavily on two previous documents : an article by Rigas Arvanitis (2012. Euro-Med cooperation on research and innovation, *Mediterranean Yearbook,* Barcelona IEMED, pp. 259-68), and a background document to Euro-Med Conference in Barcelona where the two main authors were Rafael Rodríguez and Hamid Zoheiry.

[2] An analysis of the MEDA programmes funding is made by Pasimeni *et al*., 2007.

[3] Barcelona declaration, p. 5.

[4] The countries involved are Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Syria, Tunisia, Palestine and Turkey.

[5] Survey on Euro-Mediterranean Science and Technology Collaborations (tentative title to be changed) by R. Arvanitis, A-A Canesse, A-M Gaillard and J. Gaillard. Complete results of the Survey will be available on the MIRA website.

[6] For an introduction to these matters applied to the case of Tunisia see M'henni and Arvanitis (forthcoming). La résilience des systèmes d'innovation en période de transition: la Tunisie après le 14 Janvier 2011. In: *Revue Tiers Monde,* Hiver 2012.

[7] See the example of Tunisia in M'Henni and Arvanitis , op.cit., forthcoming.

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ANNEX: Overview of major programmes, projects or actions of the European Union relevant for the Mediterranean

The fields of cooperation targeting research, development and innovation, are covered by numerous instruments among which we can highlight:

- The **7th Framework Programme**, managed by DGs RTD and INFOSOC, is open to participation to partners from all the MPCs in most of its actions, with special targeted Calls for Proposal addressing "Specific International Cooperation Actions" (SICA) covering topic of mutual interest EU-MPC. There is not a specific budget for this activity, as it is described in each specific yearly Work Programme of the Thematic Priorities. Other actions such as International Cooperation of "Marie Curie" grants are also open for MPC participation.
- The **Euro-Mediterranean Industrial Cooperation Programme**, managed by DG Enterprise in consultation with the Working Party on Euro-Mediterranean Industrial Cooperation, is an instrument created in the Barcelona Process and it is financed by the provisions of the Bilateral Association Agreements and the ENPI.
- The **Competiveness and Innovation Framework Programme (CIP)** is open to the participation of MPCs through the Entrepreneurship and Innovation Programme (EIP)
- The **EUREKA** Intergovernmental Programme is also open to MPCs.
- The **ENPI Regional** Indicative **Programme for Euro-Mediterranean Partnership** is the most important instrument for regional cooperation. It is supported by a scheduled total funding of 343,3 M€ for the period 2007-2010, following the priorities defined in the Barcelona Process, later redefined in the Union for the Mediterranean in the Marseille summit of November 2008. Here, again, research is a high priority in several actions, notably the Mediterranean Strategy for Sustainable Development, including the Horizon 2020 programme aimed at decontamination of the Mediterranean Sea, the integration of the energy, transport, ICT and research markets. The funding earmarked for the activities of sustainable development for the year 2009 is 69 M€, and 47 M€ for 2010. ENPI is the most important financial instrument for the EU-MPC regional cooperation. The funding of "RDI programmes" by ENPI provides a substantial input to the capacity building in several MPCs.
- **ENPI Cross-Border Cooperation.** Based on earlier experiences under Tacis, MEDA, PHARE and INTERREG, a new policy called "Cross-border cooperation (CBC)" on the external borders of the EU is defined as a key priority for the European Neighbourhood Policy (covering the countries of Eastern Europe, the Southern Caucasus, and the Southern Mediterranean) and in relation to the EU's Strategic Partnership with Russia. It aims at having agreements of association similar to those under the Euro-Mediterranean Partnership (Barcelona Process and the Northern Dimension). The adoption of the European Neighbourhood and Partnership Instrument (ENPI) has considerably enhanced the scope for cross-border cooperation, both qualitatively and quantitatively. The core policy objectives of CBC on the external borders of the Union are to support sustainable development on both sides of the EU's external borders, to help ameliorate differences in living standards across these borders, and to address the challenges and opportunities following EU enlargement or otherwise arising from the proximity between regions across our land and sea borders. Two main categories of programmes will be established under ENPI-CBC: programmes covering a common land border or short sea crossing, and programmes covering a sea basin (notably the Baltic and the Mediterranean). The programmes are principally defined based on the eligibility as reported in the ENPI regulation, while taking account also of the need to maintain continuity from previous programming periods, and facilitation of programme management. The Sea-Basin Mediterranean programme will be financed with 90,539 M€ for the period 2007-2010, 83,068 M€ for the period 2010-2013, a total of 173,607 M€ for the period 2007-2013.

- The **Facility for Euro-Mediterranean Investment and Partnership (FEMIP)** was created in 2002 and provides funding for private sector development in the Mediterranean region aimed at sustainable economic growth. Tentatively, a capital of about 32 M€/year is allocated to FEMIP for technical assistance and risk capital. However, in the 2005 summit of Barcelona, a Neighbourhood Investment Fund, built on the FEMIP, was scheduled, 700 M€ (roughly 100 M€/year) to be used to support lending in ENP partner countries, including the MPCs, and acting as a leverage to multiply the financial engagement by other actors, notably the MS.
- In the field of **ICT,** the **EUROMEDCONNET** Project, financed by the programme EUMEDIS of the MEDA Programme, was aimed at connecting the scientific networks of the MPCs with those of the EU member states. In the coming years, emphasis will be put on developing networks of **e-learnin**g, **e-health** and **e-culture** using the ENPI facilities at the bilateral and regional priorities.
- **Technical Assistance and Information Exchange (TAIEX).** It provides short-term technical assistance and advice on convergence with EU legislation, best practices and standards and on related administrative capacity needs, technical training and peer assistance, as well as a database and information network that facilitates the monitoring of approximation measures. MPCs took up this demand-driven instrument, which is key in supporting the transition and reform processes (http://taiex.ec.europa.eu).
- **Twinning Instruments** (http://ec.europa.eu/europeaid/index_en.htm). In recent years, the twinning instrument was expanded to benefit ENP partner countries. Twinning allows the EC to agree with a partner country on the placement of an experienced EU Member State official (long-term expert) into a ministry or public institution of an ENP partner country, to support legislative reform or administrative adjustments through the transfer of experience gained within the EC. A good example of this action is the Twinning Project to support the inclusion of Morocco into the ERA. The Commission can draw on a wide range of twinning experts through the network it has established with EU Member States. Again, after an introductory phase, partner countries increasingly made use of this instrument. By the end of 2007, 65 twinning covenants had been established with nine ENP partner countries, whilst 81 covenants were still being prepared and under negotiation with ten ENP partner countries. These 146 twinning projects are well spread between ENP partner countries and across a wide range of sector policies. The introduction of the ENPI instrument also saw the extension of sectoral budgetary support to all ENP partners.

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Abstract. The history of Barcelona process for Science and Technology coincides somehow with the activities of the MoCo, the Senior Official Forum that was created to monitor and strengthen Euro-Mediterranean cooperation in Research and Innovation. The role and the results achieved so far by the MoCo, which celebrates its 17th year of existence, are discussed with a view to contributing to better face the main future challenges, integrate and coordinate research and innovation actions and find proper solutions to bottlenecks and problems that still hamper the process toward the creation of the Euro-Mediterranean research and innovation area.

Keywords. Barcelona Process – Mediterranean region – International cooperation – Governance – Research – Innovation.

Le Comité de suivi pour la Recherche, la Technologie et le Développement (RTD)

Résumé. *L'histoire du processus de Barcelone pour la Science et la Technologie coïncide en quelque sorte avec les activités du Comité de Suivi (MoCo), la tribune officielle de hauts fonctionnaires créée pour surveiller et renforcer la coopération euro-méditerranéenne en matière de recherche et d'innovation. Le rôle et les résultats atteints jusqu'à présent par le MoCo, qui célèbre ses 17 ans d'existence, sont examinés dans le but de contribuer à relever les défis majeurs de l'avenir, intégrer et coordonner les actions de recherche et d'innovation et trouver des solutions adéquates aux goulots d'étranglement et aux problèmes qui entravent encore aujourd'hui le processus de création de l'Espace euro-méditerranéen de la recherche et de l'innovation.*

Mots-clés. *Processus de Barcelone – Région méditerranéenne – Coopération internationale – Gouvernance – Recherche – Innovation.*

I – Background

The need to establish a Monitoring Committee for the Euro-Mediterranean cooperation in Research and Technological Development (MoCo) was recognized by the Euro-Mediterranean Science and Technology Ministerial meeting in Sophia Antipolis in March 1995[1]. The Committee was formally set up in the framework of the Barcelona Declaration in November 1995.

The Barcelona Declaration was the founding act of a comprehensive partnership between the European Union (EU) and twelve Southern Mediterranean countries[2]. This partnership aimed to turn the Mediterranean into a common area of peace, stability and prosperity through the reinforcement of political dialogue, security as well as economic, financial, social and cultural cooperation.

As stated in the Work Programme annexed to the Barcelona Declaration (EC, 1995), the Euro-Mediterranean Partnership in Science and Technology focused on:

– promoting research and development and tackling the widening gap in scientific achievement taking into account the mutual interest;

– stepping up exchanges of experiences in the scientific sectors and policies which might best enable the Mediterranean partners to reduce the gap between them and their European neighbours and to promote the transfer of technology;

– helping training scientific and technical staff by increasing participation in joint research projects.

II – Role and Mission of the MoCo

The MoCo is composed of senior officials and representatives (delegates) of the Ministries responsible for Research from both EU Member States and Mediterranean Partner Countries (MPCs)[3] as well as of EC representatives. Its first meeting was held in Barcelona in 1995, immediately after the Barcelona Conference.

Since November 1995 the MoCo has convened regularly[4] - usually once a year. Before the launching of the Union for Mediterranean (UfM), in 2008, the MoCo was mainly under the responsibility of the EU Member State holding the chairmanship of the EU Council. It set the Agenda in consultation with the European Commission that was in charge of the Secretariat of the Committee. After the launching of the UfM, the MoCo followed its rules and the agenda was mainly set by the countries holding the UfM co-presidency[5].

As underlined in the Annex of the Barcelona Declaration, the main mission of the MoCo is to make recommendations for the joint implementation of the policy priorities agreed at ministerial level. Since 1995 the MoCo has played a crucial role in the development of the Euro-Mediterranean scientific cooperation by:

- acting as a forum for the exchange of information, views and recommendations on RTD policy in the Mediterranean region;
- identifying issues of regional importance to be addressed by RTD and requiring cooperative Euro-Mediterranean activities;
- monitoring and commenting on RTD policies, development and activities in the Euro-Mediterranean context;
- supporting and preparing the Ministerial Meetings on Research and Higher Education;
- reporting to the Ministerial Meeting on Research and Higher Education for issues concerning science and technology.

Figure 1. The 12th MoCo meeting. Istanbul, 6-8 November 2008.

III – Integrating Research in the Mediterranean region: past bottlenecks and future perspectives

Many programs and initiatives have been launched within the EU 5th, 6th and 7th Framework Programmes for RTD and in the context of the MEDA instrument, such as SMAP – The *Short and Medium Term Priority Environmental Action Programme;* EUMEDIS - *The Euro-Mediterranean Information Society Initiative;* EMWIS - *Euro-Mediterranean Information System on the know-how in the water sector* - Euromed HERITAGE - *Regional Programme for Euro-Mediterranean Cultural Heritage,* to favour the scientific and technological cooperation in the Euro-Mediterranean area.

In parallel, Netri-Med was launched in 2002 in Antalya, as a network of public research institutions of Euro-Med Countries to support the MoCo policies and actions.

However, several changes occurred over the years which affected the Barcelona process and the output of its joint committees:

1. a period of intensified tensions in the Middle East;
2. the eastward expansion of EU that today counts 27 members including the former MPCs Malta and Cyprus, and four potential candidates negotiating their accession (including Turkey);[6]
3. the introduction of the European Neighbourhood Policy (ENP) in 2003;[7]
4. the launching of the Union for the Mediterranean in 2008.

The MoCo adapted to all the above changes trying to focus, as well as possible, on its main objectives.

At the same time other challenges appeared:

i. The difficulties faced in organizing ministerial conferences on research (as it was envisaged and pursued for other issues of the Economic Partnership of Barcelona Process, i.e. Ministerial for water, energy, etc.) due to political issues at regional but also at community level. The first and last, so far, was the Ministerial Conference on Higher Education and Research organised in Cairo, in 2007[8].

ii. In 2007-2008, following the Cairo Declaration, a forum of experts and representatives of Higher Education was convened, but not formally established, with the mandate of establishing with the MoCo regular relations and complementary activities. Notwithstanding the common will, after the MoCo meeting in Alicante (2010), the process has not been implemented so far. Hence all the efforts to have two panels, one for research and innovation and another one for higher education, have so far not been successful.

iii. Need to have additional funds to organize the MoCo meetings.

iv. Lack of a secretariat, which could ensure continuity between the MoCo meetings. This is a particularly important aspect for a Forum where the representatives of the Ministries may change over time.

To face some of the above problems and strengthen cooperation in the Euro-Med area, some Ad-Hoc MoCo Groups, involving EU Member States and non-EU Med Countries, have been launched to allow more in-depth analyses to be endorsed in the plenary sessions.

Moreover many projects have been carried out since 1995, thanks to the co-funding of EC, with a focus to favour dialogue in science, technology and innovation, integrate research on a multilateral

and multidisciplinary scale and help the MoCo and the European Commission address issues of common interest (Table 1).

Since INCONET instruments under the capacities programme of FP7 allowed to have multi-annual projects acting as dialogue platforms to strengthen and support the bi-regional cooperation on Science, Technology and Innovation, the MIRA project was designed so as to support the MoCo actions. The MoCo acted as Steering Committee of the MIRA project to assess needs and priorities, while MIRA provided the Committee with a Secretariat, giving it the possibility to ensure the continuity of its functioning.

This has been proved to be very useful in the period of transition from "MEDA – 1st phase of Barcelona process" to "UfM – 2nd phase of Barcelona process", occurred in 2008-2009, when the Ministries of Foreign Affairs were also directly involved and when the importance to build upon the past was a must.

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

Acronym	Title	Website
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 NET	Opening up the European Research Area to the Mediterranean Countries	*www.euromedanet.gr*
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 the Euro-Med area	*www.eumedconnect.net*
MIRA	Mediterranean Innovation and Research Coordination Action	*www.mira.eu*

Source: M. Rossano, elaboration from working documents of MoCo and projects website.

IV - Analysis of the MoCo conclusions and recommendations

The MoCo has played an important role in identifying the priority areas of EU-Mediterranean RI cooperation, especially within the European Framework Programmes for RTD (FP4, FP5, FP6 and FP7). Synergies and complementarities with other instruments of bi-regional cooperation have also been explored by the MoCo (e.g. with MEDA and the ENPI) inter alia with a view to the creation of the Euro-Mediterranean free trade area planned for 2010.

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

- finding synergies and complementarities among instruments;
- clustering projects;
- enhancing capacities of RTD institutions and favouring networking;
- giving to European and Mediterranean Partner Countries' research institutions a more prominent role in the Barcelona process;
- addressing actions answering to specific priority issues of common concern.

1. The typology of recommendations

The MoCo recommendations for the 2008-2012 period are analysed below in terms of corresponding typology by using the conclusions of each MoCo meeting. In some cases the minutes are clear, while in other ones they are expressed as an acknowledgement or an agreement to be taken into consideration in future. Apart from the recommendations dealing with the functioning of the MoCo and its instruments and status, the main outputs have been divided per year and per object (Table 2).

Table 2. The MoCo recommendations for the 2008-2012 period.

Year	*Recommendation*	*Object*
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 establishing a Research Agenda
	Preparation of joint activities between the EU and MPCs	Strengthening scale, scope, impact
	Increase complementarities between the EU and national programmes	Enhancing complementarities between instruments
	Favour the use of European Neighbourhood and Partnership Instrument (ENPI)	Enhancing complementarities between instruments
	Favour the 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

Year	Recommendation	Object
	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
	Identify good practices in the frame of bilateral and multilateral cooperation	Supporting Good Practices in cooperation programmes
2009	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
	Build on ST priorities of regional nature	Defining Priorities or establishing 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 Policies	Enhancing complementarities between instruments
	Build on existing bilateral cooperation programmes as a framework for multilateral activities	Enhancing complementarities between instruments
	Favour the use of European Neighbourhood and Partnership Instrument (ENPI)	Enhancing complementarities between instruments
	Launching of calls targeting specifically the MPCs	FP7 tools
	Increase the use of all available FP7 tools such as SICAs, target calls, twinning	FP7 tools
	Sustain and reinforce the FP7 Contact Points in the MPCs	FP7 tools
	Reinforce electronic network	Infrastructures
	MPCs more actively engaged in the ERA activities	Integration of MPCs in ERA activities
	Prepare 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 with the development of centres of excellence in the MPCs aiming at the reintegration of researchers in their respective countries	Mobility

Year	Recommendation	Object
	Promote balanced exchanges of researchers	Mobility
	Reinforce the role of RTD in the Barcelona Process	Role of RTD in the Barcelona Process
	Reinforce 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
2010	Invite the countries to provide brief information on national developments in the research sector in line with the Cairo Declaration	Ministerial Conference
	Prepare a brief paper on the stocktaking of achievements since the Cairo Declaration	Ministerial Conference
	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 demand-driven and impact-driven cooperation based on the principles of co-ownership and co-funding	Strengthening scale, scope and impact and enhancing complementarities between instruments
2012	Optimise 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 RI agenda building on the report of the Barcelona Conference	Defining priorities or establishing a research agenda
	Support 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 the importance of an ERA-NET/ERANET PLUS focusing on the South Mediterranean region	Strengthening scale, scope and impact
	Develop joint activities in view of implementing the RI agenda	Strengthening scale, scope and impact
	Support 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

Source: J. Bonfim, elaboration from the MoCo meetings conclusions.

As can be seen from 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.

The following table (Table 3) summarises the results of the number of recommendations by type, thus displaying the "intensity" of the different typologies for the overall time period under analysis (2008-2012).

Table 3. Number of occurrences of main typologies of recommendations for the 2008-2012 period.

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

Source: J. Bonfim, elaboration from the MoCo meeting conclusions.

2. The degree of implementation

The reinforcement of the role of RTD in the Barcelona Process has been approached step by step but there is still room for progress. The same statement is applicable to the recommendations regarding the integration of the MPCs in ERA activities.

The MoCo recommendations can be divided in two types:

i. recommendations related to policy design and creation of new instruments;

ii. recommendations related to the reinforcement and optimization of existing instruments.

i.) In assessing the first type of recommendations ("policy design and creation of new instruments"), it is useful to remind that they require some time to be implemented. One reason for "delays" may be also associated with the difficulties in obtaining suitable conditions to fund new initiatives. The definition of priorities and/or the establishment of research agendas have not been developed by the MoCo internally but have evolved positively through the contributions of MIRA and other events or projects co-financed by the European Commission. It is a fact that the identification of priorities for Euro-Mediterranean cooperation is typical of periods of transition between two different Framework Programmes. This has always constituted a main concern in recommendations of 1997 (FP5 starting in 1998) and in 2003-04 (for FP6, 2004-2007). The conclusions of the 11th MoCo meeting, held in Vienna in 2006, were above all focused on the recommendations of two working groups, dealing with the instruments and priorities of the forthcoming FP7 (2007-2012) and with the ENPI instrument. Recommendations aiming at strengthening the scale, the scope and the impact of cooperation activities reached a limited degree of implementation as related to the existing potential. Hopefully the announcement at

the Barcelona Conference (April, 2012) of an initiative based on art. 185 of TFEU (or a similar one) is going to boost the degree of implementation of such typology of advice.

ii.) A significant number of recommendations of the second type ("reinforcement and optimisation of existing instruments") had a better degree of implementation. Competence building through strengthening research activities in universities and research organizations has evolved positively even if there is room for actions with larger impact. Concerning the use of FP7 tools and other instruments that could further accelerate the Euro-Mediterranean cooperation in ST, very positive developments have been noticed. In particular, cooperation activities involving mobility patterns (in the scope of FP7 and beyond) have been pursued. An important challenge would be to increase the scale of such activities (for example providing more possibilities for multilateral activities involving mobility). On the contrary, a slow advance has been observed in the development of complementarities with other policies and instruments for Euro-Mediterranean cooperation (such as ENPI): almost every year since the 2nd MoCo meeting, the issue was repeated in the MoCo conclusions. Progress on this aspect is desirable for future RI activities.

V – Future challenges: towards innovation

The forthcoming FP, named *Horizon 2020*, and the conclusions of the Euro-Mediterranean Conference on Research and Innovation, held in Barcelona in April 2012, call for a renewed partnership based on the principle of co-ownership and co-funding but also on deep involvement of stakeholders and innovation representatives, that is to say business associations, SMEs and others.

Most attempts to involve economic and industrial issues in the MoCo activities failed because of many difficulties, including the effort of coordination and management required at both national and international levels, having to deal with actors, policies and instruments of different Ministries: Ministry of Research, Ministry of Industry and Economic Development, Ministry of Foreign Affairs etc.

Nonetheless, despite this complexity in expressing views and actions of such a large diversity of actors, it is urgent to take steps along the following:

1. more coordination at national level on innovation and technology development issues;
2. monitoring of innovation actions, creating, for example, an ad-hoc group;
3. more structured two-way exchanges with the SFIC (Strategic Forum for International Cooperation). In that respect, the EU Member States that are both members of SFIC and MoCo could play an important role.

All these steps involve a certain understanding of the actual barriers to innovation policies and to envisage common actions to remove them.

To what extent this can be turned into a success will – of course – depend upon the efforts of all members but also on the capacity to include the actions of MoCo in a revised partnership, impacting on the socio-economic life of the countries concerned and being more in line with the needs and expectations of the civil society.

Strangely enough, many of these views and principles have been discussed as early as 1995 but the integration and concrete translation of values into concrete actions takes time. Several pre-requisites would be needed:

i. political willingness from both European and South and East Mediterranean sides;

ii. necessity to cope with the limited capacities of absorption of the knowledge economy at all levels (individuals, research and innovation organizations and governments);

iii. national policies creating a favourable environment for knowledge creation where shared experiences are the leading factors, while avoiding cultural barriers to mobility and cooperation;

iv. overcoming the bilateral relations between EU institutions, on one side, and one single Mediterranean partner country, on the other; such a policy has been introduced by ENPI framework and has somehow weakened the South–South cooperation process.

VI – The Monitoring Committee between past and future: assessing the results and the impact

The MoCo has been evolving along with the changes that occurred in the environment of cooperation on ST between the two regions. Its longevity permits to reflect in general terms on the results and impacts that have been achieved over time, and to identify the challenges that it will face in the near future. We welcome the fact that the MoCo has been able to meet regularly for a long time with the mandate to take stock and evaluate the progress of the Barcelona Process.

When assessing the cooperation process all along its existence, the MoCo has proved to be rather effective when focused on its monitoring functions. This is reflected by the in-depth discussion on the cooperation activities and recommendations for action that takes regularly place in its meetings. The question arises on how efficient it has been in fulfilling its objectives and finding proper solutions to the issues and needs of the region concerned.

An important element to be taken into account when assessing the MoCo effectiveness is represented by contextual conditions (political, financial, programmatic, etc.) in the Northern and Southern Mediterranean countries. In order to examine the degree of implementation of the MoCo recommendations and analyse the ongoing difficulties, it would be necessary to have a detailed and in-depth description of these conditions.

Moreover, many recommendations need time for maturation before the phase of implementation. The INCO-NET MIRA and other instruments allowed the MoCo to turn some recommendations into concrete actions.

At the same time, the MoCo secretariat could be optimised in providing more information about developments on the ongoing cooperation on a regular basis, i.e. not only immediately before the MoCo meetings.

Undeniably, the MoCo helped achieve the following:

– the mobilisation of thousands of researchers from both regions to work on joint RTD projects;

– the involvement of MPCs' researchers in international research networks;

– the strengthening of scientific capacities;

– an ongoing dialogue on RTD and innovation policies.

Despite undeniable achievements, there is a general feeling that this cooperation has not fully achieved its objectives. The main drawback usually pointed out is the failure to have a real impact on the economic development of MPCs. In other words the Research-Innovation articulation in MPCs has not been really boosted by the Euro-Med scientific cooperation.

At least two reasons can explain this shortcoming:

1. The first reason is that international cooperation is only one element of a global strategy for promoting research and innovation in a given country. It must be stressed that the implementation of coherent policies for research and innovation in MPCs has been more difficult than expected and this may have prevented some of them from fully benefitting from the European instruments.

2. The second reason is that during the last two decades, programmes specifically oriented towards the promotion of innovation in the MPCs have been less supported than, for example, for countries of Central and Eastern Europe before their accession to the European Union.

VII –Conclusions

Dynamics of RI cooperation in the Euro-Med region has evolved over the last few years. There is evidence that this trend will continue to increase in coming years and it will be based on a strong demand for more integration and coordination of single state national RI policies coming from both EU Member States and Mediterranean Partner Countries. This is an additional challenge that the MoCo will face in short and medium term.

Innovation strategies and policies need to be taken more into account by the MoCo, along with the interfaces with the Higher Education area.

In parallel, there is room for more systematic dissemination of information of the ongoing cooperation activities, and more links should be ensured with SFIC and other relevant bodies.

The UfM policy and the new role taken by the European Commission in 2012 should be directed to support cooperation between EU Member States and Mediterranean Partner Countries, while spurring South-South cooperation. The support of the MoCo in the organization of Ministerial Conferences on a more regular basis will be an important element as well.

Finally, it should be stressed that no cooperation can really cope with future challenges if there is no shift from a vision based on competiveness to an approach towards the well being. Unless RDI competitiveness and competition are combined with social and employment-creating programmes, it will only contribute to increase social *malaise*, both in EU and MPCs. The knowledge environment and RDI may play a role only if political and social dialogue start to share the same comprehensive language at both national and international levels.

Notes

[1] European Research and the Mediterranean, Sophia-Antipolis, France 21-22 March 1995.

[2] In 1995 the Mediterranean Partner Countries included: Algeria, Cyprus, Egypt, Israel, Jordan, Lebanon, Malta, Morocco, Palestine, Syria, Tunisia, Turkey.

[3] See *Guidelines for the functioning of the Monitoring Committee*, as adopted by the members of the MoCo in Cyprus on 12 and 13 December 1996 and as amended in Vienna, Austria on 30 June 2006).

[4] It met in Spain (1st, 1995) Italy (2nd, 1996), Cyprus (3rd, 1996), Netherlands (4th, 1997), Malta (5th, 1998), Germany (6th, 1999), Tunisia (7th, 2000), Sweden (8th, 2001), Egypt (9th, 2003), 1st Ad-Hoc MoCo meeting in Naples (Italy, 2003), 2nd Ad-Hoc in Amman (Jordan, 2005), Tunisia (10th, 2005), Austria (11th, 2006), Turkey (12th, 2008), Morocco (13th, 2009), Spain (14th, 2010), Hungary (15th, 2011), Belgium (16th, 2012), Malta (17th, 2012).

[5] The Union for the Mediterranean (UfM) was launched in Paris in 2008. It has been welcomed as a way to re-launch the Barcelona Process. Along with the 27 EU Member States, 16 Countries around the Mediterranean are members of the UfM: Albania, Algeria, Bosnia and Herzegovina, Croatia, Egypt, Israel, Jordan, Lebanon, Mauritania, Monaco, Montenegro, Morocco, the Palestinian Authority, Syria, Tunisia and Turkey. A "rotating" co-presidency is envisaged: 1 from EU MSs and 1 from MPCs. It is a fact that the co-presidency has been held by France and Egypt until February 2012. From 1st March 2012, EC represents EU Member States while Jordan represents the MPCs. The UfM also has a functional secretariat, based in Barcelona, a Secretary General and six Deputy Secretary Generals. Projects address areas such as economy, environment, energy, health, migration and culture. Among the key-initiatives of UfM: 1. De-pollution of the Mediterranean Sea; 2. Establishment of maritime and land highways that connect ports and improve rail connections; 3. Joint civil protection programme on prevention, preparation and response to natural and man-made disasters; 4. Mediterranean solar energy plan; 5. Euro-Mediterranean University, inaugurated in Slovenia in June 2008; 6. Mediterranean Business Development Initiative, which supports small businesses operating in the region.

[6] The remaining 9 MPCs becoming a subgroup of the 16 neighbour countries at the EU's new borders.

[7] With the enlargement of EU, involving also Malta and Cyprus (as concerns the Mediterranean area), new instruments and policies were conceived for "neighbouring Countries", bordering with EU. The EC Communication *"Wider Europe – Neighborhood: A new framework for relations with our Eastern and Southern Neighbors"* and the "New Policy of Neighborhood" launched in 2003, established new instruments that replaced MEDA and TACIS programmes. The new ENPI for the Mediterranean area targets the same countries as MEDA: Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Palestine, Syria, Tunisia, plus Libya.

[8] Since the second Ministerial conference in Brdo was cancelled due to eruption of Eyjafjallajokull volcano, no other Ministerial Conference has been held until now.

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National MPC policies of cooperation with the EU in Science and Innovation: the case of Morocco

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Abstract. The EU and Morocco are fully engaged in a strong and deep cooperation supported by a high-level policy dialogue, and pertaining to multiple sectors including research and innovation. At the institutional level, the Association agreement (1996), the ST agreement (2003), the European neighbouring policy (2004), the new 'advanced status' and the programme called "To succeed the advanced status" have put emphasis on the consolidation of scientific and technological ties, and are supported by relevant implementation mechanisms and instruments. In May 2011 an institutional twinning program was launched to strengthen and bring closer the Moroccan research and innovation system to ERA.
Morocco is highly devoted to reinforce and intensify the current bilateral initiatives and programmes in the field of science and technology, aiming to the preparation and definition of joint activities targeting themes of mutual interest, the improvement of cooperation on industry-oriented ST cooperation between the EU and Morocco, the setting up of joint collaboration and networking of technical platforms and research laboratories. Through these efforts, the scientific and technological cooperation with the EU is considered as a driver for the implementation of the national strategy for research Horizon 2025, a support to sectoral national programmes of socio-economic development and to the achievement of the knowledge-based economy.

Keywords. Cooperation - Policy dialogue – Integration - Research - Knowledge - Morocco - European Union.

Stratégies de coopération des pays méditerranéens partenaires avec l'Union Européenne en science et technologie: le cas du Maroc

Résumé. *L'UE et le Maroc sont pleinement engagés dans une étroite coopération soutenue par un dialogue politique de haut niveau, notamment dans la recherche et l'innovation. Au niveau institutionnel, l'accord d'association (1996), l'accord de coopération scientifique et technologique (2003), la politique européenne de voisinage (2004), le nouveau « statut avancé » et le programme « réussir le statut avancé » ont mis l'accent sur la consolidation des liens scientifiques et technologiques, et sont soutenus par des mécanismes et instruments de mise en oeuvre pertinents. En mai 2011, un programme de jumelage institutionnel a été lancé pour renforcer et rapprocher la recherche et l'innovation marocaine de l'Espace Européen de la Recherche.*
Le Maroc est fortement dévoué à renforcer et intensifier les initiatives en cours et les programmes bilatéraux dans le domaine de la science et de la technologie, visant à la préparation et à la définition des activités conjointes ciblant des thématiques d'intérêt commun, l'amélioration de la collaboration bilatérale en ST orientée vers les besoins de l'industrie, la mise en place d'une collaboration conjointe et la mise en réseau des plates-formes techniques et des laboratoires de recherche.

A travers ces efforts, la coopération scientifique et technologique avec l'UE est considérée comme un levier pour la mise en œuvre de la stratégie nationale de la recherche à l'horizon 2025, le soutien aux plans nationaux sectoriels de développement socio-économique et la réalisation de l'économie fondée sur le savoir.

Mots-clés. *Coopération - Dialogue politique – Intégration - Recherche – Connaissance - Maroc - Union européenne.*

I – Bilateral cooperation in RDI

RDI (Research, Development and Innovation) is one of the strategic sectors in which Morocco and the European Union are fully engaged in a deep partnership process constantly increasing since the Association Agreement signed in 1996, the Agreement for Scientific and Technological

Cooperation signed into 2003 and entered into force in 2005, and finally the advanced status granted in 2008. The strategic objective for Morocco is the integration into the European Research Area.

1. Framework of RDI strategy in Morocco

Over the last few years the Kingdom of Morocco has launched several sectoral integrated programmes aimed to its socio-economic development, especially in Industry (Emergence Plan), Energy (Moroccan Solar Plan), Agriculture (Green Morocco Plan), Tourism (Plan Azur), Information and Communication Technologies (Morocco Numeric Plan), and Innovation (Moroccan Innovation Initiative). Regarding scientific research, in 2006 the Ministry of Higher Education and Research set up the National Strategy Horizon 2025, in order to contribute through an increasing effort in research and development, to the support of those strategic programmes.

Also, through this strategy, Morocco aims to increase the share of GDP devoted to R&D (currently around 0.73%)[1], while allowing the cooperation with the EU strategic interest, given the importance of bilateral ties of partnership at all levels.

The measures taken in recent years in this sector allowed the increase in the share of GDP allocated to scientific research from 0.73% in 2010 to around 0.8% today, the production in 2012 of more than 2811 publications in international indexed journals against 2335 in 2010, the deposit of 856 patents (of which 90 by universities in 2012 against 70 in 2010) and the launch of 475 applied research projects in partnership with private companies.

In order to boost the Moroccan RTD system, Morocco relies on the following inputs:

- 13,000 researchers
- 5606 MDH (accounting for 0.73% of GDP)
- 45% (Higher Education and Scientific Research) 24% (Public centres of research) 2% (cooperation) 29% (private sector).

2. Participation of Morocco in the FP

Morocco is involved in all the thematic areas of FP7, and a number of societal challenges identified for the next Horizon 2020 programme are set up by the national strategy through the 2009-2012 Action Plan:

- agriculture adapted to climate change conditions
- health and well-being increase
- study, conservation and enhancement of natural resources, notably water and renewable energies
- environment and sustainable development
- biotechnologies
- management of threats (financial, natural, technological, cyber-security etc.)
- innovation and competitiveness of enterprises
- cultural and socio-economic development.

This bilateral cooperation in R&D and innovation is supported by a high-level institutional and policy dialogue, which is reflected by the significant increase of Moroccan participation in the framework programmes of research and development (FP6: 2002-2006 and FP7: 2007-2013) over the last decade. However, the full potential for the qualitative and quantitative strengthening of bilateral cooperation is far from being achieved.

3. Assessment and analysis of bilateral cooperation

The findings of the two recent evaluation studies of Morocco/EU ST cooperation showed undeniable obstacles that hinder this potential to be fully realized. This is mainly related to the administrative and financial complex management, the inadequate enhancement of research results, as well as the lack of structures in Moroccan universities dedicated to proposal building and project management.

Strengths	Weaknesses
• Institutional and technical support system (JSC, political dialogue, NCP system, institutional twinning, BILAT and INCONET projects.) • Convergence between FP priorities and thematic priorities of Morocco • Growing experience of Moroccan teams in FP and diversification of profiles	• Absence in universities and research centres of structures dedicated to project preparation and management • Difficulties to enhance the results of research (FP) • Problems in administrative and financial management • Poor research activity in specific disciplines (SSH, Nanosciences etc.) • Moroccan participation often results from foreign initiatives • Evaluation culture is still weak
Opportunities	**Threats**
• Launch of joint calls (former ERANET) synonym of more co-ownership • Integrated programme HORIZON 2020 (simplification of rules) • Sectoral strategies for Research and Innovation • Synergies between the programme “to succeed the advanced status” and the institutional twinning project	• Lobbying (warning system) is required to strengthen Moroccan participation in FP • The approach to co-funding and co-ownership requires more convergence towards the European Research Area

Figure 1. SWOT Analysis of bilateral cooperation.

4. Institutional dialogue and support instruments

To improve the environment for the participation of Moroccan researchers in European programmes, the Ministry set up, with the support of the European Commission, the Information National Point in 2005, the institutional focal points in 2007 and finally thematic contact points in

2010. Also, two structural projects “M2ERA “(2009-2012) and the institutional twinning project “Strengthening Institutional and Administrative Capacity of Scientific and Technological Research” (2011-2013) play a supporting role to the policy dialogue with the EU in ST, and contribute to the upgrading of the national research system towards its integration to the ERA.

On numerous occasions, Morocco has shown its strategic position vis-à-vis the cooperation with the EU, as it is realised through the high-level policy dialogue in the Joint Steering Committee (JSC), the ENPI sub-committee for Research and Innovation “SCRI” (on bilateral scale), and the MOnitoring Committee “MOCO” (on bi-regional scale).

In the current context of preparation of the next programme Horizon 2020, the implementation of the Common Agenda for Research and Innovation (CRIA) and a bi-regional programme for RI that may be potentially based on Article 185 of the TFEU, Morocco has given a significant support to the ERANET project “Arimnet” and the derived joint call for proposals, and also to the next ERANET MED in preparation.

At the strategic level, it is important to emphasise the participation of a high-level Moroccan delegation in the Euro-Mediterranean Conference for RI, held in Barcelona in April 2012, as well as the important meeting between a Moroccan delegation of officials from the Ministry, the Institute of Agronomy and Veterinary, R&D Maroc Association and the Director of International Cooperation (DG RI, EC) that took place in June 2012 in Brussels.

Through this high-level dialogue, Morocco highlighted its expectations regarding RTD cooperation with the EU, which goes beyond the number of funded projects and financial contributions, to achieve the objective of integration into the European Research Area, with major consequences in terms of convergence to European standards (governance, legal framework, infrastructure, research capacity etc..) and the launch of common initiatives based on thematic priorities of mutual interest.

II – Future developments and recommendations

1. Future developments

Through these efforts, the scientific and technological cooperation with the EU is considered as a driver for the implementation of the national strategy for research Horizon 2025, a support to sectoral national programmes of socio-economic development and to the achievement of the knowledge-based economy.

Two major axes of the Ministry action plan for the 2013-2016 period concern international cooperation, mainly with the European Union, as listed below:

- support and funding of scientific research including the increase of the R&D expenditure to reach 1% of GDP, the development of partnerships with the private sector and the promotion of international cooperation;
- reinforcement of cooperation in science and technology to foster the knowledge-based economy in Morocco.

The transition towards HORIZON 2020 will be ensured through the support of the next BILAT and INCONET projects starting, respectively, in November 2012 and February 2013, combined with the promising impact of the two running ERAWIDE projects and the next initiatives focused on the research and innovation chain (R2I). Those developments will certainly build on MIRA achievements and pave the way to deepen bi-regional cooperation in STI.

2. Recommendations for future activities

Some of the following recommendations are actually being implemented:

- endorsement of a joint road map that highlights the principles of co-ownership, mutual interest and shared benefits;
- the new BILAT project MOBILISE will play an important role for the transition towards Horizon 2020 and in supporting the policy dialogue;
- independent structure for the evaluation of scientific research (international cooperation);
- specialized units in proposal building and project management;
- developing a simplified management framework for cooperation project activities;
- developing specific skills in technology transfer and enhanced absorptive capacity;
- measures to increase mobility of researchers, in the frame of cooperation projects;
- fostering an environment conducive to private participation:
  - legal and regulatory arrangements;
  - institutional support and implementation capacity;
  - sector-specific strategies;
- revision of per diem rates for researchers in the frame of cooperation projects;
- reinforcing tax incentives for the private sector to create or support structures, programmes and research projects.

Notes

[1] 1% of GDP foreseen in 2016 according to the Action Plan of the Ministry of Higher Education and Scientific Research 2013-2016.

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First lessons learnt from the Mediterranean ERA-WIDE projects

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Abstract. In 2010, the European Commission launched a new scheme targeting directly research centres from the European Neighbourhood Policy (ENP) countries. The ERA-WIDE scheme was aimed at reinforcing the cooperation capacities of the ENP countries, involving the different thematic priorities of FP7. Between 2010 and 2011, approximately thirty ERA-WIDE projects were selected for funding with the focus being on the Mediterranean Partner Countries. This paper presents a preliminary assessment of these projects, highlighting the lessons learnt so far. It is divided into four main parts. The first part presents the ERA-WIDE scheme and its potential impact in terms of human capital development. Part two gives an overview of the ERA-WIDE projects funded across the Southern Mediterranean region. Part three highlights some experimental practices used to coordinate the projects at a regional level. It examines the extent to which these practices can contribute to strengthening the impacts of the projects and complementing previous initiatives funded by the International Cooperation Programme of DG Research and Innovation under FP7. The last part of the paper presents some indicators employed to assess the final impact expected at a later stage, as well as some recommendations to make the most of this approach. This paper employs material and observations acquired by the authors through their involvement in ERA-WIDE INCO activities as project officers, coordinators and reviewers.

Keywords. Capacity building – Empowerment – Ownership – Coordination.

Les premières leçons tirées de l'expérience des projets ERA-WIDE en Méditerranée

Résumé. *En 2010, la Commission Européenne a lancé un nouveau programme visant directement le renforcement des capacités de coopération des centres de recherche des pays de la Politique Européenne de Voisinage (PEV) impliqués dans des thématiques prioritaires correspondantes à celles du VII PCRD. Entre 2010 et 2011, une trentaine de projets ERA-WIDE ont obtenu un financement parmi les Pays Partenaires Méditerranéens. Cet article présente une évaluation préliminaire de ces projets en soulignant quelques unes des leçons apprises jusqu'à présent. Il est divisé en quatre principales parties. La première partie introduit le programme ERA-WIDE et son impact potentiel en termes de développement du capital humain. La deuxième partie offre une vue d'ensemble des projets ERA-WIDE financés sur la région Méditerranéenne. La troisième partie souligne quelques pratiques expérimentales utilisées pour coordonner les projets à un niveau régional. Elle analyse dans quelle mesure ces pratiques peuvent contribuer à renforcer l'impact des projets et compléter des initiatives précédentes financées par le Programme de Coopération Internationale de la DG Recherche et Innovation de la Commission Européenne sous son VIIème PCRDT. La dernière partie de cet article propose quelques indicateurs pour évaluer l'impact final des projets une fois qu'ils auront atteint un stade de mis en œuvre plus avancé, ainsi que certaines recommandations pour valoriser cette approche. Cet article repose sur du matériel et des observations acquises par ses auteurs au cours de leur participation dans les activités des projets ERA-WIDE, que ce soit en tant que gestionnaires, coordinateurs ou évaluateurs.*

Mots-clés. *Renforcement des capacités – Autonomisation – Propriété – Coordination.*

An overarching concern informing this paper is the process of moving from the integration in the European Research Area to the knowledge economy in general. Over the last two decades, the

European public policies have highlighted progressive multiplication of the financial resources. As indicated by the OECD report on the governance of research policies (OCDE, 2003), the substantial change in the modalities of allocation of funding for research has generated an important increase in the percentage of funding attributed through competitive mechanisms of grant allocation. Accordingly, research institutions are now bound to organize themselves in new ways in order to be able to respond to this phenomenon and position themselves against this new market.

The confrontation of two dynamics - scientific production and management of research teams – in a reduced time scale has resulted in high organizational stress. Currently, competitiveness of a research institution is not only measured in terms of the quality of its scientific production, but also of its ability to plan, manage and optimize resources and communication. A revealing example is the evaluation criterion used in FP7, where the total scoring is divided equally among three components: (i) scientific quality (5/15), (ii) management (including finance and governance) and composition of consortium partnering (5/15), and (iii) the impact generated by research on the socio-economic and environmental needs (5/15).

The promotion of a European Research Area (ERA) aims to '*enable researchers, research institutions and businesses to increasingly circulate, compete and co-operate across borders'*. In addition, it is intended *'to give them access to a Europe-wide open space for knowledge and technologies in which transnational synergies and complementarities are fully exploited* (ERA, 2012). The participation in networks and consortiums is undoubtedly a good asset to develop all kinds of opportunities in terms of access to information, training and knowledge, access to databases and infrastructures, access to new contacts and partnerships, as well as a marked improvement of the field of vision. Players across Europe have to position themselves strategically in an arena where they will be able to compete for grants.

The Mediterranean Partner Countries (MPC) are directly challenged by similar issues in their attempts to integrate into the ERA: insufficient research funding leading to a high level of competition, redefinition of the role of universities and research centres in a context of massification of access to higher education systems[1], lack of traditional academia-industry collaboration linkages, inadequate system of governance, lack of inter-sectoral mobility, fragmented nature of research activities, inappropriate use of limited resources, lack of intellectual property rights protection, lack of sufficient skills by young scientists and researchers[2], lack of RDI managers able to anticipate difficulties and quickly solve problems. These challenges hinder the career development of researchers and weaken the research actors' capacities of absorption of the knowledge economy in many countries across the Southern Mediterranean region.

I – The ERA-WIDE Scheme: from empowerment to ownership

In terms of management, the notion of empowerment lays on three pillars: vision, autonomy and ownership. An empowered team knows towards where to go (vision), has a sufficient margin of action to go towards this direction (autonomy) and feels legitimate to lead this action (ownership). Within an enterprise, human empowerment leads to numerous benefits given that it improves motivation, service quality, productivity and competitiveness, decision-making process, commitment and involvement. The process of empowerment is a mechanism enabling persons, organizations and communities to acquire control on the events. It is related to the power and capacity of acting (Jouve, 2006) and coping with a situation.

If applied to the South Mediterranean research centres and their involvement in the international networks for ST cooperation, the concept of empowerment tends to respond to two situations: first, failure to open these networks to newcomers, thus generating a "club effect" (Siino, 2009), turning into a protected space for senior experts that prevents replacing the pool of experts

and hence having a new vision; second, a lack of ownership and a passive behaviour from an important number of stakeholders, particularly from the South Mediterranean Countries.

Launched in 2010, the ERA-WIDE scheme builds on the Research Potential scheme (REGPOT), a previous successful pilot initiative aiming to 'adjust Mediterranean Partner RTD research entities' policies, boosting their scientific and technological research potential'. This previous scheme was highly demanded and had generated many expectations from the Mediterranean Partner Countries in 2009. Unlike the REGPOT, for the first time the ERA-WIDE scheme introduced the rule that the consortium coordination is directly assumed by the research centres from the ENP themselves (main beneficiaries), with the support of European partners willing to share and transfer their experiences. The call explicitly mentioned three main categories of activities to be compulsorily performed, among which the definition of a strategy to be usable beyond the project:

- winning/networking with research centres in MS or AC with a view to exchanging knowledge and good practices, disseminating scientific information, identifying partners and setting up joint experiments through short-term visits or exchange of staff, meetings, seminars, and similar activities;
- developing training to build competency and facilitate the participation of these centres in FP7;
- developing research centres' strategy in order to increase their modules, scope and visibility (regional coverage, activities), develop their comparative advantage and improve their competitiveness by enhancing their responses to the socio-economic needs of their countries and of the region[3].

The expected impacts mentioned in the ERA-WIDE call were as follows:

- contribution to RTD capacity building and management in the target country;
- enhanced participation of the country in the FP7;
- increased visibility and scope (regional coverage, subjects, activities) of the centre with increased linkage with economic and social environment;
- networking with other research centres in Member States or Associated Countries (mobilizing the human and material resources existing in a given field, disseminating scientific information as well as the results of research, facilitating communication between the centres having similar scientific interest);
- increased job opportunities that encourage gender equality in the country, in particular for young scientists (measures to avoid 'brain drain' phenomena: better career opportunities, better work conditions, access to research infrastructures).

Despite placing large responsibilities and workload on individuals, the ERA-WIDE scheme appeared to provide a unique opportunity to make things happen. In this respect, we can consider that the main characteristic of this call was to empower the South Mediterranean research players – potential players of change – through a "learning by doing" approach, especially in terms of RTD and knowledge management. Indeed, the funds given to the coordinator and his/her team allow them to measure their strength, thus highlighting the importance of the human capital. In return, they have to develop and demonstrate certain capacities that are not explicitly recognized by the academic arena:

Capacities of mobilization: mobilizing requires reflecting a strategic thought in the way the choices and actions are presented and conducted. They have to be of high level quality, meaning well justified, coherent and easily marketable in the sense that their impact can be logically perceived and believed, hence attracting interest and trust.

Capacities of absorption and responsiveness: absorbing the information and opportunities is intrinsically linked to the capacity of responding and reacting in time to some opportunities and demands made available through the relevant networks. The capacities of absorption depend on the mobilized human and financial resources and their organization. The more efficiently they are organized, the more they can absorb and manage knowledge, and the more attractive they become.

Capacities of building a team: building trust and quality is an important factor in this respect. Team management is a crucial issue and it implies real efforts in terms of skills development. In this respect, training for staff and partners is of strategic importance. The more a research player attracts, the more the research player can share opportunities.

Capacities of building a common goal: abilities to gather different types of actors and projects representing different kinds of interests. Identifying common gaps and burdens to be overcome and finding common denominators to fill them up is a way of mobilizing the efforts of various communities of players towards the achievement of a common goal.

An international network, seen in some cases as an open-innovation system, is organized around a system of rules resting on the game of inter-personal relationships and on explicit laws and sanctions. As mentioned by P. Moreau Defarges in his work on governance (Moreau Defarges, 2008), 'this system of rules evolves at two levels: with respect to the frontiers between public and private spheres and interests; with respect to the concept of general interest understood as a multiform construct, open and permanent'. In order to evolve and progress in such a system, a research player has to work on its attractiveness through the improvement of its capacities in three parallel sectors that correspond to the evaluation criteria mentioned before: (i) the scientific and technological knowledge offer; (ii) the way of ensuring adequate utilization of this knowledge through a regulatory system of contracting and intellectual property protection, meaning the development of legal, administrative and financial engineering and, last but not least, (iii) the development of good communication and interface mechanisms to ensure a sustainable impact on the research player, on the networks it belongs to, and on the other indirect stakeholders of the society. These components are part of a strategic approach.

The power to develop a strategy is linked to a certain degree of independence and autonomy. Indeed, an institution's organizing capacities and autonomy are intimately interrelated. According to Sébastien Bordmann (Bordmann, 2007), 'the autonomy of a university or research centre can be full, partial or inexistent' according to the degree of independence the organization may avail itself of vis-à-vis the public authorities in several fields : (i) the control and management of the budget of the establishment ; (ii) the strategy of development, meaning the internal definition of the long-term development plan of the establishment and its positioning at the national and international level; (iii) the human resources policy; (iv) the students' selection (if applicable) ; (v) the pedagogic organization (if applicable) ; (vi) the management of the real estate park and (vii) the internal audit. In the South Mediterranean countries, some national laws recognize autonomy as a necessary component of an environment conducive to the development of scientific research and technological development (e.g. Algeria[4], Tunisia[5] or Lebanon[6]) but they are not systematically translated into applicable rules. The interest of the ERA-WIDE scheme through EU funding is to give the coordinators, who are the ones signing the grant agreement with the EC, a great deal of autonomy subject to official approval by their superiors. Indeed, they benefit from being independent in the way they can define their project's objectives, implement and fine-tune their activities and manage an independent budget.

Designing a strategy does not refer only to the development of objectives and actions to achieve them. It is also intimately linked to the development of a vision and of values. Phillip N Cooke and Andrea Piccaluga (Cooke and Piccaluga, 2004) reported that, 'in knowledge management, the idea is not only to spread values through the firm itself or through the networking but above all to

share values, add values and even change some values that make up the core'. They highlight the fact that 'the framework improves in a stakeholder and values framework'.

The coordinator of an ERA-WIDE project, as all the project coordinators, is placed in between different timelines and agendas as well as different procedures, and has to struggle for the definition of the rules of the game. Depending on the quality of the coordinator's relations with the interlocutors, he/she will develop initiatives and have the flexibility to negotiate and adjust the way resources have to be spent, either in terms of planning or procedures. The coordinator, be it an organization or an autonomous entity, is the one contractually and morally responsible for achieving the project objective. Therefore, he/she is accountable to the donors financing the project, the consortium and team he/she mobilizes, especially the twin organization and the organization he/she represents.

The empowerment of South Mediterranean researchers and research organizations is expected to induce an important impact on the overall international cooperation activities structuring the Euro-Mediterranean ST cooperation, in the sense that it directly feeds and inhabits the new central concept of ownership emerged after the Arab revolutions. Although this approach in ERA-WIDE projects presents some risks and is a bet on the future, it is definitively an innovative method in the new requirements of the knowledge economy. It is based on trust, responsibility, responsiveness, creativity, risk-taking and problem-solving building process, which is more than ever required in the current socio-economic context.

II – The ERA-WIDE funded Projects

In the first ERA-WIDE call launched in 2010, only 19 proposals were submitted, whereas almost 70 proposals were submitted in the 2nd call closing on March 15th of 2011. Despite the critical situation shaking the Arab countries in this period ("Arab Spring"), the participation of the Mediterranean Partner Countries in this call raised to 75%. In total, 29 research centres have been selected for funding among the South Mediterranean countries, for a total amount of 13.5 M€. Only 27 projects are currently under implementation in 8 Mediterranean Partner Countries[7]. The number of projects is from one to seven by country (Fig. 1).

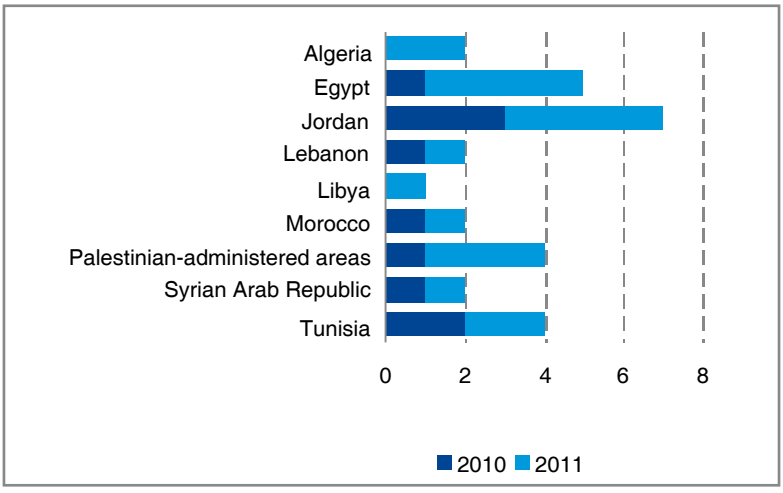

Figure 1. Number of ERA-WIDE projects by country.
Source: 15th MoCo meeting, Szeged, Hungary, June 2011.

The duration of these projects ranges from 24 to 36 months, with an average of 28 months that will certainly increase during the implementation phase in view of the important number of requests for extending the project duration. The average budget by project is 0.5 M€, and in most cases the coordinator receives approximately half of it.

The projects focus on diverse topics related to: (i) environment (integrated coastal zones management, sustainable water management, degraded soils characterization and use, biodiversity, oceanography); (ii) food, agriculture, biotechnology and fisheries (FAB) including seed and plant conservation, aquaculture, water and agriculture, medicinal and aromatic plants; (iii) nanotechnologies and new materials (NMP) applied to cultural heritage and health applications); (iv) renewable energies; (v) information and communication technologies (ICT); and (vi) health (non-communicable diseases, liver diseases, medical research and cancer biobanks).

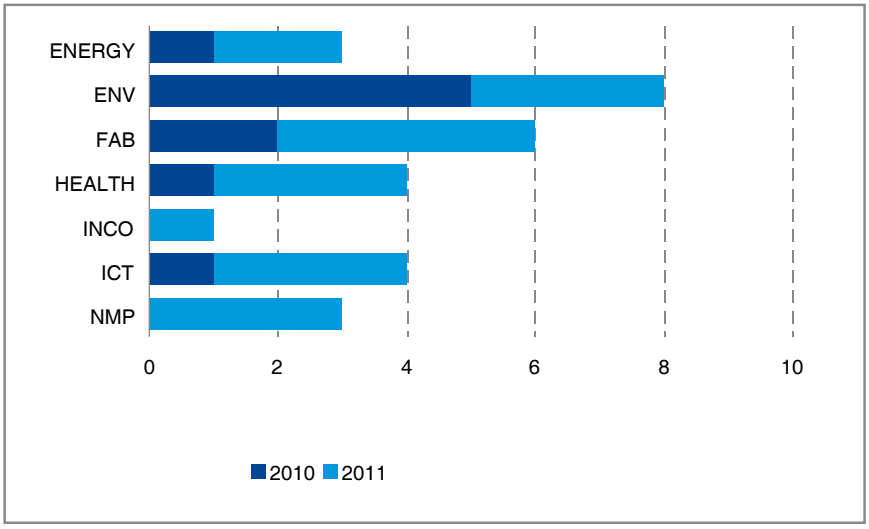

Figure 2. ERA-WIDE Projects by thematic area.
Source: DG Research and Innovation website.

Although topics are not specified in the ERA-WIDE calls, project topics are equivalent to the FP7 thematic areas and represent the research priorities of the Mediterranean region. Most research centres are working in the environment field (50%, first call). The topics of the selected projects during the second call are more diversified than in the first one (addition of NMP, ICT and higher participation related to FAB).

The number of partners in the consortiums ranges from 2 to 6 and the great majority of them have 3 partners. In total, there are 85 participations from 23 different countries in the 27 projects under implementation. The majority of the partners are European (78 from 16 European countries), 3 are from associated or candidate countries (3 from Turkey, Romania and Switzerland), 3 are from Mediterranean Countries and 1 from West Balkan Countries (Croatia).

The most active partners are from Italy (17 institutions participating in 24 projects out of 27, that is to say in almost all the projects), Spain (8 institutions participating in 13 projects, meaning almost half of the total number of projects), France (8 institutions participating in 12 projects) and UK (5 institutions in 9 projects). Germany participates in 5 projects, while Greece and Ireland participate in 3 each. The other 9 European Countries[8] participate only in one of these projects. As the

ERA-WIDE call targets the South Mediterranean research centres, it is interesting to explore the profile of EU partners. It is presented in Figure 3 and it mostly corresponds to public, non-profit organizations of research and higher education.

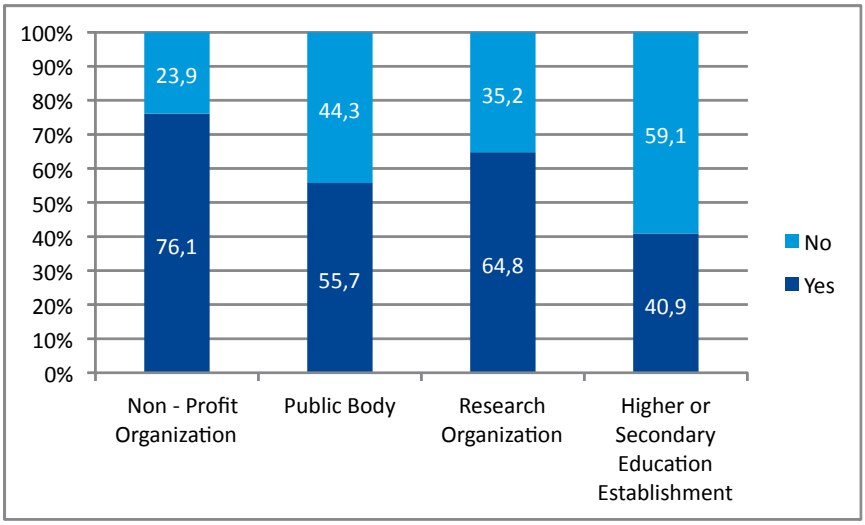

Figure 3. Legal Status of ERA-WIDE Partner Organization.
Source: ERA-WIDE survey 2011.

It is interesting to observe that the size of MPC organizations vary considerably (Fig. 4); some of them reach a number of 50 employees, while others have several hundreds of employees, almost 1,500 in one case. Obviously, depending on the size of the beneficiary organization, a project like an ERA-WIDE one will not have the same level and type of impact.

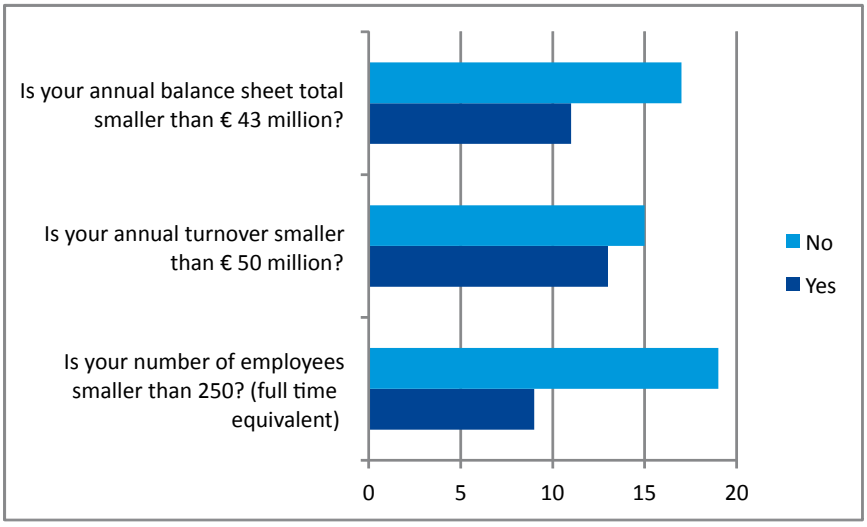

Figure 4. Size of ERA-WIDE Research Institutes.
Source: ERA-WIDE survey 2011.

Likewise, the legal status of the beneficiary organizations is different, although the majority of them are non-profit research public organizations (Fig. 5). Two thirds of them are not recognized as Higher Education establishments, while a third represents universities. Another noteworthy observation is that almost half of the interviewed institutions considered themselves as autonomous, while the others are not. Coordinating institutions of ERA-WIDE projects are non-profit organizations (92%) and public institutions (88%). Moreover, almost half of the South Mediterranean institutes coordinating an ERA-WIDE project claimed to have a legal autonomous status.

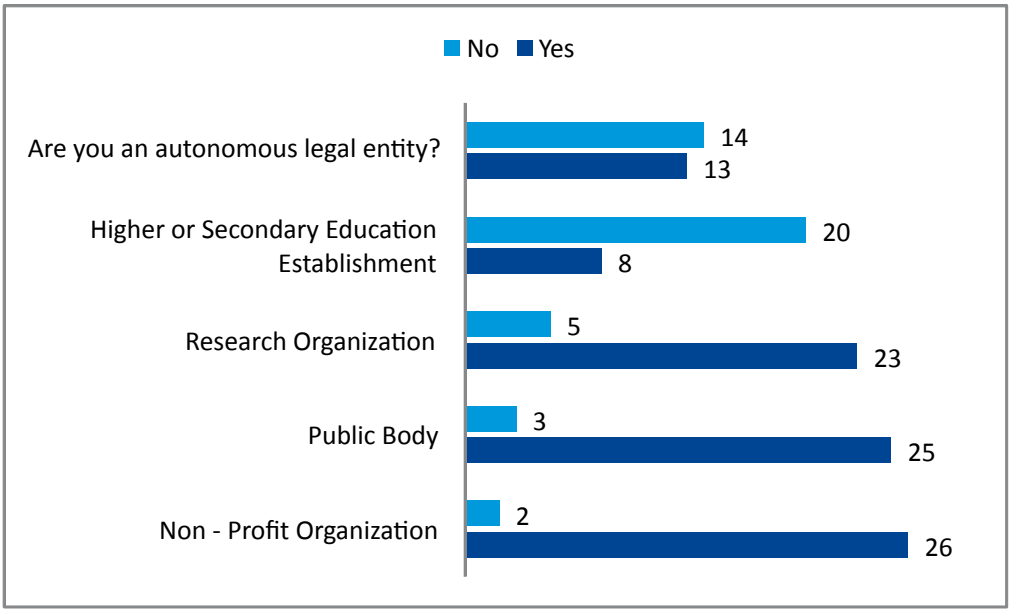

Figure 5. Legal Status of ERA-WIDE Research Institutes.
Source: ERA-WIDE survey 2011.

On the basis of the data presented above and collected through a short survey with the ERA-WIDE coordinators on their impact pre-assessment, the following part further examines how the coordination of these projects was attempted.

III – Leveraging the impacts of ERA-WIDE projects at the regional level: coordination through clustering

The FP7 mid-term evaluation in 2010 (Warrington *et al*., 2010) pointed to the valuable results and achievements of the INCO projects, but noted the lack of coordination between the different consortiums implementing the BILAT and INCO-NET schemes as one of their limitations leading, in some cases, to a duplication of work and inefficient use of the limited resources[9]. In the case of the ERA-WIDEs, their coordination was promoted during the negotiation and implementation process in order to leverage the global impact of the projects. A concrete method used to promote coordination is the clustering of projects. This clustering approach has been increasingly practiced

over the last three years with a view to avoiding the duplication of efforts and favouring synergies. Implemented at the project level, its aim is to cope with the fragmentation of the activities financed, both in terms of the diversity of the calls and financial schemes.

Taking the example of the Water Cluster Initiative (WCI) established through the REGPOT and Regions of Knowledge schemes and the so-called 'open method of coordination (OMC)[10], the International Cooperation Directorate started exploring the relevance of this approach to boost the impact of projects. At the same time, the input received from MIRA project, especially through the work on the Euro-Mediterranean Innovation Space (EMIS), also supported the development of a research-driven cluster pilot case on water as a new concept to foster innovation.

Table 1 depicts the drivers of a clustering approach, while raising the following questions: *What is the effectiveness of this method and how can its real added value be assessed? How can this approach support a more coherent and sustainable impact of the clustered projects? What could be the expected advantage and limits?* This table could be further developed by making a comparative cost analysis for this approach, as well as developing different types of clusters.

Through this coordination method, some positive preliminary results that are worth mentioning were developed. In Tunisia, the BILAT and ERA-WIDE project coordinators worked together with the support of the Ministry in order to fit FP7 management rules to Tunisian ones and elaborate a guide for researchers and participants. The National Agency of Research Promotion (ANPR – *Agence Nationale de Promotion de la Recherche*), along with FP7 project coordinators, supported the implementation of the guide. The target impacts are: (i) an efficient management procedure in agreement with FP7 rules and supported by ANPR, (ii) clearer rules of FP7 calls for Tunisian applicants in order to enhance Tunisian participation and integration into the European Research Area.

Another positive example of coordination through clustering was the drafting process of a regional policy document on the formulation of a strategic research agenda in support of the broader strategy on the de-pollution of the Mediterranean Sea. Since the process of negotiation of the first wave of ERA-WIDE (2010) coincided with the negotiation on the new mandate of MIRA, through the project officers the European Commission encouraged the successful ERA-WIDE proposals to explicitly mention the coordination between the INCO-NETs, BILATs and other ERA-WIDEs in the description of work to be annexed to all grant agreements. Six out of ten projects focused on water-related fields, all of which had proposed to review the national policies and initiatives related to the water sector in their countries as a preliminary exercise to further develop their strategy. On the other hand, MIRA tried to mobilize a representative and multidisciplinary group of experts to assess and recommend actions to tackle the de-pollution of the Mediterranean Sea. Based on a match of interests, it was decided to cooperate to formulate a 'shared deliverable': the report on the Mediterranean Sea pollution situation addressed by the Horizon 2020 Programme of the ENPI, focusing on the challenges in the research domain[11]. A quite interesting point in this process is the emerging practice of signing Memoranda of Understanding between projects. From interviews with the project coordinators, it appeared that this practice aimed at clarifying the rules of the scheme and encouraged the value of trust and recognition among the regional networks. The advantage of this 'shared deliverable' was, on one hand, to directly build on the existing work performed at a national level by the ERA-WIDE projects and make the most of it on the regional scene; on the other hand, MIRA benefited from a more cost-effective and quality-tested collaboration as well as a more legitimized result representing a larger number of projects.

Table 1. Drivers of a clustering approach.

Stakeholders	Policy-makers /donors	Researchers	Enterprises
Expected advantage of a "clustering approach"	Science-policy interface: – to raise success stories and build up a critical mass able to assess the efficiency and relevance of public policies (representativeness and legitimacy) – to raise the capacities of absorption of the policy makers through pooling the analyses and recommendations made by the projects as a result of their research activities – to help define financial needs and budget orientation (e.g. innovation: set of different financing mechanisms to support the whole chains of innovation from research to access to the market) – to gain in visibility and capacities of incidence – to create employment – to eliminate fragmentation and overlapping – to increase dissemination, multiplication and impacts	– Knowledge dissemination and upgrade (excellence) – recognition and useful application of the research – users' target: to integrate researchers in the 'innovation' process. – finding information – capacity building – infrastructure sharing – saving of money and time – exchange of experience and expertise – improving competitiveness of research centres in the new research-innovation approach – efficient networking – gaining autonomy and flexibility with respect to some national and local contexts	– Access to the market or new opportunities - making business – user's target – saving of money and time – marketing orientation – access to RDI results – value creation
Factors of success	Creating and demonstrating value added with respect to the efforts invested (cost/benefit analysis - concrete outcomes) Finding a common 'what for': win-win approach based on needs → necessity to identify topics for 'clustering' Need to achieve objectives with an interdisciplinary approach		
Limits	Multiplication of clusters Knowledge coordination and mutualisation is very time-consuming Funding plan/possibilities	– Work valorisation and recognition for individual career development – Fear to be abused	– Difficult to understand the added value (investment/cost analysis) – Property rights
Recommendations	Need for extra-funding and administrative mechanisms in order to support mutualisation of deliverables and peer review exercise	Need for developing mechanisms to protect the ideas to be shared	Need for structures and human resources for RDI management and integration

Source: 1st Week of ERA-WIDE integration - Towards integration of the Mediterranean Research and Innovation networks in water-related fields, 22-24 March 2011, Brussels.

Another positive illustration is the way by which a sample of ERA-WIDE projects can contribute to the formulation of a new financial scheme. Inspired by the clustering approach, the European Commission decided to promote the organization of joint activities co-funded between the

projects and external partners. As the ERA-WIDE projects were not targeted in the contract implementing the International Learning Platform (ILN)[12], the project officers in charge decided to establish the regional ERA-WIDE 'weeks of integration' in coordination with MIRA and the BILATs and in collaboration with several services of the EC or other institutions, such as the European Investment Bank and *Centre de Marseille pour l'Intégration de la Méditerrannée* (World Bank). These 'regional weeks of integration' played a kind of 'incubation' role, with the main objective of connecting the Mediterranean researchers involved in project coordination for them to exchange their experience and support each other in their respective mandates. To generate fruitful discussions, these regional meetings were organized around one of the expected impacts with a view to providing food for thought to elaborate a strategy for internationalization and research valorisation. Another objective was to keep project coordinators and EC scientific, legal and financial officers in touch. This bottom-up approach proved to be quite useful to grasp needs and potentials, and efficiently contributed and oriented to the design of new schemes for the Euro-Mediterranean region.

Figure 6 illustrates the dynamic approach of policy formulation in the Euro-Mediterranean ST cooperation. It also shows to what extent the international cooperation activities (INCO Programme) of the FP7 Capacities Programme, as a whole, constitutes a coherent programme allowing a top-down and a bottom-up approach to converge.

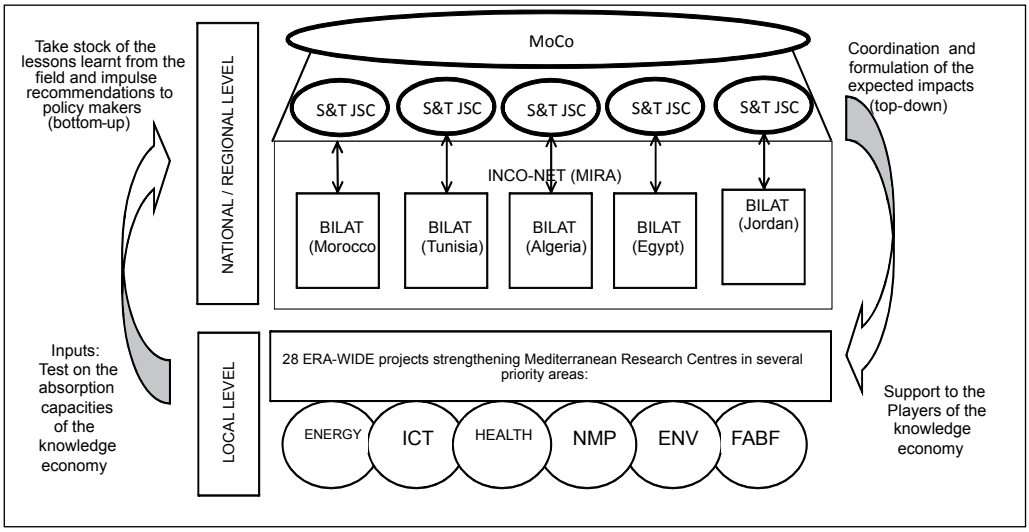

Figure 6. Policy formulation in the Euro-Mediterranean ST cooperation.

Source: European Commission, Directorate D, DG Research and Innovation, 2nd week of ERA-WIDE integration - Joint CMI-EC-EIB workshop for Mediterranean Research Centres Managers: "Strategy for internationalization and research valorisation", 3-6 October 2011, Centre for Mediterranean Integration, Marseille.

IV – Assessing the greater impact of the ERA-WIDE scheme: is it a driver of innovation in public administration?

The European Training Foundation observed that donors make important efforts to support reforms through pilot actions. Nevertheless, it also stressed the limited results obtained with

respect to the translation of pilot actions into systemic changes. This limitation needs to be overcome by appropriate monitoring and ensuring that the best practices are not only exchanged but also supported. In order to assess the long-term effects of the ERA-WIDE scheme, several questions need to be addressed: *To what extent can a pilot scheme contribute to identify and build innovative practices that fit the current challenges faced by the Mediterranean societies? How can innovative processes in the public sector (motors and barriers) be identified and recognized? How can innovations that have a positive impact on the efficiency, effectiveness and fairness of the public sector be taken up and developed?* To respond to these questions, it is important to develop an appropriate assessment method based on building indicators.

A survey performed by MIRA in 2010 (Bonas, 2010) to obtain feedback on programmes and projects on the members of the MoCo illustrated that the existing mechanisms of follow-up and monitoring appear inadequate for assessing the impact of the programmes designed to achieve the objectives committed in the Cairo Declaration. This trend is reinforced by the difficulty to set up common indicators based on accessible and available data, and the lack of skilled persons for their interpretation. Recognizing this, the *White paper on strategic indicators for the measurement and impact of international scientific cooperation and collaborations in the Mediterranean region* produced by MIRA in the frame of its Euro-Mediterranean ST Observatory recommended the MoCo that 'impact assessments should [rather] be oriented towards programmes [than policies]'. In other terms, the indicators for impact measurement should be designed at the programme definition stage. Contrary to other existing programmes using the method of the logical framework, the ERA-WIDE scheme, as most FP7 projects, does not envisage a proper set of indicators to measure its impact. Consequently, only a soft evaluation can be performed, either through self-assessment and project officers' supervision or external reviewers in charge of assessing the quality and relevance of the deliverables.

In response to this challenge, the first coordination meeting organized in Brussels few months after the start of the projects, proposed to discuss the adoption of indicators that could be used to measure the progress of the projects and hence progressively build and valorise their impact. This exercise aimed at suggesting ways by which the ERA-WIDE coordinators could self-evaluate their actions and communicate their decisions while implementing their projects. Another objective was to develop awareness by thinking together about similar actions to be considered in the development of their own individual project strategies. To ensure the proper ownership of the project objectives by the coordinators and partners, they all brainstormed together during the event. The objectives and indicators were theoretically discussed based on the way they were mentioned in the ERA-WIDE call text as well as on general frames and strategic orientations, such as the ones set in the bilateral cooperation within the ST Agreements or the regional ones mentioned in the Cairo Declaration of 2007, the European Research Area and the Innovation Union flagship initiative.

Table 2 illustrates the results of these discussions in a logical framework through a reverse engineering process. Several methodological approaches were taken into account and used in a combined way in this exercise:

Systemic approach: the discussions took into account the heuristic system proposed by C. Bogliotti and J. H. Spangenberg (2005) to understand the concept of sustainable development with a comprehensive and global vision. This systemic approach is based on three functions: (i) durability, founded on the inter-linkages between economy, environment and society; (ii) governance, based on the relation between knowledge, capacity and critical mass; and (iii) ethics, linked to a system of values. This approach was used as an introduction to the exercise and constituted the basic criteria to select the indicators (see Table 2).

Table 2. ERA-WIDE logical framework.

Macro-level/strategic objectives	**Sustainability (scientific excellence)**		
	1. Social cohesion	**2. Environmental quality (limit throughput/out)**	**3. Economic development**
Programme level objectives (FP7 – ERA-WIDE Call)	**1.1. Employment**	**1.2. Emissions reduction and resources conservation**	**1.3. Ethical competitiveness**
Project level objectives / results (ERA-WIDE projects)	**1.1.1. Improved work conditions and employability**	**1.2.1. Limit throughout resources conservation, contribution to decrease ecological footprint**	**1.3.1. Access to research infrastructures and burden reduction**
Project level activities (Indicators)	Creation of new permanent positions for young researchers; integration of researchers in public/ private-related field sectors; salary increase; better career opportunities; development of new skills and profiles; number of contracts; type of contracts (e.g. permanent, temporary); courses related to innovation market; number of completed PhDs; number of new young researchers involved.	Courses related to environmental impact decrease; cost-effectiveness of each event; improved net return from the implementation of the event.	Increased fund rising; % of increased budget of the laboratory with respect to the institutional budget; level and share of the budget; time of equipment use; number of new measures taken to solve administrative burdens; evolution of financial schemes; number of financial pilot actions adopted, lab modernization (investment done for use by people with disabilities and improvement of safety conditions); list of recently acquired high level experimental equipment and software; indirect costs/total costs ratio.
	Governance (management)		
Macro-level/strategic objectives	**1. Innovation**	**2. Reinforcement of research national system and capacity**	**3. Shared knowledge**
Programme level objectives (FP7 – ERA-WIDE Call)	**1.1. Competitive research**	**1.2. Research internationalization**	**1.3. Communication and dissemination**
Project level objectives / results (ERA-WIDE projects)	**1.1.1. Links with private sector and socio-economic environment**	**1.2.1. Networking and opportunities development**	**1.3.1. Win-win cooperation (social innovation)**
Project level activities (Indicators)	Number of established or transferred patents; number of partnerships with SMEs; number of contacts started up with private companies; number of projects with direct application by final users/for social improvement; % of increased budget of the laboratory compared with the institution budget; number of agreements and contracts signed/ under discussion; number of industrial partners; contribution (in %) from industrial investors to total R&D budget; number of the RTD Centre papers in international peer-reviewed journals.	Number of participations in international events; number of international scientific networks accessed; number of proposals submitted to international calls; number of projects approved; truthfulness; capacities of planning and risk taking; timing reduction for decision making process; number of foreign researchers joining research teams of the center; number of interdisciplinary teams.	Number of shared deliverables; number of Memoranda of Understanding with other projects and research institutions; cost-effectiveness of each event; improved net return from the execution of the event; accessibility to available information.
Macro-level/strategic objectives	**Policy (impact)**		
	1. Euro-Mediterranean integration	**2. Converging political determination**	**3. Tackling global challenges**
Programme level objectives (FP7 – ERA-WIDE Call)	**1.1. Increased visibility and scope**	**1.2. Euro-Mediterranean knowledge/research in support of sectorial policies**	**1.3. Interdisciplinarity and systemic approach**
Project level objectives/ results (ERA-WIDE projects)	**1.1.1. Contribution to regional decision-making process (e.g. MoCo) - Incidence**	**1.2.1. Incidence on sectoral public policies, programmes and initiatives**	**1.3.1. Contribution/outputs for a comprehensive national/ regional strategy**
Project level activities (Indicators)	Relation with media and policy-makers; representativity of critical mass; number of recommendations proposed and adopted.	Participation in regional events related to priority policies; contributions to regional policy papers and recommendations; links between focal points and EU programmes at the local level.	Complementarity, match and/or contribution as expert to other local/regional initiatives related to other socio-economic fields but with cause/effect links.

Source: Authors' elaboration from the results of "regional weeks of integration".

Empirical approach: during the discussion, the indicators were adapted to the objectives and activities negotiated in each of the contracts. It took into account the learning process and maturity curve embedded in the implementation process and leading to some actions/corrections along the different steps of the project life: proposal, evaluation, negotiation, implementation, amendment, reporting, and dissemination of the results and post evaluation of the impact. In this respect, the empirical approach consists in a flexible evaluation method of the activities and impacts, and approximates closely to the action research or participatory action research.

Participatory action research approach: first developed by Kurt Lewin in the sixties (Lewin, 1958), this method aims at solving an immediate problem or building a reflective process led by individuals working with others in teams or as part of a 'community of practice' to improve the way they address issues and solve problems. As exposed by Wendell L. French and Cecil Bell four decades ago, 'action research involves the process of actively participating in an organization change situation whilst conducting research' (French and Bell, 1995). In the implementation process of the ERA-WIDE projects, the philosophy consists in a "learning by doing approach", which should be reflected in the design of the indicators. As an example, the timing reduction of the decision-making process is a qualitative indicator that can result from innovative ways of communication with the hierarchy enabled by the need to implement the objectives of the project.

Comparative approach: the potential impacts were compared according to the different contexts and some convergence was identified.

Prospective approach: while part of these effects can be directly linked to the impacts that were expected from the call, others – certainly the most important ones – are more intangible.

The results of these approaches should be verified, ordered and applied at several levels and scales: (i) the micro-level would concern the enhancement of the human capital of the individuals through the development of their capacities, (ii) the meso-level would be related to the increase in the performance of their research institutions, and (iii) the macro-level would correspond to the efficient absorptiveness of the innovative practices by the national research and innovation systems of the Mediterranean Partner Countries and, more generally, to the degree of inclusiveness of the Euro-Mediterranean Research and Innovation Space. These results could also be classified according to two types of requirements: (i) progress indicators to ensure sound self-assessment and monitoring during the project implementation and (ii) impact indicators to assess the final outcomes.

V – Conclusions

The recent developments within the regional ST policy dialogue confirmed the will of further shaping a Euro-Mediterranean Research and Innovation Area, based on the principles of co-ownership, co-design, co-funding, mutual interest and shared benefits[13]. In this perspective, the modernization, governance and reforms of the ST National Systems remain by far some of the most challenging objectives already highlighted in 2007 in the Cairo Declaration. More than promoting the integration into the European Research Area, the ERA-WIDE scheme appears to have great potential in contributing to shape a more inclusive knowledge economy in the Euro-Mediterranean region. First, its uniqueness rests on directly supporting the human capacities and empowerment of the South Mediterranean research players, which in turn encourages the broader trend and demand of ownership and responsiveness. This ownership from the South Mediterranean research and innovation players can create some pressure vis-à-vis the decision-makers to further encourage and/or build on such initiatives. Second, the sample of projects funded under ERA-WIDE scheme provides a useful and representative feedback from the field needs to monitor the adequacy of the public policies, either in terms of budget or legal and financial reforms. Although it is too early to assess the results of the projects, it was important

to develop a common understanding of their parameters and potential impact so as to increase the alignment of the quality of projects. This alignment is a condition to efficiently support the decision-making processes and should be further promoted through the adoption and application of common indicators. Third, the project clustering developed under this scheme complementarily with others is relevant to build adequate communication channels able to convey strong messages from empowered practitioners to the decision-makers. These channels of communication could be further recognized and used through the BILAT and INCO-NET schemes, acting as field-to-policy 'transmission belts'. A benchmarking exercise between the different countries or sectors of research could be envisaged to assess the degree of dynamism of these processes.

Acknowledgments and disclaimer

This paper builds on the work and experience of Aurélie Pancera acquired from her position in the International Cooperation Directorate of DG Research and Innovation in the EC, and the contributions of Sanaa Boutros, Latifa Bousselmi and Kyriaki Papageorgiou. The views expressed in this publication do not reflect the views of the European Commission. The authors would like to thank the ERA-WIDE coordinators for their feedback, particularly Abeer Al-Bawab, Sonia Abdelhak, Ayadi Hammadi, Ali Ferrah and André Mégarbané. They also extend their thanks to the Unit D.3 European Neighbourhood, Africa and the Gulf in DG Research and Innovation of the European Commission as well as to the coordinators of MIRA and the Mediterranean BILATs. The authors would also like to express their thanks to Claudio Bogliotti, Leonardo Piccinetti, Maartje Wouters, Rigas Arvanitis and Abdelhamid El Zoheiry for their feedback and support.

Notes

1 Report of the EU-Southern Mediterranean dialogue on higher education policies and programmes, launching event, 2-3 July 2012, Berlaymont, Brussels.

2 European Commission, Mobility of Researchers between Academia and Industry-12 Practical Recommendations, DG Research, EUR 22573.

3 http://ec.europa.eu/research/participants/portal/page/capacities?callIdentifier=FP7-REGPOT-2009-2

4 Loi d'orientation et de programme à projection *quinquennale* sur la recherche scientifique et le développement technologique, 23 février 2008.

5 Tunisia recently adopted some legal rules to change the status of some research centres now recognized as public establishments with a scientific and technical character.

6 The Science, Technology and Innovation Policy in Lebanon promotes the culture of responsibility and good performance.

7 Two projects with Syrian institutions were selected but have been frozen due to the current political situation in Syria.

8 Austria, Belgium, Czech Republic, Denmark, Finland, Hungary, Luxembourg, Portugal, Sweden.

9 The INCO-NET and BILAT schemes are two previous schemes targeting the Mediterranean region and financed under the international cooperation activities (INCO) programme of FP7 Capacities Programme.

10 OMC refers to a relatively new means of governance based on voluntary cooperation. The open method rests on soft law mechanisms such as guidelines and indicators, benchmarking and sharing of best practice. This means that there are no official sanctions for laggards. Rather, the method effectiveness relies on a form of peer pressure and naming and shaming, as no member state wants to be seen as the worst in a given policy area.

11 See MIRA website : www.miraproject.eu

12 The ILN has been developed by the International Cooperation Directorate of DG RTD to promote the exchange of best practices between the international cooperation projects financed under the INCO-NET, ERA-NET, BILAT and ACCESS4EU schemes.

13 See the conclusions of the Euro-Mediterranean Conference for Research and Innovation: an agenda for a renewed partnership, organized by the EC in April 2012 on the EC website.

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Euro-Mediterranean science and technology collaborations: a questionnaire survey

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Abstract. This chapter is based on the results of a questionnaire survey conducted in 2011 and addressed to a population of researchers, from both European countries and EU Mediterranean Partner Countries (hereafter referred to as MPCs), whose international collaborations/co-publications involved both the two geographical regions during the period 2005-2010. Four thousand three hundred forty (4,340) scientists filled in the questionnaire in 38 countries altogether (27 in Europe and 11 MPCs) with a balanced distribution of responses, i.e. 48% of the respondents working in Europe and 52% in the MPCs. The response rate (17%) is considered as satisfactory. Responses are heavily concentrated in larger countries: five countries, i.e. France, Italy, Spain, Germany and the United Kingdom, accounted for ¾ of the responses in Europe (74.7%), while in the MPCs the first five countries, namely Turkey, Israel, Tunisia, Algeria and Egypt, accounted for 82.6% of the responses. The main findings show that the asymmetry in collaboration, which was recognised as a source of tension and a burning issue in the 1970s and the 1980s, has developed into a more equal partnership and that international collaboration is a win-win process that benefits all partners with very significant outcomes in both regions. International collaboration addresses and involves very dedicated and goal-oriented individual scientists who seek to increase and improve their scientific capacities and develop greater international recognition.
Keywords. Partnership – Scientific Mobility – Surveys – Europe – Mediterranean region.

Les collaborations euro-méditerranéennes en Science et Technologie: une enquête questionnaire

Résumé. *Ce chapitre présente les résultats d'une enquête questionnaire menée en 2011 auprès d'une population de chercheurs travaillant soit dans un pays européen soit dans un pays méditerranéen partenaire de l'UE (dénommé PPM dans la suite du texte) dont les collaborations et/ou publications internationales associent des chercheurs des deux régions géographiques au cours de la période 2005-2010. Quatre mille trois cent quarante (4.340) chercheurs de 38 pays (27 en Europe et 11 PPM) ont rempli le questionnaire. Les réponses se répartissent de façon équilibrée entre l'Europe (48%) et les PPM (52%). Le taux de réponse (17%) est considéré comme satisfaisant. Ces réponses sont fortement concentrées dans les pays les plus importants : 5 pays (France, Italie, Espagne, Allemagne et Royaume-Uni) recueillent ¾ des réponses (74.7%) en Europe et les 5 premiers pays PPM (Turquie, Israël, Tunisie, Algérie et Egypte) concentrent 82.6% des réponses. Les principaux résultats montrent que l'asymétrie des collaborations, perçue comme une source de tension et de confrontation au cours des années 1970 et 1980, s'est transformée en un partenariat plus équilibré. Ils montrent également que la collaboration internationale est un partenariat gagnant-gagnant qui bénéficie à l'ensemble des parties prenantes et produit des résultats significatifs autant en Europe que dans les PPM. La collaboration internationale concerne et implique des chercheurs déterminés en quête d'un accroissement qualitatif et quantitatif de leur production et capacité scientifiques et d'une plus grande reconnaissance internationale.*
Mots-clés. *Partenariat – Mobilité scientifique – Enquêtes – Europe – Région méditerranéenne.*

I – Method of the survey and questionnaire sample

A questionnaire was organized in order to catch important features that allowed us to investigate the relation between research collaborations and professional trajectories, i.e. stays abroad for post-docs and periods of work out of the country. It aimed also at analysing the international collaborations based on the background of the respondents, particularly in relation to their

educational path, diplomas, as well as their disciplinary track. It also aimed at analysing aspects related to their professional data (their affiliation, scientific context, etc.) in order to understand, confirm or dismiss the possible specificity of countries in the scientists' involvements in international cooperative research schemes or projects.

1. The questionnaire

The web questionnaire survey was organized to cover the following aspects:

- professional data: institutional affiliation, name and country of the institution, country of birth, nationality and residence, age, gender, field of scientific activity, professional position;
- data on the lab or department the respondent belongs to: type of institution, lab budget, origin of funds in the lab budget (year 2009);
- time devoted to activities such as teaching, research, administration, consulting or others;
- publication language: principal and secondary language of publication;
- stays abroad for studies and post-docs, countries of these stays, time of residence abroad, reasons for choosing these countries, shorter stays abroad and nature of these stays: training, sabbatical, employment, field work, etc.;
- foreign collaborations and co-publications with foreign colleagues, type of collaborations and co-publications;
- collaboration framework (personal, institutional, bilateral, multilateral, etc.), most important countries involved in collaboration, type of research developed in these collaborations;
- permanence of the linkages with foreign colleagues and how these contacts were initiated;
- collaborations through EU-funded projects;
- opinions on the drivers and motivations of these international collaborations, on the main difficulties to collaborate/co-publish with foreign scientists, and on the expected outcomes;
- responses to calls for proposals and funding involving international scientific collaboration. For the last call of proposals/funding obtained: organization promoting the call, promoters of the project, participation in distribution of tasks and budget. Main difficulties in getting involved in the project and contribution to the project. Motivations to participate in an international call for proposals/funding;
- opinions on the state of research in the country and on the reasons that may limit participation in international scientific calls for proposals;
- some personal data on spouses or husbands (aimed at understanding the family reasons that may influence international collaborations).

2. The sample

The sample was built on the basis of a query on the Web of Science, selecting co-authored articles from 2005 to 2010 and involving authors from a European country, on the one hand, and from the Mediterranean Partner Countries (MPCs) on the other hand. A total of 36,624 addresses were selected, out of which 11,900 addresses appeared as non-valid (machine response from the email daemons). Thus, the 24,724 remaining addresses were considered as valid, and invitations were sent to each of them. However, to allow non-invited but interested scientists to fill in the questionnaire, additional invitations were programmed on demand on the survey site. But, due

to technical difficulties, this feature did not work properly and a second and identical survey was launched some days after the first one with a free access.

Consequently, this open survey reached a lot of interested people, some of them declaring that they live in countries out of the targeted regions. These responses were eliminated, except those coming from nationals of Europe and MCPs countries working in institutions outside the region at the moment of the survey.

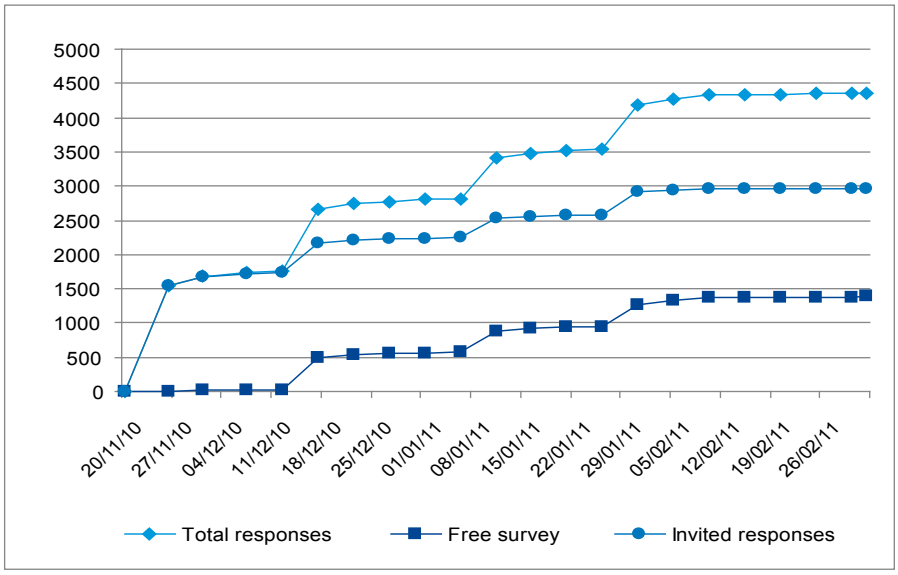

Figure 1. Responses to the survey.

The survey was circulated over a stretch of 15 weeks (approximately 4 months) from November 21, 2010 to March 6, 2011. Three reminders were sent. The following graph shows that each reminder produced a significant increase in responses during the first four to five days following the reminders. Amazingly, the increase in responses could be observed in the same proportions in the invitation-based survey where potential respondents were directly approached and in the free survey where potential respondents could not be directly stimulated by the reminders. That probably means that the reminders were transferred by targeted scientists to colleagues who were not directly invited (Fig. 1).

3. The response rate

The sample consists of all valid questionnaires fully completed. With 4,340 scientists having filled in the questionnaire (48% working in Europe and 52% working in the MPCs), the number of responses can be considered as satisfactory. Calculated on the number of valid addresses, the response rate reaches 17% of completed responses. Considering the time required (from 30 and 45 minutes) to fill in the questionnaire, and the fact that the e-mail addresses collected through the Web of Science could reach people who were no longer interested in research and collaboration, also the rate of responses is considered to be good.

Despite a satisfactory response rate, the results of this survey based on an uncontrolled sample cannot be deemed representative of the targeted population. However, the characteristics of the group (as presented below) show a fair distribution among the countries according to their respective size, and reflect more or less their level of scientific development and their geographical

and historical proximity. Not surprisingly, more respondents come from the most scientifically developed countries. Likewise, the repartition of respondents in terms of research areas and gender, for example, is more or less in line with the characteristics of the targeted populations and can be interpreted basing on different histories and states of scientific development in the respective countries.

II – The surveyed population

1. The countries

A. Country of work of respondents

The survey was designed to include all EU countries and all partner countries of the EU in MENA countries (i.e. all countries with a coastline on the Mediterranean, plus Jordan). The analysis of the survey is based on the country where the institution of the respondent is affiliated, not on his/her nationality or country of origin. As mentioned early, 4,340 researchers/scientists filled in the questionnaire in 38 countries altogether (27 in Europe and 11 MPCs)[1].

As expected, larger countries had the highest number of responses. As seen in Figure 2, five countries, i.e. France, Italy, Spain, Germany and the United Kingdom, accounted for ¾ of the responses for Europe (74.7%) while in the MPCs (Fig. 3) the first five countries, namely Turkey, Israel, Tunisia, Algeria and Egypt, counted for 82.6% of the responses.

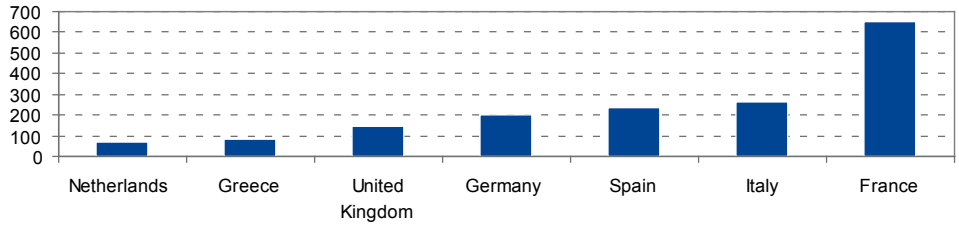

Figure 2. The main European countries where the responding scientists work (more than 60 responses).

The main scientific European countries are present among the 5 first countries of the survey but not in their order of importance. Regarding the number of researchers in full-time equivalent, for the year 2007, the international statistic database (UNESCO and EUROSTAT) ranks Germany first (290,883), followed by the United Kingdom (261,406), then France (215,755), Spain (130,986) and Italy (96,303).

The same international statistical sources (UNESCO and EUROSTAT) give data for the same indicator (researchers in full-time equivalent) only for the main scientific countries of the region (apart from Israel for which no indicator is given). According to these data, the main scientific countries in the MPCs are, by decreasing order, Turkey (49,668), Egypt (49,363), Morocco (19,972), Tunisia (15,833) and Algeria (5,593). These countries are among the main respondents to the questionnaire but, the same as for European countries, not in order of importance. Thus, the order of importance of activity in the Region is not the same as the overall ranking of countries when comparing their research potential.

As seen in Figure 2, France is by far the main country of respondents. No bias in favour of France can be found in the way invitations were done. As explained before, the survey sample was not drawn through institutions but by interrogating the Web of Science on co-publications that are

mainly written in English. In the survey. Institutions of France represent 15% of all the respondents' institutional affiliations, followed by institutions of Italy (6.3%), Spain (5.6%), Germany (4.7%) and UK (3.5%). Greece has a proportionally high participation (2%) compared to the size of its scientific community.

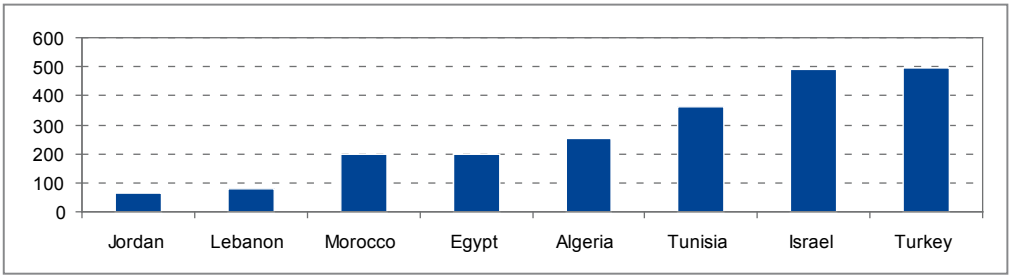

Figure 3. The main MPCs where the responding scientists work (more than 60 responses).

On the side of the MPCs, the two main countries of respondents' institutions are Turkey and Israel (nearly 12%), followed by Tunisia (8.6%) and Algeria (6%). Despite the non-strict respect of their ST ranking based on ST public indicators, the main scientific countries in the two geographical zones provide the bulk of the answers and represent altogether 78.8% of the responses.

Table 1. Other countries where responding scientists work (below 60 answers).

		Number	%			Number	%
European countries	Portugal	40	2.0	European countries	Irish Republic	7	0.3
	Sweden	38	1.9		Malta	4	0.2
	Switzerland	25	1.2		Slovakia	3	0.1
	Poland	21	1.0		Latvia	1	0.0
	Romania	17	0.8		Lithuania	7	0.0
	Hungary	14	0.7	MPCs	Palestinian Territories	23	1.1
	Norway	11	0.5		Syria	14	0.6
	Slovenia	10	0.5		Libya	2	0.1

B. The country of nationality and mobility at the moment of the survey

Four hundred eighty-one respondents (11.5%) declare a first nationality different from the country where they are settled. France, Germany, the United Kingdom, Israel and Turkey have the highest number of respondents who declare to be nationals from another country.

Table 2. Countries counting the highest number of respondents declaring a first nationality different from the country where they are settled.

Country of residence	MPCs & European first nationalities	Other first nationalities	% on the total of respondents
France	113	10	19.2%
UK	34	9	29.9%
Germany	32	6	19.6%
Israel	29	17	9.3%
Turkey	10	6	3.2%

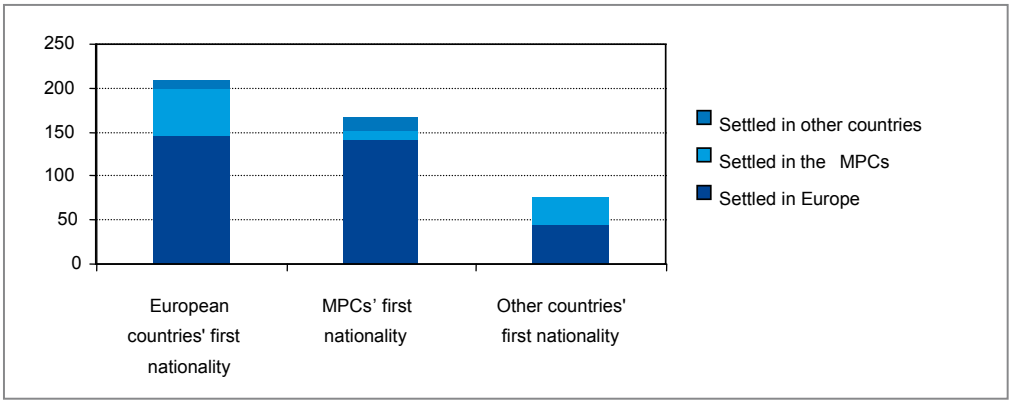

Figure 4. Residence of respondents having a first nationality different from the country where they are settled.

Among the said 481 respondents, 162 are dual nationals, 151 of which declare nationalities of countries belonging to the two geographical regions. Dual nationals represent 3.9% of the sample. These data prove that at least 7.6% of the respondents were migrants when they answered the questionnaire. As no further question was asked on how they acquired their first nationality, i.e. if it had been received at birth (from parents with different nationalities, birth in a foreign country, etc.) or if it was the result of another type of acquisition (by naturalization after migration, for instance), 3.9% of dual nationals obviously hide an unknown proportion of previous migrants.

Consequently, the diaspora at the moment of the survey can be assessed to range between 7.6% and 11.5%. Compared to the available sources (Ackers and Gill, 2008; Dumont *et al.*, 2010; Docquier and Marfouk, 2006; Docquier and Rapoport, 2007), this high level of diaspora proves again that scientists and PhD holders are more mobile in their careers than the average of highly qualified migrants. Comparable results (9.3%) were found in a similar survey concerning international scientific collaborations between Europe and Latin American countries (Eulaks).

2. Age and gender of respondents

A. Age

Almost two thirds of the respondents are between 40 and 59 years (61.7% for the entire group, 62.6% for the European group and 60.9% for the MPC one), the peak being in the age group of 40-49 years (33.8% for the entire group, 32.9% for the European group and 34.7% for the MPC one). Only 21.9 % of the researchers in the whole sample are below 40 years of age (20.5% for the European group and 23.2% for the MPC one). Altogether, there are no marked differences in age repartition between respondents from European countries and the MPCs.

The surveyed population is however older than the overall population of scientists in both Europe and the MPCs (UIS, 2009). This would tend to confirm that researchers in the middle of their career (40 years and older) are more likely to collaborate internationally than those who are in early or late stages of their career (NSF, 2009).

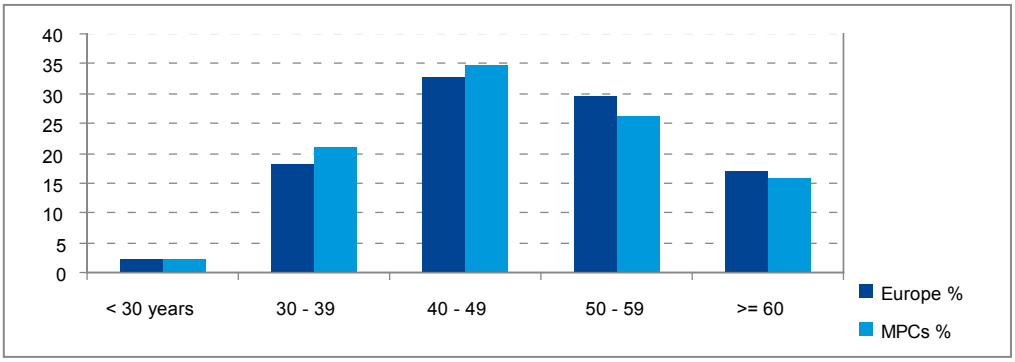

Figure 5. Age of respondents.

B. Gender

The results about age and gender repartition are quite comparable to those obtained in a similar survey run in Latin America and Europe in 2009. Women represent a quarter of the sample, evenly distributed between the two geographical zones where they represent 24.8 and 24.6 of the respective groups. Whilst the participation of women in ST has increased in the world during the last decades, only five countries have achieved gender parity[2].

Table 3. Gender.

	Europe		MPCs	
	Frequency	**Per cent**	**Frequency**	**Per cent**
Male	1,496	75.2	1,631	75.4
Female	493	24.8	533	24.6
Total	1,989	100.0	2,164	100.0

According to available data:

- women represent slightly more than a quarter of researchers (29%) worldwide (UIS, 2009);
- in the MPCs where this repartition is known, the average of women in research fluctuates from 18.8% in Palestine to 47.4% in Tunisia (UIS, 2009);
- in the EU (27 countries) 30% of researchers are women (OST, 2008).

A recent study also indicates that female scientists are less likely to collaborate internationally than their male counterparts (NSF, 2009). Thus, based on a longitudinal survey that follows recipients of research doctorates from U.S. institutions until age 76, NSF found that 30% of them collaborate internationally (23% female and 33% male). Assuming that this behaviour is likely to be the same in the EU and the MPCs, it is concluded that the participation of women in this survey is not very far from the average participation of women in international ST activities in the MPCs and EU countries.

3 Respondents' professional activities

A. Type of institutions where respondents work

As shown in Figure 6, the largest part of the surveyed population works in universities: 81% of the whole sample is split between 72.6% for the European scientists and 88.7% for their MPCs' colleagues. Activities in research centres are more frequent in Europe than in the MPCs.

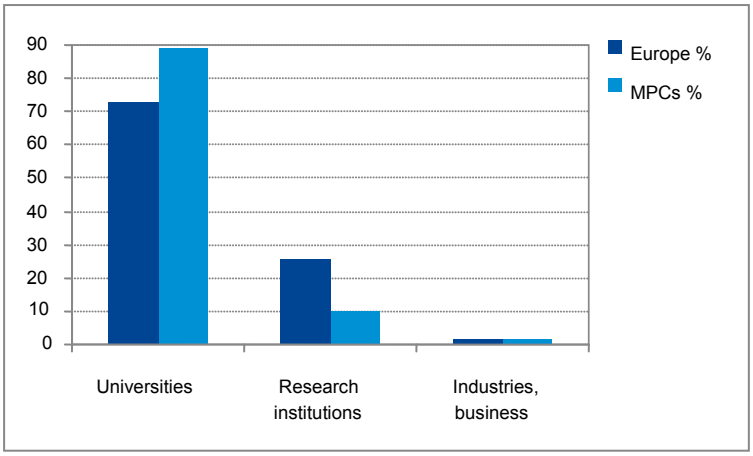

Figure 6. Types of institutions where respondents work.

Overall, very few scientists who answered the questionnaire work in business or industry. This is supported by the fact that 93.7% of the respondents work in the public sector (slightly more in Europe, 96.2%, than in the MPCs, 93.3%).

B. Professional status

A very large majority of the respondents declare they are professors (full, associate or assistant). Relatively to the gender repartition in the survey, males are slightly dominant in this position. In the European male group, 64.3% are professors against 54.4% of their female colleagues and, in the MPCs, 86.4% of the group of males hold professor positions while their women colleagues who do the same are 80.9%.

Table. 4. Professional status.

Position	Europe		MPCs	
	Number	%	Number	%
Professor (Full/Associate/Assistant)	1,159	61	1,765	85
Full time researcher	544	29	208	10
Post-doctoral researcher	130	6,9	61	2,9
Doctoral or Ph.D. student	41	2,2	42	2
Total	469	100	1,405	100

C. Administrative position

As seen in Table 5, the number of heads of laboratory is proportionally slightly more important in EU countries (28%) than in the MPCs (22.6%) and, conversely, the frequency of high administrative positions, i.e. deans of faculty, directors, heads of department, is proportionally higher in the

MPCs (17.8%) than in Europe (11.5%). The latter may be explained by the relatively small size of departments in most MPCs' universities compared to European ones.

Table 5. Administrative status.

Administrative position	EU		MPCs	
	Number	Per cent	Number	Per cent
Dean of faculty / Director	12	0.6	55	2.5
Head of department	217	10.9	331	15.3
Head of laboratory	557	28.0	489	22.6
Other/None	1,203	60.5	1,288	59.5
Total	1,989	100.0	2,163	100.0

About the permanency of their position, 92% of the total sample has a permanent position or a long-term contract. This result is also in line with the fact that close to 90% of respondents work in the public sector.

D. Nature of scientific activities

Research is the main activity of the respondents. They spend more time on research than on teaching and other activities (e.g. administration and consulting). For almost 60% of the whole group (58.5), research occupies at least 50% of their working time while less than 20% of respondents (17.1%) devote 50% and more of their time to teaching. European scientists working more numerously in research centres than their MPCs' colleagues, generally tend to spend more time on research, especially those who devote more than 60% of their time to this activity (31.7% in Europe against 26.6 in the MPCs). In both geographical regions, the group declaring to have no teaching at all is not negligible: altogether, 14.7% of the respondents declare they spend 0% of their time on teaching (19.4% in Europe and 10.3% in the MPCs).

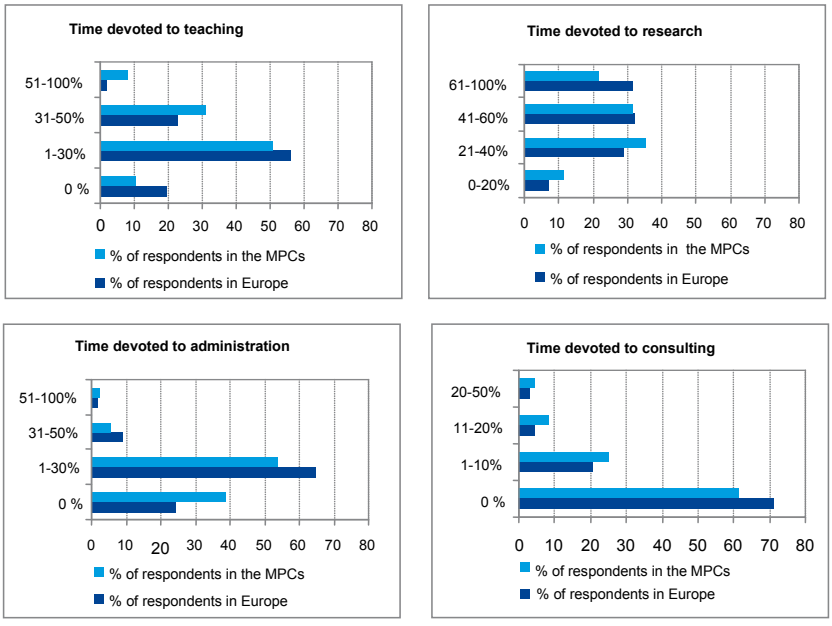

Figure 7. Percentage of time devoted to research, teaching, administration and consulting.

The time devoted to administration is equally shared between the two regions and the large majority of the respondents (90.7%) devote less than 30% (between 0 and 30%) to this activity (89% in Europe and 92.4% in the MPCs).

E. The scientific disciplines

The top research area for ST collaboration between the EU and the MPCs among the respondents is Engineering and Technology (and Energy) with 16.5% of the total of responses (14.5% in Europe and 18.2% in the MPCs). As observed earlier through bibliometric studies (Waast *et al*., 2010), also in this surveyed population this is an area of over-specialisation for the MPCs.

The second preferred field of research collaboration is Biology and Environmental Sciences (and Biotech) (14.8%). For the other fields of research, one can observe a relative symmetry in responses between Europe and the MPCs and the ranking of disciplinary fields. Social and human sciences are the weakest domain of collaboration with, altogether, no more than 5% of the respondents working in Social Sciences and Humanities, Economics and Business Administration as well as Psychology and Behavioural Sciences.

The extremely low figures in SSH reflect the Web of Science bias which was the source of addresses used in this survey. The very small number of responses in psychology is however confirmed by the quasi-absence of this field in Maghreb (Waast *et al*., 2010), and very low numbers of publications in Middle East countries (Zebian *et al*., 2007).

Table. 6. Field of research.

	Europe		MPCs		Total	
	Number	%	Number	%	Number	%
Engineering & Technology (and Energy)	289	14.5%	394	18.2%	683	16.5%
Biology and Environmental Sciences (and Biotech)	298	15.0%	315	14.6%	613	14.8%
Physics	209	10.5%	241	11.1%	450	10.8%
Chemistry	243	12.2%	199	9.2%	442	10.7%
Biomedical research	248	12.5%	191	8.8%	439	10.6%
Mathematics & Computer Sciences	210	10.6%	207	9.6%	417	10.1%
Earth, Ocean, Atmosphere	161	8.1%	157	7.3%	318	7.7%
Agriculture & Veterinary Sciences	129	6.5%	170	7.9%	299	7.2%
Clinical Medicine (surgery, pharmacology, dentistry)	120	6.0%	162	7.5%	282	6.8%
Social Sciences and Humanities (including Archaeology and Architecture)	32	1.6%	55	2.5%	87	2.1%
Economics and Business Administration	29	1.5%	35	1.6%	64	1.5%
Psychology & Behavioural Sciences	20	1.0%	36	1.7%	56	1.4%
Total	1,988	100%	2,162	100%	4,150	100%

III – The history of mobility prior to international collaboration

1. Studies and post-doc abroad

International mobility for studies is much more frequent in the MPCs' group than in the European one (respectively 40% and 14.9%). Conversely, the post-docs are less frequent in the MPCs than in Europe and, when done, are mainly abroad (69% for the MPCs' respondents and 29% for their European colleagues) (Fig. 8).

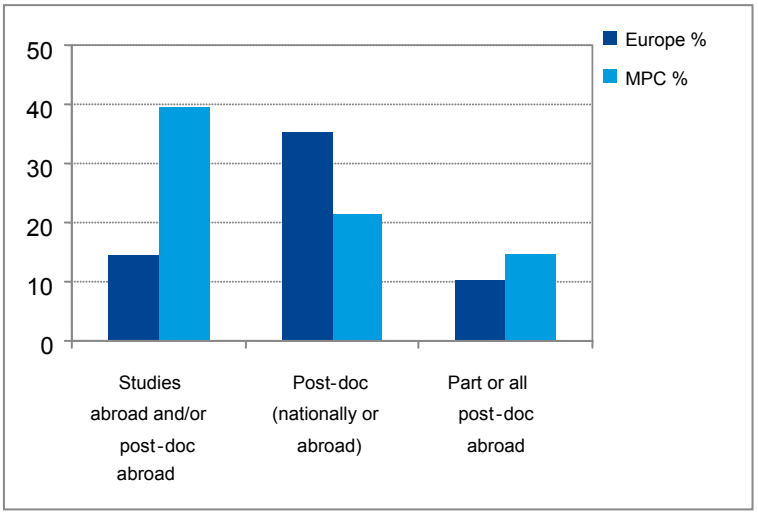

Figure 8. Percentage of respondents having studied abroad or having achieved a post-doc (nationally or abroad).

2. Main reasons for doing studies and post-doc abroad

The main reasons for going abroad for studies and post-doc are almost the same in the two regions (Fig. 9). By decreasing order they are: "Scientific expertise developed in the host country" followed by the "Reputation of the host country/institution" for the two categories and the two regions. The determinants to go abroad for a post-doc slightly diverge, between the EU and the MPCs, on the presence of funding from the host country that comes in third position for the MPC scientists, followed by the presence of scientists from the host country having visited their country (this reason comes in third position for determinants of the post-doc of European scientists). Nevertheless, on a cumulative basis, financial reasons are the most important (with 58.4% of the motivations given to study abroad and 68.3% for the post-docs).

Table 7. Reasons for studying and doing a post-doc abroad linked to funding availability.

	MPCs	Europe	Total
Studies	61.7%	50.3%	58.4%
Post-doc	71%	65.4%	68.3%

For the whole sample, the least frequent reasons for going abroad are: "Members of my family living in the host country" (9.8% for studies and 6.2% for post-docs) followed by "Scientists from my country settled in the host country" (6.6% for studies and 5.2% for post-docs).

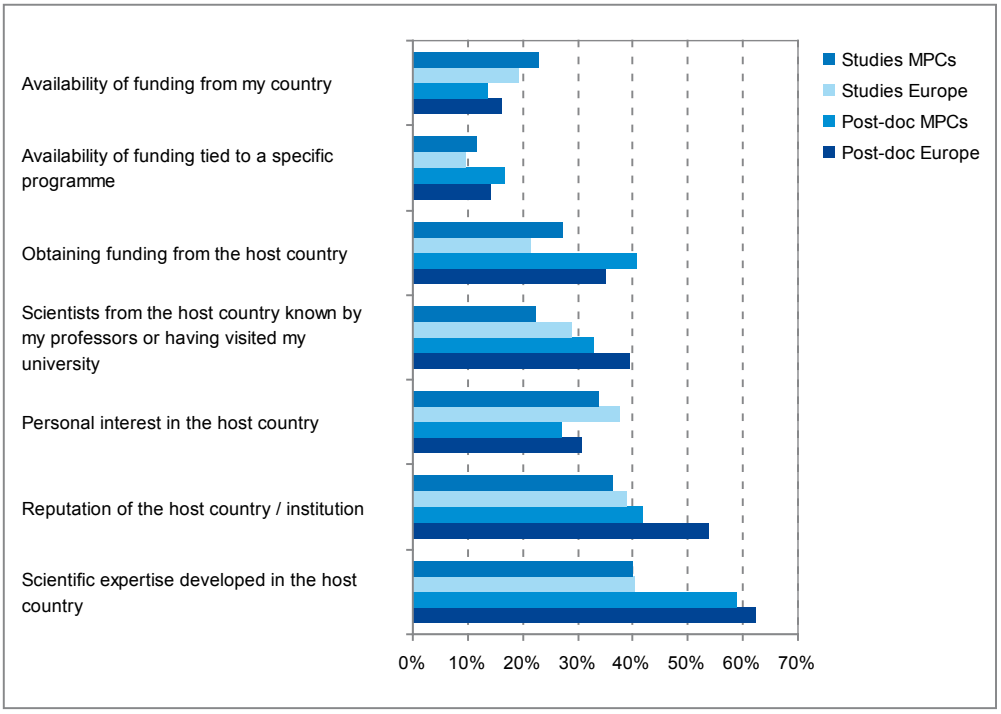

Figure 9. Main reasons for doing studies and post-doc abroad (reasons gathering more than 15% of responses on the whole sample).

In line with the fact that reputation and expertise are the prime movers as motivations for going abroad, policy/strategy do count a lot in the answers. These motivations (i.e. availability of funding, exchange programmes and specific programmes devoted to studies abroad) account for 61% of answers of European-based researchers and 65% of the MPCs for studies and even more for the post-docs motivated by a policy-related reason in 79.9% of the cases for the European-based researchers and 75.4% for their MPCs' colleagues.

IV – Research collaborations

1. With whom do they collaborate?

For 69% of the respondents (with no difference in the two sub-groups), the preferred partners are the "colleagues from the institutions of the countries where they stayed abroad". The second preferred groups of partners, in a more significant proportion for European scientists (respectively 58.0% and 65.5%), are "Scientists from other countries they met only at scientific conferences" and "Foreign colleagues visiting or trained in their institution or country". Similarly, foreign students are more important partners to collaborate for European scientists (52.9%) than for MPC scientists (21.3%), taking also into account that European scientists are more likely to have foreign students than MPC scientists. Conversely, foreign thesis directors tend to be more often the preferred foreign partners for MPC scientists (43.0%) compared with their European colleagues (20.3%), the latter having most often the choice to stay home for their PhD thesis. "Scientists from their country living abroad" come at the end of the list of preferred partners with 28.2% for Europe and 24.9% for the MPCs, respectively (Fig. 10).

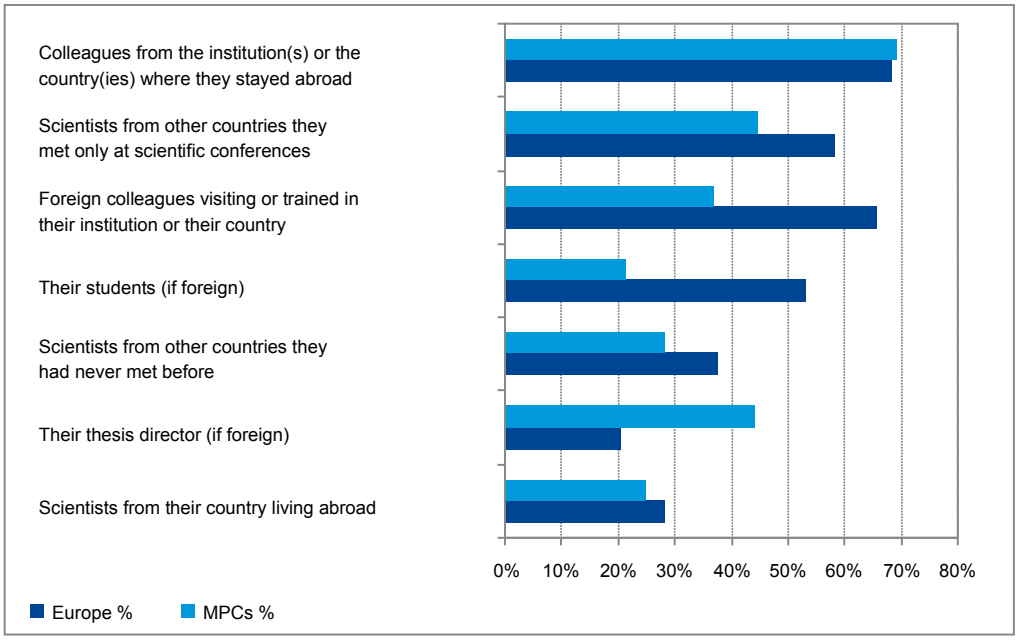

Figure 10. Preferred foreign partners to collaborate with.

When coming to the question of continuing collaboration today, the three top preferred partners are almost the same but at a lower level. “Colleagues from the institutions of the countries where they stayed abroad” come first with a global rate of 42% (split between 44.8% for European and 39.5% for MPC partners). “Foreign colleagues visiting or trained in their institution or their country” take the second place with a general rate of 31.7% but with a large gap between the two geographical regions: 42.5 for Europe and 21.80 for the MPCs. “Scientists from other countries they met only at scientific conferences” rank third with 30.6% of responses (36.5% in Europe and 25.3 in MPCs). Over one third (35.1%) of the European sample still collaborates or co-publishes with their foreign students, while 18.9% of the MPC group still collaborates or co-publishes with their foreign thesis director.

2. Drivers of collaboration

When asked about the drivers to collaborate internationally, a quite homogeneous set of answers is evident and almost all of the proposed reasons were considered as “important” or “major” for more than half of the respondents (Fig. 11). The prime reasons to collaborate internationally are directly linked to advanced scientific interests: “Access to new and interesting scientific topics” for 80.2% of the entire group (79.4% in Europe and 81% in the MPCs), followed by the “Necessity to improve the impact and visibility of one’s research” for 67% of the group (61.5% in Europe, 72.5% in the MPCs). Not surprisingly, “Access to better equipment and working conditions” is a more important reason for the MPCs with 74.5% than for Europe with 54.9%. The “necessity to gain access to research subjects, such as natural or social phenomena, located in given areas” gathers the least interest (in absolute numbers) in the surveyed population; nevertheless, the interest remains quite important and 44% of researchers in the MPCs and 38.6% of their European counterparts declare that it is either “important” or “major” for them.

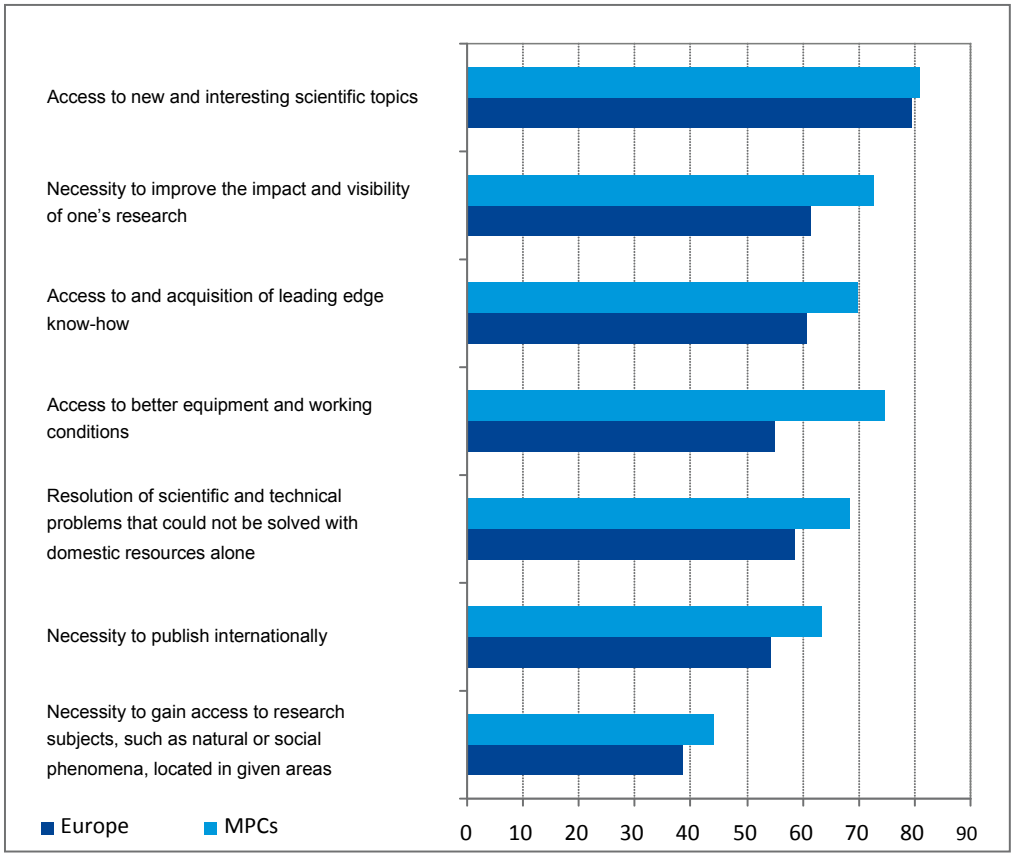

Figure 11. "Important" and "Major" drivers of collaboration (in %).

3 Main difficulties in collaborating at international level

In an attempt to characterise the main difficulties related to international collaboration, a set of reasons were proposed as "difficulties". Figure 12 shows the difficulties when taking into account the values "moderately important", "important" and "major". The most severe difficulty, affecting more than 80% of the respondents in the two regions, is the "lack of collaborative programmes" followed, for the MPCs researchers, by the problems related to "intellectual property" (78.8%). Inter-institutional problems remain a difficulty for 58.9% of the whole sample (more important in the MPCs with 66.1% than in Europe with 51.7%), as well as the amount of time required for the achievement of common publications (51.9% in Europe and 56.9% in the MPCs). The lack of common research interests is perceived as a problem by 58.4 of the MPC respondents and by only a third of their European colleagues (33.3%).

4. Results and outcomes of international collaborations

A series of outcomes were proposed to the surveyed scientists for them to select everything that applied to their specific situation (Figures 13 and 14).

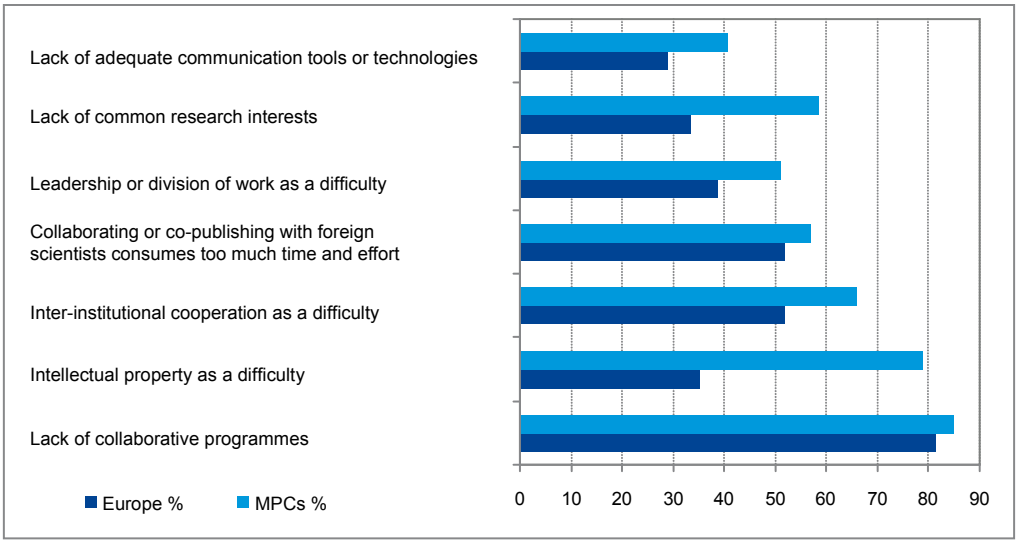

Figure 12. "Moderately important", "important" and "major" difficulties in collaborating or co-publishing with foreign scientists (in %).

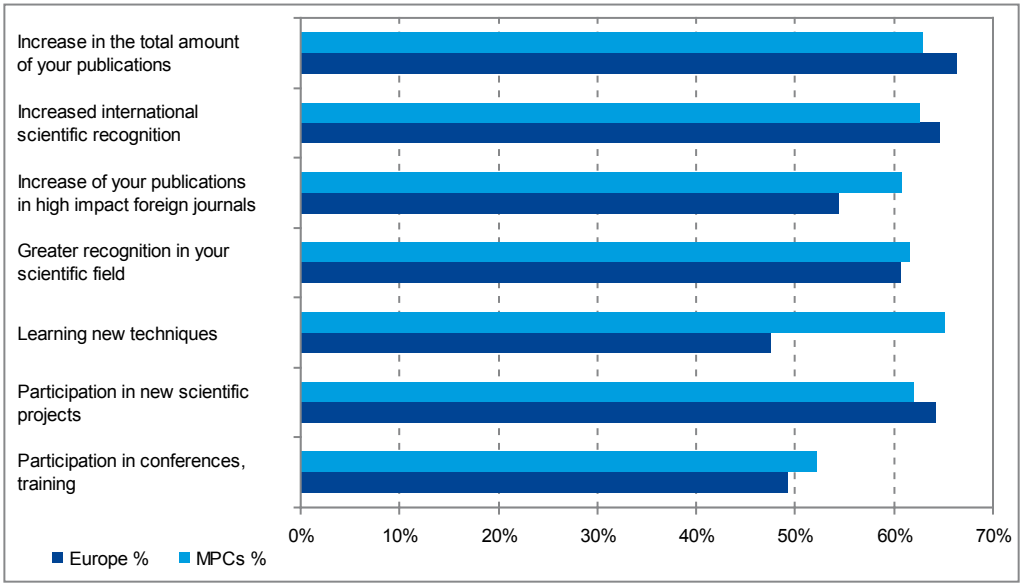

Figure 13. "Important" and "major" outcomes of collaboration gathering an average of at least 50% of responses.

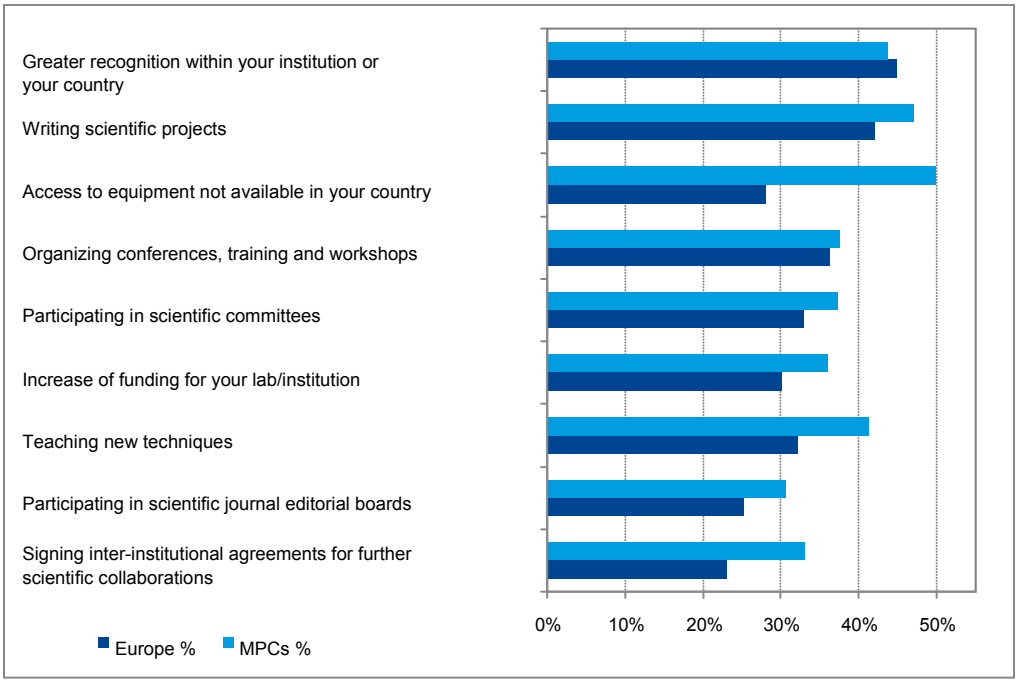

Figure 14. "Important" and "major" outcomes of collaboration gathering an average of less than 50% of responses.

Although the relative importance of many of the proposed outcomes is not very significantly different for MPCs' scientists and their European colleagues, some trends could be observed. The outcomes benefiting slightly more European scientists are more related to their scientific visibility: "increase in the total amount of their publications" with 66.4% (the MPCs ranking second with 62.8%), "increased international scientific recognition" (64.6%), "participation in new scientific projects" (64.2%) and "greater recognition within their institution and their country" (44.9%). For all the other proposed outcomes, the results show a more positive level of satisfaction in the MPCs and the difference is quite important for the ones offering a more tangible benefit as "learning new techniques" which ranks first in this region with 65% (at the 7th place in Europe with 47.4%) and "access to equipment not available in their country" which ranks eighth with 50% (14th for European scientists with 28%).

5. Impacts of collaboration on funding

International collaborations have resulted in increased funding for laboratories or institutions in less than 20% of the cases (apart from 22.5% of European labs who benefited from European funding). The most common increased funding for the two groups comes from their national institutions (20.4% in Europe and 18.2% in the MPCs). The second increased funding source for the MPCs originates in foreign countries (17.5%) and the third comes from their own institution (15.7%). Private funding from foreign or national source accounts for less than 5% for the entire group and increased funding is even less likely to come from Arab funding (less than 2%).

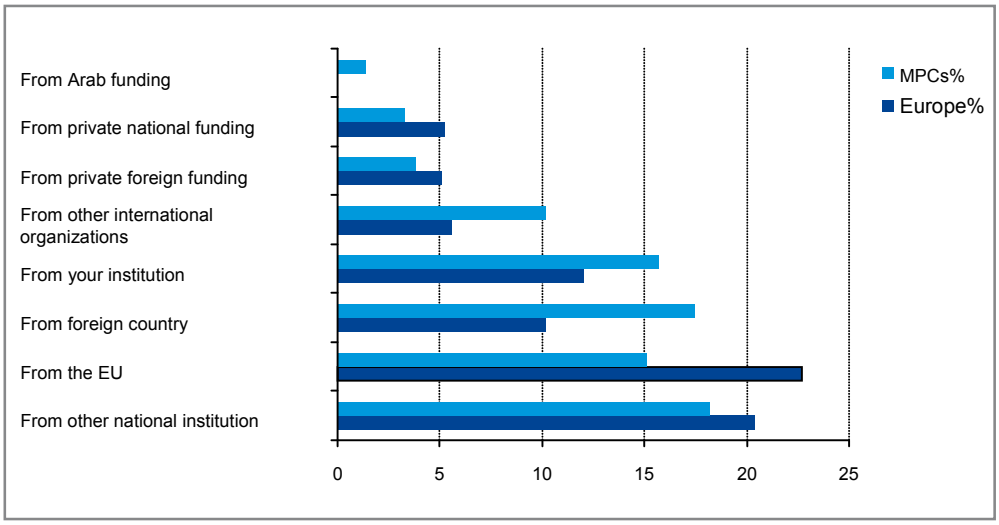

Figure 15. Origin of increased funding for labs/institutions.

Europe is the main geographical origin of funding for both regions (around 50%). The second half of the funding is more or less evenly split between the other sources (Mediterranean countries, international organizations, North American institutions, private funding and others). MPCs' researchers receive slightly more funding from Mediterranean countries and international organizations while private funding benefits slightly more European researchers.

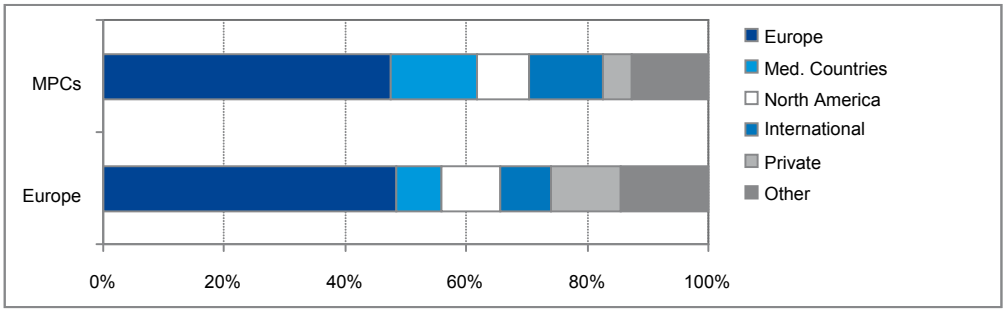

Figure 16. Geographical distribution of funding agencies.

6. Participation in EU-funded programmes involving international collaborations

More than one third of the total surveyed population participated in an EU-funded programme (37.2%). Not surprisingly, researchers working in Europe did participate more than their partners in the MPCs (46.7% and 31.1%, respectively). Nevertheless, one can observe an increase in participation between FP4 and FP7 for both sub-groups in the two geographical areas. Europe increased its participation from 22% in FP4 to 56% in FP7 (i.e. an overall increase of 154%, while the MPCs enhanced their participation from 8% to 56% (i.e. almost 600% of overall increase). It is also worth mentioning that more than half of the two groups of the surveyed population participated in the FP7 (56.5% for the European group and 55.7% for the MPC group).

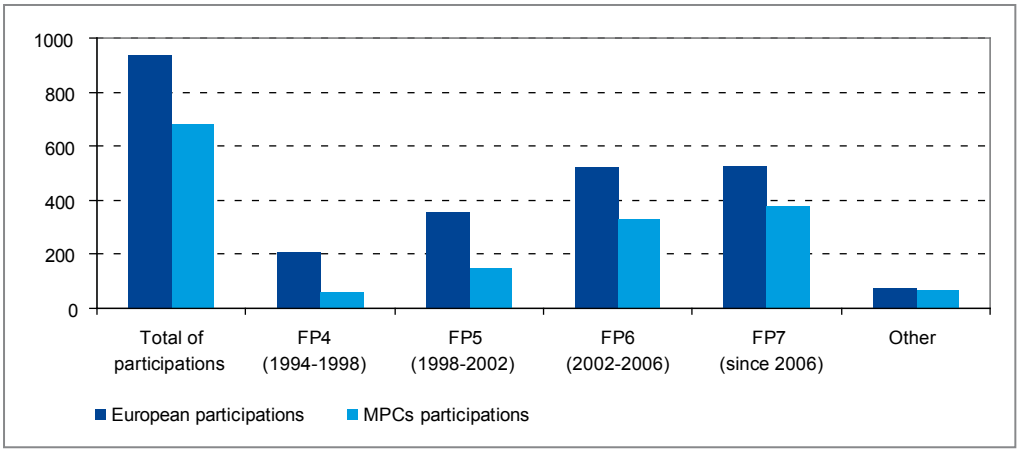

Figure 17. Participation in different European Frame Programmes.

Half of the respondents from Europe and a third of their MPCs' colleagues participated in more than one Framework Programme.

Table 8. Number of participations in EU funded programmes.

	EU		MPCs	
	Count	**% EU**	**Count**	**% MPCs**
1 programme	466	49.8	461	67.9
2 programmes	266	28.4	144	21.2
3 programmes	128	13.7	62	9.1
4 programmes	70	7.5	12	1.8
5 programmes	5	0.5	-	-
Total	935	100.0	679	100.0

V – Calls for proposals involving international collaboration

1. Participation in calls for proposals

More than half of the surveyed population (55% of the entire group) did apply for international calls for proposals involving international scientific collaboration. Scientists working in Europe participated more than their partners from the MPCs (61% and 49.4% respectively). A number of reasons were suggested to characterise motivations to participate in an international call for proposals (Fig. 18). Almost all the motivations were considered as "important" or "essential" by the majority of the respondents in the two regions, apart from "To reach new technologies / competences not available in my country" which, not surprisingly, is the last one given by people working in Europe (44.8%) but ranked second for people working in the MPCs (67%). In both regions, money was the most important criterion: "access to international funding" (Europe 80.1%, LAC 79.7%). Globally, the proposed motivations are more explicitly acknowledged in the MPCs (between 52% and 79.7% of positive opinions expressed for all proposed motivations); nevertheless, motivations linked to visibility, mobility and networking rank very high in both regions.

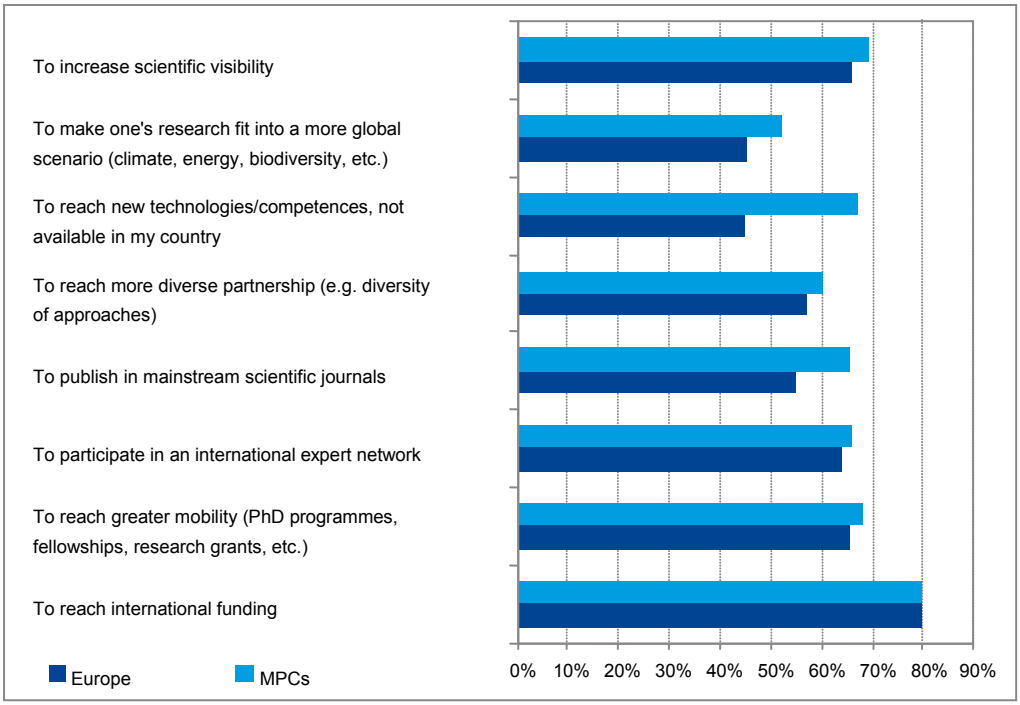

Figure 18. "Important" and "essential" motivations to participate in international calls for proposals.

Along with the motivations, we asked about the difficulties that restrict the scientists' involvement in such projects (Figures 19a and 19b). The limiting factors are not the same in the two continents but four reasons received more than 50% agreement as restrictive, very restrictive and crippling in both continents.

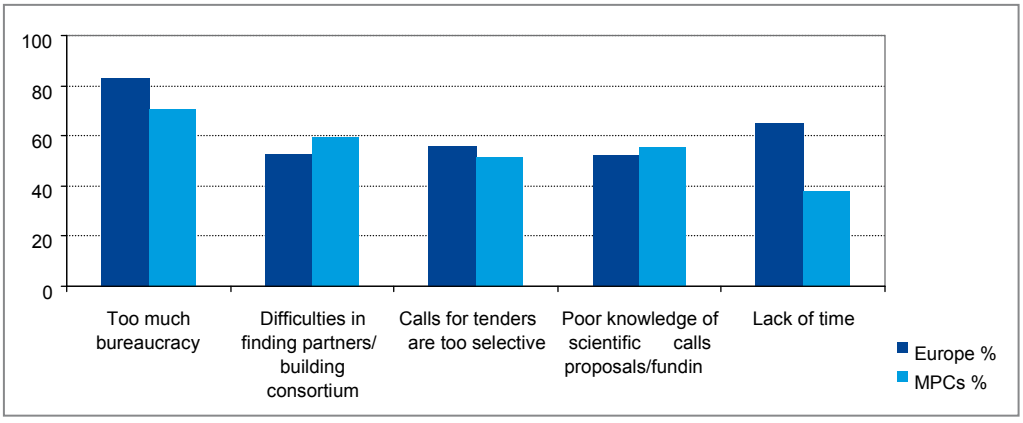

Figure 19a. Five main "restrictive", "very restrictive" and "crippling" limitations to participate in international calls for proposals.

The limitations linked to the administration of the projects, “too much bureaucracy”, are at the first position gathering between 70% of opinions in the MPCs and 83% in Europe, followed by “difficulties in finding partners/building consortium”, slightly more often expressed in the MPCs (60%) than in Europe (52%). Two proposed limitations, i.e. “My institution has not reached a sufficient scientific level” and “Problems linked to cultural differences and languages“, do not appear as very critical. Amazingly, except for the “lack of time”, which seems to be a more important limitation in Europe than in the MPCs, the two regional subsamples declare they are affected in almost the same proportion by the different limitations or constraints proposed to them.

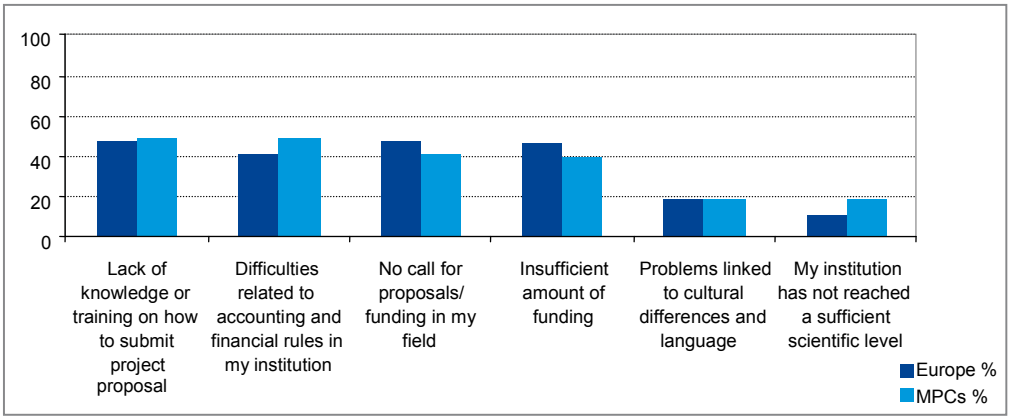

Figure 19b. The next “restrictive”, “very restrictive” and “crippling” limitations to participate in international calls for proposals.

A. Project management, roles and responsibilities

Although the MPC scientists participating in call for tenders are less numerous, once they are engaged in the project, their involvement shows a relatively symmetric participation compared to their European colleagues.

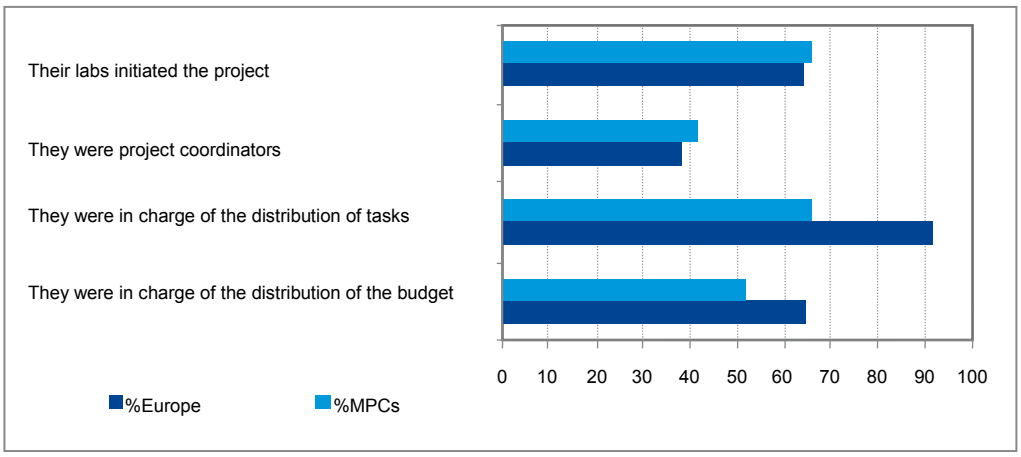

Figure 20. Respondents’ leading roles in the last project they participated in (alone or with partners).

The responses to the questions about the last project they participated in show that almost two thirds of the respondents (64.2% working in Europe and 66.1% of their MPCs' colleagues) declare that the project was initiated by their lab/institution alone or together with one or several partner labs (Fig. 20). Regarding their roles in the projects, once again the results show a similarity between the two groups with a predominant position for the MPC partners, the latter being proportionally more often coordinators than their European colleagues (41.9% and 38.7%, respectively).

Conversely, the proportion of scientists working in Europe is more important when it comes to be in charge of budget distribution where more than half of the participants (58.9%) belong to a laboratory or an institution that, alone or with partners, decides for the distribution of the budget (64.7% in Europe and 51.7% in the MPCs). The same occurs for the distribution of tasks where 91.7% of the researchers working in Europe belong to laboratories that decide (alone or together with partners) on the way tasks should be distributed, compared to 66.1% of their colleagues working in the MPCs. Nevertheless, these results tend to indicate that, on the whole, a more equal partnership in international collaborative projects is being practised between the North and the South of the Mediterranean Sea.

B. Involvement in projects

This generally high level of involvement is also reflected in the way the respondents rank their contribution to the project (Fig. 21). Close to half of the MPC group (48.5%) considers its contribution as "essential for the conduct of the project", while 40.2% of their colleagues from Europe have the same opinion. The very positive opinion of their participation in the project is almost the same in the two geographical zones when adding "essential for the conduct of the project" and "important for the progress of the project" (85.8% for the MPCs and 85% for Europe).

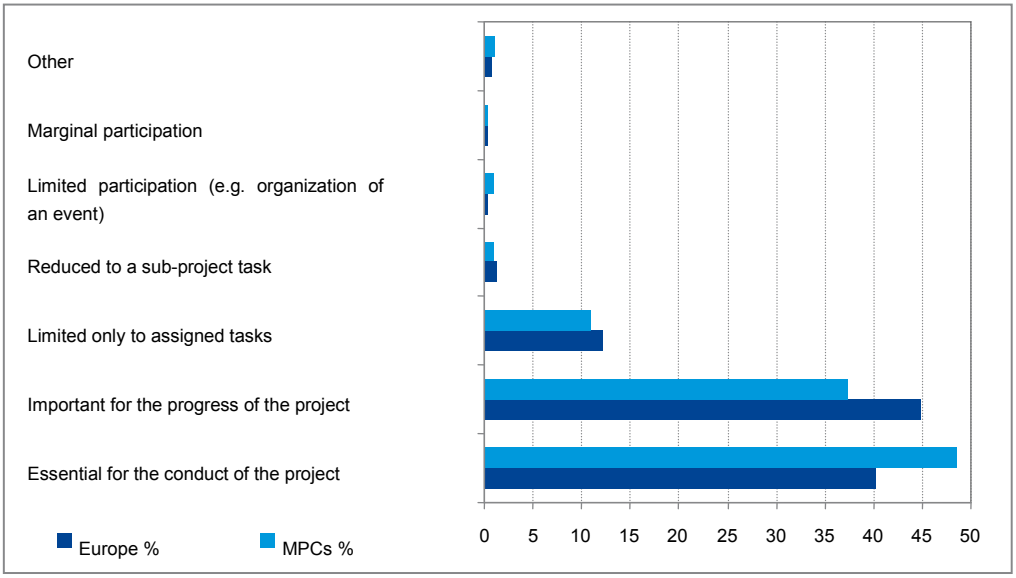

Figure 21. How do the respondents rate their contribution to the last project.

Similarly, a great majority of the respondents (85% for the scientists working in Europe and 83.8% of those working in the MPCs) consider that they were able to get involved as much as they wanted in this project.

VI – Conclusions

The main findings of this survey on international collaboration between the Mediterranean partner countries and EU countries are summarised below and developed more extensively in this concluding section:

1. The asymmetry of collaborations, which was recognised as a source of tension and a burning issue in the 1970s and 1980s, has developed into a more equal partnership.
2. The surveyed population is older than the overall population of scientists in both the MPCs and Europe. This would tend to confirm that researchers in their mid-career stages (40 years and above) are more likely to collaborate internationally than those who are in their early or late career stage.
3. The international collaboration is a win-win process that benefits all the partners.
4. The motivations and expectations related to participation in international calls for proposals involving scientific collaboration are very high, and the declared derived outcomes are very significant in both regions.
5. International collaboration addresses and involves very dedicated and goal-oriented individual scientists in all countries, scientists who seek to increase and improve their scientific capacities and develop greater international recognition.

The 4,340 scientists who answered the survey belong to quite homogeneous categories in the two regions. There are no marked differences in age and gender repartition between respondents from the MPCs and EU countries: in the two regions, the surveyed group is older than the overall scientific population and women represent close to a quarter of the respondents. The respondents work mainly in universities and in the public sector, and research is their main activity, i.e. they spend more time on research than on teaching and other activities such as administration and consulting.

The survey confirms the great mobility of scientists even prior to international collaboration, although with differences depending on the country and the region. At the time of the survey, between 7.6% and 11.5% of the surveyed population could be considered as being part of the ST diaspora (meaning that they are living in a country other than their country of nationality). Compared with the figures on high-skilled migrants reported today, this percentage is very high.

Scientific collaboration between the two regions is often the result of this mobility. Over 69% of the scientists have collaborated or published scientific papers with colleagues met during long stays abroad, and 50% did so with colleagues who were trained in or had visited their own institution. Nevertheless, these results clearly state the strong connecting role of scientific conferences, and more than half of the respondents have collaborated or co-published with “scientists from other countries they met only at scientific conferences” (58% of scientists in Europe and 44.7% in the MPCs).

The prime reasons to collaborate internationally are directly linked to advanced scientific interests: “Access to new and interesting scientific topics” for 80.2% of the entire group (79.4% in Europe and 81% in the MPCs), followed by the “necessity to improve the impact and visibility of one’s research” for 67% of the group (61.5% in Europe, 72.5% in the MPCs). While quite homogeneous between the two groups, the expectations are higher in the MPCs and more tangible effects are expected as “access to better equipment and working conditions” that motivates 74.5% of the MPC scientists against 54.9% of their European colleagues. On the other side, in the two regions the lack of collaborative programmes is perceived as the major constraint to collaborate internationally (more than 80% in the two regions).

The outcomes of collaborations are also many, not different in the two regions and directly linked to the professional improvement in knowledge and recognition of the respondents. Starting with the most important and by decreasing order, they are: “increase in the total amount of their publications” (EU 66.4%, MPCs 62.8%), “increased international scientific recognition”, (EU 64.6%, MPCs 62.6%), “participation in new scientific projects” (EU 64.2%, MPCs 61.9%) and “greater recognition in their scientific fields” (EU 60.7%, MPCs 61.6%). Nevertheless, some more tangible outcomes are more prized among the MPC scientists, such as “learning new techniques” (EU 47.4% MPCs 65.1%) and “access to equipment not available in their country” (EU 28%, MPCs 49.9%).

While a majority (55%) of scientists in the overall surveyed population responded to calls for proposals involving international scientific collaboration, the extent of this participation differed clearly between the two regions: 61% for scientists working in EU countries, 49.4 % for those working in the MPCs. However, analysing the scientists’ participation in calls for proposals gives a very balanced picture of the two country groupings. The responses indicate that for approximately two thirds of the scientists (MPCs 66.1%, EU 64.2%) the project was initiated by their laboratory or institution alone or together with one or more partner laboratories. A large proportion of the respondents (EU 38.7%, MPCs 41.9%) reported that they were project coordinators. The large majority of the scientists in both regions were directly involved in budget allocation (EU 64.7%, MPCs 51.7%) and task assignment (EU 91.7%, MPCs 66.1%).

As for “involvement in the projects”, the results show a very high level of satisfaction in both regions; 83.8% for MPC scientists and 85% for scientists working in Europe felt that they were able to get involved as extensively as they wanted. The responses given in the two regions about the level of individual contribution in the projects follow almost the same pattern, but scientists working in the MPCs were more likely to rate their contribution as “essential” (MPCs 48.5%, EU 40.2%). Nevertheless, a large majority of the respondents (EU 85%, MPCs 85.8%) rated their contribution to the project either “important for the progress of the project” or “essential for the conduct of the project”.

Money was the leading reason for scientists to participate in such international schemes in both regions, i.e. ”access to international funding” (Europe 80.1%, MPCs 79.7%). Globally, the proposed motivations are more explicitly acknowledged in MPCs (between 52% and 79.7% of positive opinions expressed for all proposed motivations). Nevertheless, motivations linked to visibility, mobility and networking rank very high in both regions.

Although many scientists are highly motivated to respond to calls for proposals involving international collaboration, their participation is often restricted by a number of difficulties. The limiting factors are not the same in nature or scope in the two continents, but at least four reasons received over 50% agreement on both continents: “too much bureaucracy” gathering between 70% of opinions in the MPCs and 83% in Europe, followed by “difficulties in finding partners/ building consortium”, slightly more often expressed in the MPCs (60%) than in Europe (52%). Amazingly, except for the “lack of time”, which seems to be a more important limitation in Europe than in the MPCs, the two regional subsamples declare they are affected in almost the same proportion by the different limitations or constraints proposed to them.

Notes

[1] For the MPCs: Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Palestinian Territories, Syria, Tunisia, and Turkey. For Europe: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Irish Republic, Italy, Latvia, Lithuania, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

[2] The countries that reached the gender parity are in Latin America: Argentina, Cuba, Brazil, Paraguay, and Venezuela (UIS, 2009).

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Second part

The MIRA project contribution

Assessing international scientific cooperation in the Mediterranean region
An international challenge ahead

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Abstract. The article is based on the White paper that was elaborated by the Observatory of Scientific Cooperation in the Mediterranean. It examines the theoretical and institutional background, then proposes a series of indicators and initiatives that can be taken in the future. The article shows the possible relation between the policy objectives of the Cairo Declaration and the indicators needed. It also examines the needs for the creation of a more permanent Observatory in the region.

Keywords. Sciences – Technology – Research – Innovation – Indicators.

Evaluer la coopération scientifique dans la région méditerranéenne. Un défi pour le futur

Résumé. *Cet article est basé sur le « White Paper » qui a été élaboré par l'observatoire de la coopération scientifique dans la région Méditerranéenne. Il examine les fondements théoriques et institutionnels et propose une série d'indicateurs et d'initiatives qui devraient être mises en oeuvre dans le futur. L'article montre la relation possible entre les objectifs de la Déclaration du Caire et les indicateurs nécessaires pour l'accompagner. Il examine enfin les besoins d'un observatoire permanent dans la région.*

Mots-clés. *Science – Technologie – Recherche – Innovation – Indicateurs.*

I – Introduction and background

MIRA project aims at creating a regional ST dialogue platform in the Mediterranean Region. It seeks to identify common interests in research areas; it helps set up ST priorities and support the capacity building activities. MIRA promotes synergies among the different cooperation ST programs between the Mediterranean Partner Countries (MPCs) and the member states of the EU, and fosters the participation of the MPCs in the Framework Programme. All the activities are aimed at providing a strong institutional basis for the EU-MPC ST cooperation.

Among its follow-up of cooperation activities, it was decided to create an Observatory of the EU-MPC ST cooperation, geared toward understanding the state of research and technological cooperation between the EU and the MPCs.

A first challenge is to establish a standard set of indicators to be used by the MoCo for:

1. Monitoring the state of research and technological cooperation between the EU and the MPCs;
2. Making recommendations based on evidence in order to improve the patterns of the Euro-Mediterranean ST cooperation.

Ideally, the Observatory should be in charge of maintaining a database on the scientific production of the co-operation engaged between European and Mediterranean Partners. It will engage in the analysis of the research system dynamics. Ultimately, this Observatory should promote the

establishment of observatories for science and technology among the Partner countries and be in co-ordination with these observatories.

The objective of this article, which is based on a White Paper for the project, is to propose the guidelines on the indicators measuring international collaboration in the context of the Euro-Mediterranean cooperation. It will draw the attention on *methodological issues* related to the measurement of research activities. The article will review the *framework* of the EU-MPC co-operation for which these indicators are proposed, including the political framework as defined by the EU-MPC policy platforms (Monitoring Committee for EU-MPC scientific co-operation and inter-ministerial "Cairo Declaration" signed in 2007). It will propose a *list of indicators* and suggest possible uses for them. It will also identify the instruments needed in order to *actually* provide these indicators, something that is still lagging behind in many countries. The *White paper* will define a roadmap of activities that need to be developed in order to prepare the appropriate measurement activities in the framework of an Observatory for Science and technology Euro-Med Cooperation[1].

In the first section, we review the notions of international scientific collaborations and co-operation and the questions related to the level of analysis and of the reference framework. In section 2 we review the policy framework and in particular Cairo Declaration. In section 3 we cover the different kinds of indicators and the more general methodological issues concerned with the measurement of research collaboration and co-operation. In section 4, we propose a specific framework and indicators to back up the Euro-Mediterranean co-operation at various levels: policy level and programme level. It contains the guidelines and indicators proposed. Section 5 examines the structure of an observatory on scientific and technological co-operation.

II – International scientific co-operations and their measurement

The need to measure and analyze international scientific collaborations has been triggered by the increasing number of such collaborations. Scholars specialized in the field of science policy, sociology and bibliometrics have proposed a variety of methods for their measurement. They all insist on the great range of rationales, drivers and factors identified affecting scientific collaborations. This section will briefly sketch some of the arguments uncovered by this literature. It will then proceed to indicate the different scope of international scientific co-operations as compared to collaborations. Finally, it will review the possible framework of analysis of the international scientific collaborations.

1. Scale and scope of international scientific collaborations

Scientific collaborations have always been an ingredient of science in the making. *Physical Letters*, the prestigious physics journal was born out of the exchanges of letters with Newton and the Royal Academy and dispersed thinkers around the World. Science, as a human endeavour, has always been based on collaborations mainly at the international level, but it is only recently that it became an active ingredient of science policy. What has changed fundamentally is the scale of international collaborations. Their increase has been quite spectacular in the last twenty years (since mainly the mid-90's to now). The number of articles in science co-authored by scientists in different countries has grown proportionally more rapidly than the overall number of publications. This explains the abundance of mainly bibliometric studies depicting the scale of international collaborations.

The internationally co-authored articles have not only grown rapidly; they have also more intensely included countries outside the "triad" (USA, EU, Japan) that has dominated science since the second world war. The developing countries have seen their share of co-publications grow very quickly and even quicker than industrialized countries. This steady growth of the share of co-authored articles has affected all countries until 2000.

Between 2001 and 2006, international co-publications increased in all countries except China, Turkey and Brazil. This has to do with the fact that international co-authorship is related to the size of the scientific community: these three countries have now a rather important scientific community; they also collaborate more domestically. In reality, during the last twenty years, two concurring processes have been taking place: the numerical growth of scientific communities and the growth of international collaborations.

The determining factors of international collaboration in science and technology are based on a wide range of reasons that go beyond the internal dynamic of scientific research (Gaillard, 2001; Wagner, 2008). Demographic, political, economic and social reasons explain this growth. All these suppose to be aware of the varying factors that act upon scientists, and policy personnel when designing measures that support either collaborative research or mobility issues.

Any discussion on international collaboration should take into account the context in which research activities take place. Overall, the recent period has seen not only the emergence of mega-networks of science at international level; it has also seen the pressure of more R&D activities at international level, mainly promoted by the business sector, and a general understanding that innovation needs to be the focus of policy (Arvanitis, 2003). Innovation has also created the conditions for a new science policy discourse that promotes international linkages. Maghreb countries have been very actively engaged in testing these policy measures that support networking of competences (Arvanitis *et al.*, 2010).

A considerable effort has been made thus far in the region for the monitoring of the research activities, although unevenly and quite differently from one country to the other, or from one organization to the other (Arvanitis and M'Henni, 2010; M'Henni, 2009). Nonetheless, the challenge has still not been met and the close relation of the European Union with its Mediterranean partners in research calls for a more intensive monitoring activity (Pasimeni *et al.,* 2007).

The main changes that took place in science have affected the scope of scientific collaborations. They can be summarized in the following way:

- Increasing need to gather high-level basic scientific competences within applied technologies in all new and emerging scientific fields such as biotechnology, nanotechnology, materials science, information sciences; this has been labelled a change in the *search regimes* in science and technology (Bonaccorsi, 2008) or *new modes of knowledge production* (Gibbons *et al.,* 1994);
- More privately funded research, either internally in R&D departments or in close connection with private and public research labs;
- Growth of the global issues such as environmental concerns, public health, specific diseases such as AIDS;
- Active involvement of users in the governance of science, by the creation of large NGOs that actively fund and support research, and a more active demand for participatory research (that is research involving both researchers and non-researchers);
- Increasing use of information and communication technologies creating the infrastructural conditions of the Knowledge Economy, and that has created opportunities for *collaborative research practices.*
- Very deep change in what was once called the 'developing world' with increased presence of some large emerging economies that are challenging the international scene (like China, Brazil, Mexico, South Africa); but also the growing differentiation in medium-level income countries from others in terms of scientific production (Chile, Thailand, Tunisia, Morocco are good examples), and the very rapid growth of scholarly activity in countries that are rich but have had no previous research history (such as the Gulf countries). Challenges and prospects for collaboration are different in this more fragmented world.

2. The framework of scientific cooperation

The motivations and the dynamics of the research collaborations have been relatively less studied than the scale of research collaborations. In other words, the scope of research collaborations at the international level is less well known and needs to define a larger framework of analysis, that goes beyond the scientific networking that appears when performing analysis of the international co-authorships. This supposes a different analytical framework and supposes to use instruments other than bibliometric analysis in order to go beyond the publications and take into account the various dimensions of the internationalization of research. We examine these aspects in the following paragraphs.

Scientific *cooperation* (as opposed to collaboration) appears when support programmes actively promote the scientific collaboration at the international level. Scientific cooperation activities are promoted by both international and national institutions. International programmes and national agencies working at the international level, design, fund and sustain these cooperation programmes. The role of agencies in international scientific activities has broadened and policies are more pervasive today; they aim less at increasing collaborations of individuals, mobility, and research careers than was the case some twenty or so years ago[2].

In an effort to synthesize these tendencies, a recent research, funded by the EC, distinguishes on one hand « the *narrow* Science, Technology and Innovation (STI) cooperation paradigm » and the « *broad* research cooperation paradigm » (Boekholt *et al.*, 2009). In the former paradigm, the drivers are mainly « to improve the quality, scope and critical mass in research by linking national resources and knowledge in other countries ». In the later paradigm, other non-science policy objectives interact with the “intrinsic” science-oriented objectives. For example, the urgency of tackling global societal challenges has opened the discussion for more global research programmes. Other drivers such as diplomacy and historical cultural ties between countries and development or bilateral aid have for a long time influenced the choice of partners and may still form a stable influence in the background.

The ‘governance’ of the new research system has to take into account the changes mentioned above. By ‘governance’ one has to understand that any decision taken by official authorities (governments, international agencies, EU) should include (some say: ‘accompany’) the several players of the new learning economy. Research collaborations are not only at the individual level; they concern public research institutions, private companies, NGOs, institutions performing research as well as regulatory agencies (in fact, the involvement of actors that directly influence the regulatory framework of technologies has been an active ingredient of the growing research collaborations).

The “governance” of international co-operations supposes a particular attention pointed towards:

i. Co-ordination needs: competing objectives and competing funds create a need for coordination activities.

ii. Priority setting: since international collaboration networks seem to respond to their own “ecology” and the economic system imposes its own rhythm to funding and insertion of technologies into the productive processes (also known as “path dependency”), public action needs to be more targeted; therefore, priority setting becomes a necessity.

iii. Stakeholders involvement: the changes summarized above indicated the need to integrate stakeholders that participate both in the definition of objectives and in their implementation.

iv. Evaluation and assessment of impacts: evaluation should be part of the whole policy cycle and feed the process itself.

3. Three levels of assessment frameworks of scientific cooperation

The evaluation, or assessment, of the performances of international scientific co-operations can be performed at *three levels of assessment,* which call for different methodologies.

1. The most natural reference framework for a scientist is his academic discipline –usually also corresponding to some organizational structure: department or faculty. For this type of assessments, bibliometric indicators, closely related to the production of science, are the preferred instruments of analysis. It corresponds to a first level of analysis. Thus all scientific collaboration analysis performed on the basis of co-authorships systematically refer to this first level.
2. Funding agencies –such as the Framework Programme of the EU – do not adopt the same organization of knowledge: they would go along programmes. Programme managers would refer to this framework as the pertinent level of reference of any assessment of the scientific activity, as is usually the case in any evaluation report funded by the EU. This programme level assessment is the second level, and probably the most usual one.
3. Policy (its stakes and implementation) is defined at "higher" level. Indicators in this case need to be related to the policy framework and to its implementation.

In brief, we can conclude by stressing:

- The necessity to define the level of assessment needed in order to use appropriate indicators for the international scientific collaboration;
- The necessity to highlight the target and reference of the assessment exercise;
- The necessity to draw on information and knowledge about the R&D systems of the partner countries.

III – The policy framework of research cooperations between EU and Mediterranean countries

1. The policy framework

The historical conformation of science in the region explains a variable peculiar mix of institutions in each country. ESTIME project as well as the UNESCO Meta-study of science and technology systems (Mouton and Waast, 2007) indicate a typology of national research systems which opposes centralised to decentralised systems. Nonetheless, the overall impression is of a rather large and growing dispersion of research in a great number of institutions. This has to do with the growth of the research system, but also because of a greater role played by universities, and a larger importance of technological activities.

It should be mentioned that the national coordination bodies in charge of providing appropriate governance for science have been created rather late as compared to other continents. In more centralized countries (Tunisia, Algeria), Ministries or State secretariats were created, following the French Model or an Eastern European model (Egypt). In more decentralized countries, Science Councils were usually preferred (Jordan, Lebanon). The Egyptian and Syrian research systems have been evolving more profoundly and rapidly in the very recent past (since 2007 for Egypt, and 2008 for Syria).

A major new ingredient in the research systems is represented by funding agencies at the national level or programmes – usually depending on a Ministry of a national Council – functioning as funding agencies.

Academics of sciences have also played a minor role in the region, whereas they have been an essential ingredient in Europe, the USA and Latin America. In some countries an effort is made to reactivate them as real 'parliaments of science' and not mere honorific institutions. National scientific communities were the outcome of the strengthening of the state, and became a symbolic institution in the hands of powerful social and political patrons, mostly tied to some national projects, incarnation of progress and development (Gaillard *et al.,* 1997).

In Lebanon, the Lebanese Association for science has been only very recently re-animated (Charif, personal communication). Its main activity consists in publishing the Lebanese Science Journal and has received support by the National Council for this.

Morocco has recently promoted the creation of a Science Academy modelled not after the American AAAS but the French Académie des Sciences, an elite institution of renowned and recognised persons. It is a quasi-public institution with public funding and independent status.

In Egypt, because of its former strong political relations with the USSR in the fifties and sixties, the model of governance was based on the State Academy. It is only recently, since 2007, that the system has been revamped in Egypt, creating a funding agency and enhancing the Ministry of research. The Academy in Egypt still exists appointively and acts as a think tank for the government on science issues.

Disciplinary associations, although they exist throughout the Mediterranean, are usually of little activity except in some specific areas (for example Public Health,…), where one encounters a strong scientific regional activity. These regional or disciplinary associations for science constitute the living proof of scientific organizations that are independent from the activities of the State. They are usually based on voluntary activity of researchers.

Whatever the scheme, scientific co-operation has usually been managed by the Councils or Ministries, at the State level, in a very centralised manner. Practically, scientific collaborations rely on the performing institutions (universities, labs or public research institutions). Universities usually have the legal authority to sign agreements, which they do indeed, but in the MPCs the national governmental authorities seem to prevail in terms of habits. The governance of the research systems shows this duality between co-operation and collaboration in all countries, including European Union member countries and MPCs. Moreover, the EU has been imposing a scheme of more centralised partnerships: the MPCs have been taking in charge more strategically the co-operations with the EU going beyond the usual very general political agreements.

Historically, science in the MPCs, even when it has a long historical record –as is the case of some emblematic institutions such as the American University of Beirut or the less science-oriented University Al Azhar in Cairo – has been both marginal and rather concentrated in some unique institutions. Still today, this explains the strong variations of number of publications in many countries: they are the *expression of a small number of institutions*. To give an example, nearly 50% of the scientific publications in Lebanon, the more decentralized country in the Mediterranean, rely on one institution. This very high concentration of the research activity is typical of countries with a small scientific community.

Even with low budgets and low priority, with a record of activities with ups and downs, the governing bodies of the research systems in the Mediterranean have not totally left research unattended. Rather it seems that its weaknesses rely on the unstable support given to research. International cooperation has often appeared as a means of supporting research when national funds were rather difficult to obtain or unavailable. But cooperation programmes operate on a different basis than collaborations: they are not the sole result of a need for money. They also express a political will. They are instruments in the hands of the governments, particularly when bi-lateral relations are concerned.

The agreements signed between the EU and the partner countries form a complex web of political and diplomatic relations and serve as a reference framework. MoCo is closely associated to this effort. The ASBIMED Project has tried to review all the bilateral cooperation programmes in the Mediterranean region. It was clear from the results that most of these programmes between Europe and the Med countries were "based on spontaneous proposals by the stakeholders, which in their large majority come from academia" (Final Report, p.12). Moreover, ASBIMED found little if no correlation between the number of bi-lateral cooperation programmes and co-publications. The authors speculate on the reasons for this lack of correlations that comes from the very formulation of the cooperation agreements. In most cases, cooperation agreements are quite large in scope and researchers under these schemes of collaboration do not necessarily report under one single heading.

Box 1- Objectives of the Cairo Declaration (June 2007) (elaboration)

A. In Higher Education:
Creating a Euromed Higher Education Area:

1. Approximating the Euromed Higher Education Systems;
2. Promotion of a Permanent Euromed University Forum;
3. Promoting Educational Innovation and Information and Communication Technologies (ICT);
4. Promoting mobility through exchanges of higher education students, teachers, researchers and administrators;
5. Enhancing participation in the Erasmus Mundus External Cooperation Window.

B. In Research and Innovation:
Towards the creation of a Euromed Research Area:

1. Modernizing Science and Technology, R&D policies in the Mediterranean Partner Countries;
2. Supporting Institutional Capacity Building, including human and research infrastructure development;
3. Enhancing the participation of the Mediterranean Partner Countries in the Framework Programmes while taking into account their particular needs, as well as areas of mutual interest and benefit between the EU and Mediterranean Partner Countries;
4. Promoting innovation in the Mediterranean Partner Countries and enhancing exploitation of the RTD outputs by society and industry;
5. Favouring mobility of researchers;
6. Enhancing participation of the Mediterranean Partner Countries in the "People" Specific Programme of FP7.

2. Cairo Declaration

A major change has occurred in the Euro-Mediterranean policy context with the signature of the inter-ministerial agreement known as Cairo Declaration between EU and partner countries, "Toward a Euro-Mediterranean Higher Education & Research Area" (June 2007). It included a series of policy objectives and serves the purpose of a framework for the assessment exercise (see Box 1 Objectives of the Cairo Declaration (June 2007)). The MoCo ad hoc committee of April 18, 2008 decided to focus on the mobility issues. Finally it is necessary to replace the whole effort on research in the more general policy framework of Euro-Med co-operation (see "The policy framework of Euro-Med cooperation on research and innovation" by Arvanitis, Rodriguez-Clemente and El-Zoheiry infra pp. 12-39).

General issues in the measurement of science and technology collaborations.

In this section, we would like to highlight some of the main tools that can be used in measuring scientific collaborations. Since a report has been recently issued for the EC with a literature review (Edler and Flanagan, 2009), we will mention the main tools at our disposal.

3. Indicators & descriptors: general issues and difficulties

In an extended review of types of indicators that are available in science and technology, Rémi Barré mentions that the international standards always prefer to measure inputs and outputs (Barré, 2001):

- *Input indicators* are measuring resources available for research. They are defined by the Frascati Manual (OECD, 2002). They concern human, financial and infrastructure resources.
- *Output indicators* concern publications, patents, production of technology, innovations, and other possible issues of research such as production of new researchers, reports based on consultancies or expertise work, participations of researchers to public debates, activities related to the general public.

Input indicators, in particular "human resources" devoted to research, pose specific problems, mainly because of different status of the research personnel inside the academic or public services system. The methods that are proposed in the Frascati manual for human resources, in particular the estimation of *Full-time equivalents* are difficult to implement. They suppose to establish the time devoted to research for individuals that have multiple roles: teaching, professional practices, administrative activities, consultancy, participation into economic enterprises, and other outreach activities. In most Mediterranean countries, an additional difficulty comes from their social status: 'researchers' rarely occupy a recognized social position inside their organizations. They are first of all teachers in universities or part-time teachers, or professionals (doctors, engineers, lawyers, etc.). The organizations they belong to –mainly universities– encourage them to do research for internal promotion and in order to favour the enhancement of the teaching activities. They rarely acknowledge that research is a full-time activity as can be the case of a public research institution entirely oriented to research. Also, researchers rarely benefit from internal research budgets allocated by their universities, although this is becoming more frequent. Some good academic institutions in the Mediterranean devote up to 1% (rarely more) of their overall budgets to research. Most budgets come from external funding, either from national agencies or international agencies and foundations. International co-operation programmes are an important means of obtaining these funds.

Table 1. Categories and types of indicators.

Type ***Epistemological status*** ***Category***	**Descriptive type** **Volume and broad category of activity**	**Cognitive type** **Substantive – thematic nature of the activity**	**Opinion type** **Opinion of stakeholders on the activity**
human and financial resources (inputs)	volume of resources used as an input for the research activity	thematic nature of the skills and knowledge input for the research activity	opinion on the resources
production (outputs)	volume of output produced by the research activity	thematic nature of the knowledge and skills produced	opinion on the production
interactions	volume of resources flows and number of linkages	thematic nature of the interactions, thematic distances, thematic knowledge flows	opinion on the interactions
performance	efficiency ratio (output/ input), volume of impact and effect	cognitive impacts and effects	opinion on the performances

The most commonly used *output indicators* are publication counts, citation counts, and patents. Contrary to input indicators, there are no general accepted measures for the measurement of outputs beyond publications and patents. For the case of *collaborations*, most bibliometric analysis is based on the analysis of co-authorship. This material is of particular interest: co-authorship measures are robust, probably more than simple output figures (number of publications, either in absolute or in relative measures). Moreover, it is now relatively easy to produce large figures and graphs depicting the networks created by the co-authorships. Nonetheless, still many questions arise from these figures (levels of confidence and degree of strength of the linkages, meaning of presence of co-authors, difficulties in making a correspondence between institutional graphs and content of the research, choice of central points in the graphs,…). These very interesting tools need research to answer these queries.

Other measures try to capture the relations established between different fields, different cognitive areas, or between different institutions. These relational and cognitive indicators are usually seen as more complex. The measurement of co-operations is certainly part of this effort to produce relational indicators, either on the cognitive nature of collaborations in science, or on the institutional networking that is produced by researchers. This a blooming area of research in science policy analysis and bibliometrics. Contrary to input indicators there are no standards in the relational type of indicators.

Innovation activities are probably more difficult to measure; this has led to the development of specific innovation surveys, different in nature from the surveys needed in order to gather data on inputs for research along the lines proposed by the Frascati Manual. The experience of doing innovation surveys has been standardized in the Oslo Manual (OCDE, 1992). Innovation surveys are addressed to companies performing R&D, not to public institutions devoted to ST activities.

Establishing relations between the innovation surveys and the ST statistics has never been proposed. Rather, different proposals have been made to characterize the overall national state of research and innovation by establishing a profile on research, innovation and other knowledge related activities. Examples are provided by literature on economics of innovation when defining the national system of innovation (Archibugi and Lundvall, 2001; Lundvall, 1996; Lundvall, 2006; Nelson, 1993; OECD, 1999; World Bank, 1999), some of which concern specifically the Middle-East and North African region (Arvanitis and M'Henni, 2010; Djeflat, 2002; Reiffers and Aubert, 2002). An alternative to the national innovation system approach is to characterize the overall institution framework of the science and technology system.

Box 2 - Is there an ideal template to gather data on ST systems?

The template that we propose is based on what we have learned from our analysis of the 52 country reviews as well as a comparison with other existing approaches. Much of the detail that is proposed in the template has its origins in specific country studies. However, a few if any of the individual country studies would comply with the proposed template. In fact, we would argue that the template be seen as an ideal-typical framework that suggests (best) good practice in constructing a country study or profile. It should be seen as a heuristic framework that suggests categories and themes as well as different forms of information and data. In many cases information might not be available on every one of these categories. For some countries, some of the proposed categories and variables might be inappropriate. Therefore, it still requires insight and judgment on the part of the researcher.

The Mediterranean Innovation Scoreboard (MEDIS) proposed by the Medibtikar project is also an attempt to characterize the technological environment by establishing a list of indicators around five dimensions:

1. Innovation drivers;
2. Knowledge creation;
3. Innovation & entrepreneurship;
4. Application;
5. Intellectual property.

The underlying model of the Mediterranean Innovation Scoreboard (MEDIS) is based on an enlarged vision of the notions of 'input' and 'output'. *Inputs* here correspond to: (1) "drivers" of innovation such as education, levels of literacy and internet penetration; (2) actual means for the production of knowledge (the usual definition of inputs) such as expenditures on R&D and research personnel; (3) innovation and entrepreneurship, such as numbers of innovative SMEs, non-technological innovations in enterprises, ICT expenditures, venture capital, etc. On the other side, in the MEDIS framework, outputs are more strictly limited than usually assumed in such general frameworks: outputs are strictly market-based, such as employment, products, and outcomes that can be legally protected (patents, trademarks, etc). Nonetheless, MEDIS made the point to show that these commonly accepted indicators are difficult to gather[3].

Indicators reflect also the nature of research activities and the institutional framework in which research is evolving. The heterogeneity of the different national structures, and their concentration into a few universities and research centres is a common characteristic of most developing countries (Gaillard, 2010). The high concentration of research into some establishments or some major projects, as Gaillard mentions, "leads to volatility and inconsistency in statistics. The situation is exacerbated by the great divergence in the circumstances by which R&D take place and is measured in different countries and institutions in the developing world".

Countries need to establish a sufficient body of knowledge on how research is performed within the context of their political, economic and educational scientific and technological systems. They need to gather information on: knowledge producers and R&D performers; informal scientific structures such as associations, academies, trade unions, journals, invisible colleges; the working conditions of researchers (status, salaries, pay systems, evaluation systems); the role of international donors and funding agencies; the research output; scientific agreements (Mouton and Waast, 2007).

By analyzing the research and innovation system of 52 countries, Mouton and Waast (2007) created a template to gather systematically the information. They mention three different kinds of information to be collected, formal and less formal:

- Statistical indicators (Social, Demographic, Health, Educational, Science, Technology and Bibliometric).
- Descriptors: quantitative or visual descriptions that present the facts of a certain category of entities or events. They distinguish between Listing descriptors and Diagrammatic descriptors.
- Narratives: More elaborate and deep historical and contemporary descriptions of aspects of the research system in a country.

In 2001, Barré was also advocating, along similar lines as above, a 'mixed perspective' on the use of quantification as the basis of decision-making, using both quantitative data and more narrative or qualitative information: "*It is mixed in the sense that the decision-making process is*

based both on a quantitative dossier and on judgment. Judgment results largely from interactions among those concerned, and discussion and criticism of the indicators are an aspect of such interactions".

As Daniel Villavicencio reminded in the MIRA Bondy workshop, a recent review on measuring knowledge in specific countries (Argentina, Mexico, Uruguay)[4] shows that we have to be quite modest in this quest for the right indicators, not only on methodological grounds, as is suggested in the Santiago Manual (RICYT, 2007), but also because of more structural reasons: indicators measure inputs and outputs in terms of stocks of knowledge, rather than flows of knowledge. Furthermore, we have difficulty in measuring processes in the creation and circulation of knowledge flows. Learning processes, knowledge networks performance, all kinds of 'incremental innovations', knowledge spill-overs, are left aside or quite rarely measured (Villavicencio, 2009); but more than that we have no instruments to measure:

- tacit knowledge flows –usually strong in science and technology;
- traditional, 'indigenous' and other 'non-scientific' knowledge, as well as users' knowledge;
- technological absorption capabilities –or only to a rather limited social and productive area, such as an enterprise, an industrial or productive sector, rarely a geographical region;
- social capabilities needed for knowledge generation and absorption.

Furthermore, as policy tries to promote knowledge flows, we know little about the impacts of policies on knowledge absorption. In brief, there is no instrument that measures in proper terms knowledge policies. International cooperation is part of this quest, since the hope is that by promoting more international linkages there will be more circulation of knowledge and, by way of consequence, a higher degree of knowledge creation and diffusion.

The above discussion on the methodological aspects of indicators serves the purpose of stressing that, for the specific case of cooperation, we need to *combine a quantitative and a more qualitative assessment*, apart from defining the reference framework as mentioned in section 2 above.

4. Indicators in the policy process

Indicators do not only serve as a thermometer. They are also part of the decision and evaluation process. In that sense, they allow organizations and social actors to define their position inside the science and technology scene, inside the innovation world, inside the larger globalization movement. In the MIRA Bondy workshop, Barré exposed the notion of '*positioning* indicators' (Lepori *et al.,* 2008). He and his co-authors have investigated the evolution of indicators: anyone, with a small investment in equipment and databases, can produce today do-it-yourself indicators, creating 'desktop scientometrics' tailored to his/her needs. What differentiates indicators is not so much their technical construction; it is their inclusion in a specific decision-making process, or an assessment exercise. Thus, users of the indicators can use the indicators to define their own position inside the system.

This notion of positioning is important and has both methodological and practical consequences as well as theoretical consequences. On the theory side, it is important to note that the variety of demands exerted on indicators will prove a powerful engine for producing new indicators, less based on input measurement and, probably, more linked to refined methodologies. This is so because the variety of users induces a variety of uses. A multiplication of producers with new and diverse funding will inevitably appear. What then becomes central is the issue of *reliability* of these indicators: they should be *robust, comparable, credible, and relevant*; on the other hand they need to be custom-tailored and fitting the needs of each actor.

Barré and Arvanitis (2009) explore the consequences of this evolution of indicators as far as cooperation and international scientific collaborations are concerned. Cooperation indicators need

to go beyond the measures of the degree of scientific collaboration as measured by bibliometric indicators. They should tend toward some integration of actors implied in the cooperation:

- Strategic integration: between institutions, and between actors
- Scientific integration: at the level of projects, concepts, ideas, scientific objects and choices of themes
- Operational integration concerning careers, and organizational objectives.

Cooperation indicators pose a specific institutional challenge since they are not commonly used; they need to integrate the objectives of more actors than the mere public entities that are usually the producers of Frascati type indicators. To enter the challenge, a stronger relationship is needed between indicators' producers and users, between the designers of the indicators and the producers, between the producers and the users. This could be the case, for example, in assigning the indicators to the assessment of the objectives of the Cairo declaration.

Edler (2008) mentions implementing an interaction between the production of indicators and their users (see Fig. 1). It poses some specific difficulties: in our case, on the co-operation indicators, as is more generally the case, there is a growing mismatch between the analytical base that serves to produce indicators and the need for a collective intelligence toward measuring this integration at the international level.

The indicators mentioned in the above sections focus on a national base; they focus on industrial R&D, national capability in human resources, and mostly at the aggregate national level.

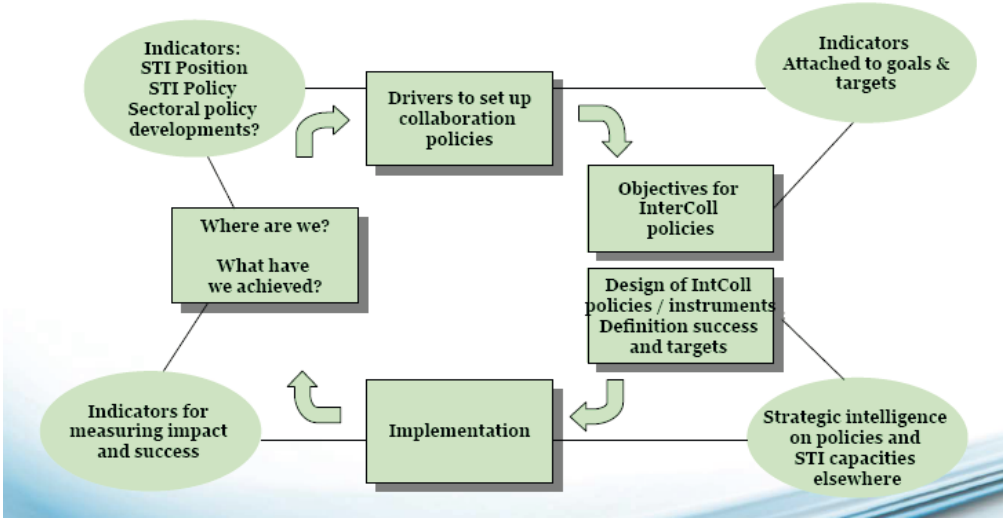

Figure 1. The use of indicators in policy for STI internationalization (Edler, 2008).

A very similar exercise, linking policy decision-making processes and indicators, has been done by WP5 in the MIRA project under the name of "stock-taking for policy makers". Results of this exercise have been circulated among members of the MoCo.

5. Indicators of research co-operations and impact assessment of programmes and policies

Contrary to collaborations, international scientific co-operations have rarely been the object of study in academic terms. Most of the work that has been published was mainly done in projects funded by the EU when the need to evaluate these programmes has risen. A body of literature has now emerged regarding the assessment of research programmes (Callon *et al.,* 1989; Callon *et al.,* 1991; Callon *et al.,* 1995; Callon *et al.,* 1997; Guy *et al.* 1995; Leopori, 2009; Mangematin and Joly, 1996; Rabeharisoa *et al.,* 1992).

As mentioned in the preceding section, the assessment of international co-operations can be done by focussing on three different levels of analysis: (1) the level of disciplines, involving collaborations between individual scientists or particular research units; (2) the programme level; (3) the higher policy level.

Usually, when addressing the evaluation or impact analysis of specific programmes, the need appears to identify:

- The underlying scientific structure of scientific disciplines;
- The relations of this scientific world with the activities funded by a specific programme.

The *research collaborations* – the Santiago Manual calls them 'spontaneous collaborations –that take place as a consequence of research contacts between researchers in different countries out of training or curiosity-driven research - and *research cooperation* take place inside this previously set framework given by the scientific fields as well as by the framework defined by some cooperation agreements between countries and institutions (See Box 3). Collaborations are the real underlying structure of scientific co-operation. Wagner calls them 'a dynamic ecosystem' and they form global networks of collaborations (Wagner, 2006; Wagner, 2008).

Scientific collaborations can be (or not) the main aim of research programmes; the impact assessments of the programmes, whether this is the case or not, necessarily have to examine the underlying research collaborations. An analytical difficulty lies in the fact that the dynamic of international collaboration is related not only to the international structure of science, but also to the general environment of research in the country, the disciplinary evolution, and opportunities and policies for international collaboration, part of which are given by the co-operation framework. The context acts upon international scientific collaborations in a way that goes well beyond what the policies actually are. It is difficult to identify the relative influence of these various components influencing the research co-operations.

Cooperation with "Third countries" of the EU (that is countries other than the ones under an association agreement) has rarely been the focus of analysis. Most analysis is limited to examine the participations in Framework Programme calls for offer.

More recently, the Report for the CREST Working group on internationalization of research has identified issues, objectives and possible measures for the assessment of internationalization policies directed to Third countries.

The International Science Foundation (IFS), an international institution funding scholarships to individual researchers that come back to their home countries after they have obtained their PhD and worked abroad, devised a framework for the assessment of its activities, called MESIA framework, which combines the three levels of analysis of co-operations.

Box 3 - Forces acting on international collaboration:

- Situation of research in the country –see assessments based on a framework like the Mouton & Waast study reveal– including the need for stronger training and support in order to foster scientific research.
- Policy towards external training and cooperation.
- Fast moving disciplinary fronts (biotechnology, nanotechnology, etc…).
- Increasing need for wide international cooperation (global science). Some priorities are necessarily tackled at an international scale, very much so in 'open air research' that is research that needs fieldwork more than laboratory and experimental work inside the walls of the research institution.

Informal and formal actors

- Networks of relations, many of which date to the PhD or post-doc location.
- International institutions.
- Funding agencies – also known as donors, private foundations, public agencies working at the international level such as IDRC, SIDA, French Cooperation and the like.
- European programmes, FP7, MEDA, DG Enterprise, etc…
- Bilateral programmes of co-operation.
- Regional or national institutions promoting individual scholarships and exchanges – Marie Curie, Erasmus Mundus, AUF, etc.
- Finally research performing institutions that have also a policy toward international cooperation. Should this policy be lacking, there is an 'implicit' policy that is the result of the aggregation of individual initiatives.

Degrees of intensity of international cooperation:

- individual initiative;
- facilities, labs /teams with a regular exchange;
- policy at the level of the performing institution;
- policy at the regional or national level.

6. Building a reference framework

The usual measurement of international collaborations through co-authorship is not enough when one wants to measure the impact of cooperation programmes. It is necessary to develop a *framework* that involves a *reference* (which population is concerned?), a *metric* (which indicators?) and a *temporality* (a time frame that permits to oppose "before" and "after"). Finally the impact measurement should be discussed in such a manner that it permits to assess the meaning of a general cooperation policy[5].

A full and complete evaluation in large cooperation programmes is difficult because of the multi-level effects of programmes, the multi-actor nature of these programmes (many distinct populations are impacted by the programme) and the lack of "reference" groups, that is a sort of "control group" that is not affected by the programme[6]. Randomized impact measurement has

not been used in research and innovation policy among other reasons because of the difficulty to identify “control groups”.

It is thus necessary to carefully distinguish the level addressed by the framework for indicators that should be developed, in order to permit the measurement of impacts at these different levels:

1. *national* level. The country as a whole
2. *institutional level* of the research institutions (performing institutions, like universities and public research institutes that received the funds)
3. *technological or scientific areas* (e.g. “nanotechnology” and “biotechnology” are not defined by a specific scientific discipline)
4. *programme* level.

Apart from this diversity, “impact” is a concept that has several meanings at different levels (regional, national or international level):

- achievement of the programme objectives
- implementation of national objectives/priorities
- consolidation of a research area – at the national & international level
- promotion of researchers
- strengthening of training programmes and faculty advancement
- strengthening of the national scientific community
- consolidation - or creation - of research groups
- strengthening of research performing institutions
- creation of research networks at the national level
- research networks at regional/international level.

By defining a reference framework, we also identify target actors. These should be the population to which a specific measure or a specific programme is addressing *directly* (e.g. researchers in mobility programmes, institutions in capacity building, and so on). The assessment exercise can also address *indirect* effects of the measures and programmes assessed. Indirect effects go beyond the direct linkages and far beyond the scientific networks; they need refined methodologies including the populations in which targeted populations are embedded or populations that are targeted as the ultimate effect of the programmes. This can be the case for people with specific diseases in a research programme on these diseases (instead of the effect on the research itself); another example might be companies that should benefit from technological developments directly supported by a specific R&D programme. Indirect effects are also known as “spillovers” in the economics literature; they are the kind of impacts that policy people aim at and thus those being the most directly linked to their decisions. Because of the “indirect” nature of these impacts, they are open to multiple interpretation.

To conclude, impact assessments, and sets of indicators depend upon the *objectives* announced by the programmes to be assessed. They also depend upon the *capacity to clearly identify the universe that we try to assess*. This is far from being trivial or easy. In the following Box 4, we show a list of questions that were presented in the discussions and that imply specific methodological decisions.

Box 4 - Methodological questions that need to be addressed by the Observatory

1. Since the observatory has to focus on co-operation (and not mere *collaborations* in science), how can we isolate the effect of the *programmes* (funding, institutional structure, and so on) and the *dynamic of research and scientific collaborations*?
2. Do we have to limit ourselves to the sole *areas of research* covered by the FP?
3. Do we include "strategic" or technological linkages between research areas and productive activities? How do we relate scientific collaborations and programmes oriented toward rather basic research from technologically-oriented activities?
4. Even in the case of scientific collaborations as measured by co-authorship patterns, what is the *reference population*? Do we imply the persons publishing in a determined set of journals? Or, the people belonging to a certain rank in institutions receiving funding? Or the overall FTE in research in partner countries? As defined by the area of research, the institutions?
5. Do we extend the assessments to indirect effects of policies on research, innovation, mobility and training issues, or do we limit to more direct effects measurable around specific programmes (e.g. participations in FP calls; participation in bi-lateral programmes and funded entities)?
6. What data are available for the assessment? Should they be national, regional, based in the EU, based in some international organizations?
7. How do we establish the links between data on the overall inputs and outputs of the research and technological development and cooperation indicators?
8. And, finally, do we prefer to refer to overall policies, as the Cairo declaration framework, or should we be only focusing on and identify specific objectives and translate them into impact assessments at the level of programmes?

IV – Proposals for a framework and indicators for the Euro-Mediterranean science and technology co-coperation

In using the general policy framework, one needs to translate it into specific indicators as well as into a specific interpretation of the linkages between the various areas of concern: higher education affects collaborations, mobility of researchers and students, and the overall output of research; mobility issues are both problems related to the economy and employment and to the development of research; institutional issues are related to priorities in scholarships and research. We still lack this assessment framework that needs to be built. The following are proposals in order to attain the overall objective.

1. Feeding the Cairo declaration Framework

Cairo declaration can be used as the general policy level. Following is a proposal based upon the measures identified by the Cairo declaration itself. Below we show the detail of the measures *(in italics)* and list the possible indicators that could be used in illustrating them.

Objective 6 of the Cairo Declaration. Integration of the Mediterranean Partner Countries in the European Research Area. This could be achieved through the following actions:

a. Promotion of links between centres of excellence in the Euromed region;

- Mapping of institutions having common projects on both sides of EU and MPCs
- Evolution over time
- Co-publication mapping EU-MPCs
- List of agreements at the level of institutions for research

b. Promotion of joint networks of excellence in the fields of mutual interest, e.g. renewable energy, biotechnology, environment, etc.;

- Participations in the FP projects of Med partners
- Participations in programmes under other DGs involving research and technological development
- Participations in other programmes (bilateral or international funding agencies)

c. Promotion of regional initiatives in RTDI;

- Number of SICA / ERAWIDE / FP7 participations
- Number of funds / programmes
- Specific measures, programmes (e.g. BILAT)

d. Promotion of contact points in Mediterranean Partner Countries' Universities and research institutes to disseminate information and promote participation in FP7;

- List of Technology transfer units in MCPs
- List of institutions that benefit from Technology transfer units and NCPs in MPCs
- List of already constituted networks of NCPs by domain of activity (biotechnology, energy, water, social sciences, etc.)

e. Promotion of National funds in Mediterranean Partner Countries for Scientific Research and Development;

- List of funding structures with EU support / outcome report of these funding programmes
- List of non-EU funding structures active in the region
- Compare the National funding / Non-national funds

f. Explore the possibility of co-finance by Mediterranean Partner Countries in FP7 for coordinated activities;

- Number of co-funded programmes
- Evolution over time

g. Enhance the participation of Mediterranean Partner Countries in FP7;

- Assessment of participations
- Dynamic of international collaborations; motivations, drivers, difficulties, obstacles
- List of institutions in MPCs and effort of collaboration identified through bibliometric or general purpose indicators

h. Cooperation in capacity building in:

i. Formulating research projects;

- Capacity building projects funded by EU (ERAWIDE, others)

ii. Particular areas of mutual interest.

- Topics/objectives with mutual interests (or thematic clusters): sustainable development, coastal areas management, marine resources, water management, forest management, waste management, farming systems, monitoring of environmental change, climate change, seismic risk and geological resources, business enhancement and entrepreneurial initiatives, innovation promotion, economic and financial risks, economic policies, industrial and agricultural policies, ICTs, nanotechnology networks, public health, endemic diseases, epidemiological networks, vaccines, genetic services, biomedical research capacities, food and agro-industry, cultural heritage, social and cultural identity, linguistic issues, science in society, scientific awareness, migration issues, legal and social gender issues, political sciences issues…
- Priority lists funded by EU multilateral, bi-lateral and non-EU programmes;
- Identification of institutions on similar topics or priorities
- General macro-indicators on collaborations (general purpose indicators)

Objective 7 of Cairo Declaration. Promote innovation, knowledge sharing and its return on the industry and economy in Mediterranean Partner Countries. This could be achieved through the following actions:

a. Promotion of the creation of national and regional innovation funds within the Mediterranean Partner Countries to support innovation and exploitation of research outputs by industry;

- Funding oriented toward innovation
- Listing of programmes promoting innovation (not *necessarily* research)

b. Implementation of the 'Euromed Innovation & Technology Programme', which aims at developing innovativeness in Business firms (esp. SMEs);

- Programmes and beneficiaries
- Mapping of innovation-related measures
- Infrastructures for monitoring of research and innovation in MPCs

c. Promote the participation of Mediterranean Partner Countries in activities related to innovation, including the EU Competitiveness and Innovation Programme (CIP);

- Med Participations to the EU CIP programme
- List of measures developed to promote R&D in the region (see *b* above)
- Economic studies specifically intended to support businesses in MPCs

d. Develop Capacity building in R&D and innovation management.

- Innovation surveys
- Information on promotion of Monitoring innovation & research (EMIS framework).

Objective 8 of Cairo Declaration. Enhance Effective Mobility in the Euromed region. This could be achieved through the following actions:

a. Establishing Mobility Centres and Portals as well as promoting mobility contact points in the Mediterranean Partner countries;

- Number of centres/portals created

b. Establishing national programmes of mobility and open access to incoming mobility from EU Member States to Mediterranean Partner Countries.

- List of programmes at national level

- Statistics on foreign research personnel from MPCs in EU Member states (students, invited researchers,…)

Objective 9 of Cairo Declaration. Attain Brain Circulation and Knowledge Dissemination. This could be achieved through the following actions:

a. Support to expatriate researchers through networking opportunities and allowing periodic research sabbaticals to countries of origin;

- List of existing opportunities for EU-Member countries + EU initiatives (eg. THETYS): programmes devoted to "return" activities
- Statistics on researchers in foreign countries / Surveys by fields of activity and countries
- Mapping of expatriate researchers
- Promotion of web-connected collaborative communities

b. Promotion of a regional network of Institutes for Advanced Studies & Research, through which European Academic Institutions cooperate with selected Mediterranean Partner Countries' Universities to form the best human capital;

- Same as 9.a
- Policy measures promoted by EU member countries / EU Commission /partner countries specifically oriented toward mobility + training between EU member countries + MPCs
- A new initiative is called in by this objective/measure.

c. Address the issues linked to brain circulation, notably through strengthening the return phase in the different mobility programmes.

- Same as 9.a
- Study the mobility issue *'brain drain'* vs. '*brain gain'*
- List of 'return' programmes: TOKTEN, national programmes…
- Study support of high-level competence diasporas by computer-mediated networking.

2. Macro-level indicators

MIRA produced a validated list of indicators that are needed in order to measure the scientific cooperation. During the workshop, a series of lectures examined different aspects and dimensions of these indicators, as well as the general context of production and use of indicators (institutions producing the data, availability, manageability of indicators, comparability, etc.). Some of the issues of debates go back to the International Conference on Science Indicators held in Paris (Arvanitis and Gaillard, 1992). Apart from listing the indicators, this session identifies potential producers of the indicators; they will be presented in the following section.

The indicators listed in Table 2 are macro-indicators that are valid for a country. They can be modified to fit a specific area in as much the data provided permit it. This list is comparable to the one produced by the 'Manual of Santiago' on the 'Internationalization of science and technology' (RICYT, 2007). The list distinguishes indicators related to financial and human resources and those related to outputs.

Table 2. List of indicators for the Observatory of EU-Med cooperation.

Type of indicator	Indicator	Source
Financial resources	Budget dedicated to I.C./GERD	Surveys/EU
	EU source budgets for R&D / Budget dedicated to I.C.	Surveys/EU
	Budget for research projects/ Budget from EU dedicated to R&D	Surveys/EU
	Budget for research equipment / EU Budget for R&D	Surveys/EU
	Research Budget to enterprises	Surveys/EU
	EU funding for research by discipline/sector/theme	Surveys/EU
	% of research funding for a specific topic or discipline as a share of overall funding for research and overall EU funding to the discipline or topic	Surveys/EU
Human Resources	Number of MPC researchers in Europe	Various
	Number of MPC doctoral students in Europe	Various
	Number of MPC students in Europe	Various
	Number of doctoral students from European universities in MPCs	Various
	Number of teaching faculty members in MPC	Various
Bibliometrics	Number of co-publications with European co-authors as share of MPC publications	THOMSON/SCOPUS/PASCAL
	Number of co-publications with European co-authors by discipline or theme	THOMSON/SCOPUS/PASCAL
	Impact factor for co-publications	THOMSON/SCOPUS
	Impact factor for co-publications by discipline or theme	THOMSON/SCOPUS
	Specialisation index by sub-disciplines and regions of MPC production	THOMSON/SCOPUS/PASCAL
	Thematic similarities between Europe and MPC	THOMSON/SCOPUS/PASCAL
Patents, designs and trademarks	Number of patents in EPO (European Patent Office / US PTO)	EPO/USPTO
	Number of designs in Europe/US	EPO/USPTO
	Number of trademarks in Europe	EPO/USPTO
	Number of European patents locally deposited	EPO/USPTO
	Number of patents as co-inventors (Med/EU)	EPO/USPTO
Others	Number of projects in FPs	Surveys/EU
	Number of projects in FPs analyzed by type/topics/countries	Surveys/EU
	Number of projects in FPs with Med partners as leaders/co-leaders	Surveys/EU
	Number of publications linked to FPs participations	Surveys/EU
	Socio-economic impacts of FPs	Surveys
	Number of research (teams, institutions, centres) participating to FPs	Surveys/EU
	Number of enterprises participating in European projects	Surveys/EU

Notes : IC = International Cooperation. GERD: Gross Expenditures on R&D. EPO : European Patent Office. USPTO : US Patent and Trademarks Office. FPs : Framework Programmes (DG Research).

3. Programme-oriented indicators

As indicated above, impact assessments should rather be oriented towards programmes. This would entail to maintain an inventory of collaborations, based on EU participations or other funding programmes where there exist available data. Indicators would be designed out of this inventory along the following possible lines (also useful for the more general assessment of Cairo declaration):

- Training (doctoral students engaged in programme)
- Creation of networks, participation into existing networks
- Mapping of publications produced by the programme
- Inventory of activities related to dissemination other than scientific publications
- Patenting and other technology related outcomes
- Assessment of the quantitative outputs in relation to participating country
- Assessment of the relative size of funding provided by the programme, relative to the funding for R&D in the participating countries
- Assessments related to the relative participation of institutions

These indicators need not only to maintain the inventory of the programmes but also to head towards a "clean" institutional database, where affiliations of researchers can be shown without the ambiguities usually encountered when dealing with the names of institutions in bibliographic or other project databases.

4. Availability of data

CREST has carried out a larger policy level exercise on the internationalisation of research (CREST Working Group, 2009, p. 6). It states that there is "insufficient ST infrastructure and expertise in Third Countries":

> *… one obstacle for international ST cooperation, especially as regards emerging or developing countries, is the non-existing or insufficient local ST infrastructure in these countries as well as a lack of human resources (e.g. because of 'brain-drain'). This comparative disadvantage is linked to the still existing deficits in the coordination of education, research and development policies at national and EU level.*

As the ESTIME project has showed, data in the MPCs do not usually correspond to Frascati Manual standards. Expenditure indicators are difficult to obtain in particular for universities where the bulk of research is performed.

The various initiatives on input indicators (financial and human resources) reviewed in this paper are based on estimates. The most recent Arab Knowledge report (2009) uses 2006 data for its 2009 report on funding coming mainly from COMSTECH sources and a study sponsor.

Bibliometric data are available but pose specific issues related to affiliations, coverage of databases and specific difficulties related to their format and use. Nonetheless, they remain the most robust data on research outcomes.

Table 3. R&D indicators availability in some Mediterranean countries (as of 2009).

Country	Human Resources	Financial Resources
Morocco	Yes	No since 2003
Algeria	Yes (2006)	No
Tunisia	Yes	Yes
Libya	No	No
Egypt	Partial data on universities	No since 2000
Syria	No	No
Jordan	Yes (2003)*	Yes (2002)
Lebanon	No - Estimates	No - Estimates

*Jordan: ESTIME data 2006 on human resources. Lebanon ESTIME offers estimates for 2006.
Sources: UIS-ALECSO and ESTIME.

V – Steps toward an Observatory for science and technology EU-Med cooperation

In spite of the obstacles previously identified, there are ways that allow to overcome these constraints. They suppose specific tailored tools, databases and instruments built to collect information, such as:

- surveys of beneficiaries;
- clean bibliometric indicators;
- database of projects/programmes/agreements;
- database of EU-Med participating institutions;
- information on measures and policies.

The ideal observatory would need to create a **reference material**. This might be true for the case of publications; the population of researchers and beneficiaries of research grants and scholarships; the list of international agreements/programmes; the listing of policy measures; the listing of institutions. No such information can be totally complete. Nonetheless, a mapping of these different objects should be the background material of the observatory. It would be renewed by periodical studies and analysis.

Databases. These tools present difficulties and are expensive not so much materially – it may be expected for some bibliometric databases- but intellectually and in terms of competencies needed to manage them:

- The first and foremost difficulty (and cost) relates to competencies needed: it is necessary to have stable competencies and trained personnel who have experience on the uses and benefits from these databases, either bibliographic or other. They also have to acquire the routines needed to interrogate and build meaningful reports. These competencies have been repeatedly addressed in the ESTIME report and presented at the MoCo meeting of Istanbul (2009).
- A second difficulty lies in the varied types of information needed: bibliographic/bibliometric; projects database; statistical information on funding, human resources and other economic information.

- A third difficulty comes from the varied sources of information: statistics from different sources, databases of different type and origin, listings from different institutions.

Maintenance of valid databases. The use of the publication output measures, in particular by measuring co-authorships**,** involves a series of technical steps in order to "clean" the data but also to maintain a validated database. The maintenance of these clean databases is not a high cost when included in a general framework. It becomes more important when the databases or the samples extracted from bibliographic databases are drawn only on the opportunity of specific case studies.

More work needs to be done both on the significance of co-authorships, involving international affiliations, which implies a better knowledge of the authoring practices in many different fields, but also the relation between the actual collaborations and the publication habits.

Surveys. A need for not exclusively quantitative skills is also a competence that should be addressed. Surveys either by questionnaire or by interviews might be sub-contracted.[7] The observatory should build on existing competencies in the region and promote interaction between specialists on these methodologies.

Sourcing of data. A closer interaction should be sought between the CORDIS and other databases (such as ERAWATCH) for sources of information on projects and activities funded by the EU.

Website. It would be necessary to develop a specific website either enhancing the MIRA website or feeding specific websites. Also the participation to the ERAWATCH is to be more actively sought.

A stable relation with users. Building the relation between the users of the data and the data producers is an ambitious goal. To this end, the observatory must be considered as a permanent structure that is fed by local units/observatories and that feeds the policy process. There are two competing views on this "observatory". It might either be a stable unit, located in one particular country, with a specific budget; or, alternatively, a network inserted in some larger structures or projects, as is the case today of WP2 into MIRA. This second solution would be preferable for a regional unit. The Observatory needs to have a more pro-active programme of activities that is related to the needs of the stakeholders and to opportunities for actual realisation of its work programme. It needs a stakeholders' steering committee, that will be in charge of some of its activities, its budget, and working plan. It would also need a network of working parties where the Observatory pools the existing competencies on indicators either in the European member countries or in the MPCs. As in the MIRA project, such an observatory would need a small secretariat of the steering committee and of the activities undertaken for the stakeholders.

Stakeholders. Inside the MIRA project the main stakeholders and working partners of the Observatory were the official ministries and councils in charge of the policy, as well as some agencies and the EU commission. But they have shown little if no interest in such a permanent Observatory through all sorts of arguments against such an initiative. ESCWA has also repeatedly tried to create such an Observatory in the East Mediterranean and North African countries. Until now the effort has not been successful although the objective still remains.

It should be necessary to compare the successful experience of the RICYT, the Latin American and Spanish-speaking network on science and technology indicators, and draw some indications from its success. One could consolidate the already existing indicators' units at national level – Lebanon, Tunisia, Morocco, Jordan, Egypt, as they have expressed their needs and work programme. The national experiences could be followed by involving more stakeholders, such as NGOs and international organizations. Involving more than just governmental units seems a necessary step.

VI – Conclusions

In the light of the previous initiatives we can draw the following conclusions:

1. There is a clear willingness to shape indicators, and design indicators fitted for specific needs. The need is rather felt at the international level, mainly through multilateral organizations, and at the national level through some Ministries – usually in ST or higher education – which want to design tools that permit an evaluation of the research potential in their countries and need "positioning" indicators (Where do we stand?).

2. The need for indicators is not evenly distributed in all countries; some countries have been forging the adequate infrastructure; others have been rather unwilling to feed these indicators as well as any other data on their potential. Moreover inside countries, different public institutions have different needs. Finally, in countries with a more decentralized research system or with a research system that is more open to international competition, indicators seem to be easier to accept.

3. Reliable data are difficult to obtain. The UIS exercise clearly showed that the effort is difficult for many reasons that have to do with the inability of national statistical offices to get data for ST. Partly this has to do with the inadequacy of the statistical administration as far as research is concerned. It is also partly because of lack of experience in the field of ST statistics. Moreover, inside the same administration, one can find offices in charge of strategic studies stating the need for indicators and a rather opposite attitude from the potential suppliers of data.

4. Although bibliometrics is at the very heart of all indicators on performance, there is still a very low capability in using and creating bibliometric indicators. International organizations have favoured general statistics and economic analysis, but bibliometrics has rarely been an issue. The exceptions here are Turkey (Karasözen *et al.,* 2009), and Morocco –which created a team on bibliometrics in IMIST. Tunisia made an extensive use of bibliometrics in the 2007 report on the research system, as given to ESTIME, but no other uses were reported since then.

5. The abundance of initiatives in the last four years has created expectations that are not met and a certain dispersion of efforts. This is particularly true of the EU exercises. Too little funding has been oriented in the Mediterranean region towards the creation of an analytical capacity for indicators. As always, policy-makers want immediate results and figures they can use to feed/legitimate their own discourse and policies. The main drawbacks are known and an Observatory on science and technology will always be a difficult, although necessary, task.

6. In the case of impact measures, an analytical effort is needed that goes beyond the production of data. As has been mentioned in Europe, there is a strong analytical need that is still not covered (Edler, 2008). MIRA could partly respond to this analytical need and WP2 should really try to build bridges with other initiatives that define methodologies and look at the design, production, and use of indicators. It might also be that MIRA is not the right framework for such an analytical effort: in this case, it should be necessary that MIRA envisages the possibility to promote the formulation (and funding?) of a proposal that aims at gathering the experience in indicators design and production.

7. Creating an observatory seems to be possible only by enlarging the interested parties beyond the usual Ministries and national Councils for research.

Notes

[1] This document is the result of intensive discussions that took place among members engaged under the work package in charge of the observatory (WP2). A first outcome of this work was the organization of a Workshop on "*Scientific cooperation indicators and impact measures*" co-organized by IRD and IFRIS (Institute for Research and Innovation in Society) on March 16-17, 2009 at the premises of IRD, (Bondy), France. All Workshops may be be found on the Mira website.

[2] The EU has been pioneering this important cooperation effort, as exemplified by international research organizations. The most famous case is the CERN: as John Krige shows, the effort and enthusiasm of scientists engaged in the early years of the CERN was not only related to the increased possibilities of collaboration, or sharing costs but by the attempt to build real European institutions. The effort to create a European co-operation in high-energy physics was coincidental with Schuman's proposal of a European Coal and Steel authority. Large collaborative facilities have always been the most visible and important co-operation instruments. It is also the case of the European Molecular Biology Organization (EMBO) (Krige, 1997).

[3] A complete set of available indicators is published in Tsipouri, 2008.

[4] See Villavicencio *et al.,* 2009.

[5] See MIRA presentation in Rabat, February 23, 2009: *Measuring the impact of scientific cooperation : MIRA contribution*, by R. Arvanitis.

[6] The World Bank has been promoting this kind of randomized impact measurement of aid programmes to developing countries in schooling, nutrition, or health support programmes (World Bank, 2007).

[7] Most qualitative tools, such as interview guides, are published on the ESTIME website.

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Identifying barriers to Academia-Industry relationships in the MPCs, and their impact on Research and Innovation cooperation between the EU and MPCs

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Abstract. Collaboration between Academia and Industry at both national and international level is a pivotal issue to strengthen competiveness of countries and face major future challenges. The inputs needed to develop such a kind of cooperation and the main barriers hampering the implementation of joint activities are analyzed in this paper taking into account the results of a survey carried out in the framework of the MIRA project. Finally some suggestions are provided to support the implementation of policies and instruments aimed at enhancing the necessary links and contributing to the establishment of a Euro-Mediterranean Innovation Space.

Keywords. Industry – Partnership – Governance – Financing – Communication – Infrastructure.

Identification des obstacles aux relations Université-Entreprise dans les PPM et leur impact sur la coopération entre l'UE et les PPM en matière de recherche et d'innovation

Résumé. *La coopération université-entreprise à l'échelle nationale et internationale est un enjeu majeur pour accroître la compétitivité des pays et faire face aux grands défis du futur. Dans cet article, en nous appuyant sur les résultats d'une enquête menée dans le cadre du projet MIRA, nous allons analyser les éléments nécessaires pour donner une nouvelle impulsion à cette collaboration et les principales contraintes qui limitent la réalisation d'activités communes. En plus, nous allons fournir des indications pour encourager la mise en œuvre de politiques et d'instruments visant à renforcer les liens nécessaires et à contribuer à la création d'un Espace euro-méditerranéen d'innovation.*

Mots-clés. *Entreprise – Partenariat – Gouvernance – Financement – Communication – Infrastructure.*

I – Introduction

One of the main objectives of the INCO-Net Project MIRA is promoting stronger interaction between the research systems in the EU and in the neighbouring Mediterranean Countries (hereinafter referred to as MPCs), paving the way to the development of a Euro-Mediterranean Innovation Space (EMIS).

Therefore a study was carried out to identify the main barriers to the participation of MPC institutions and research centres in the European Framework Programme for RI, and the difficulties in bridging the communication and collaboration gap between Academia (Universities and Research centres) and Industry in the MPCs, being firmly convinced that these two issues are strictly related and represent the two pillars of the future perspectives of research and innovation driven international cooperation.

II – The survey

The survey was conducted by a MIRA team and the results were delivered to the European Investment Bank which is carrying out the IT1 Programme: “Fostering Innovation and supporting the promotion and financing of Innovation in the Mediterranean Countries”. Indeed one of the IT1 components is the “Diagnosis about barriers to innovations” (Benraad, 2011) whose main objective is identifying and analyzing issues that may inhibit the development of systems to support innovation, particularly in the field of the relationships between the academic/ research and industrial world.

The survey was based on a Questionnaire intended for the coordinators of projects co-financed under the ERA-WIDE activity of FP7 (2007-2014) Capacity Programme. The ERA-WIDE is aimed at reinforcing the cooperation capacities of well evaluated research centres located in the ENCs (European Neighbouring Countries) and working in the scientific domains covered by the thematic priorities of FP7 and involving stakeholders and industry representatives. It does not support directly research work, but contributes in order to improve the centres’ capacity to participate in the FP and to upgrade their infrastructure and international connectivity. The beneficiaries of ERA-WIDE projects may represent a significant sample of Research Centres in the MPCs with international cooperation activities, and were taken into account as the target of a pilot study on International Cooperation and Academia-Industry cooperation, based on their previous and current experiences.

The survey was focussed on the experience of research institutions in National cooperation and MPC-EU International cooperation, if any.

Therefore, two separate sets of answers to the same questions in the National and International context were collected through the Questionnaire which served as the survey base. The respondents were asked about the barriers which the industry has to face to interact with Universities and Research centres in National Initiatives and in International Cooperation. Answers were based on an extensive list of barriers and types of engagement and were divided according to the four key issues to improve cooperation activities.

The results are summarized in six figures:

1. Pros that had an impact on your decisions to start cooperation projects with Academia/ Industry (as in Figure 1);
2. Cons in deciding to start cooperation projects with Academia/Industry (Figure 2);
3. Main results/impact achieved when participating in the projects (Figure 3);
4. Main problems faced when participating in the projects (Figure 4);
5. Instruments for Academia/Industry cooperation (Figure 5);
6. Suggestions to improve RTD cooperation between Academia/Industry (Figure 6).

The list of ERA-WIDE Projects for which the Questionnaire was submitted is provided in Annex 1.

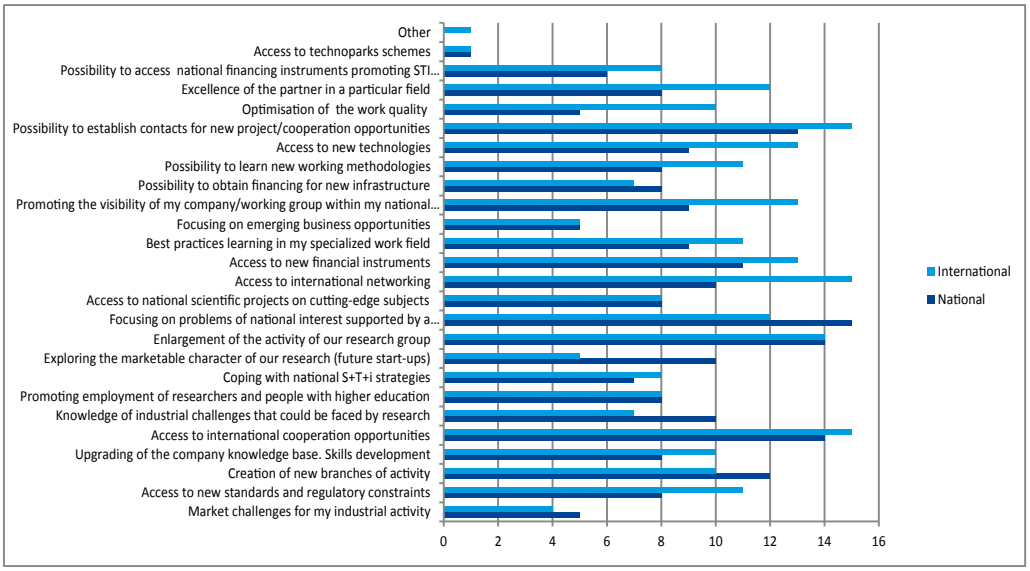

Figure 1. Pros that had an impact on the decision to start cooperation projects with Academia/Industry.
Source: MIRA *project survey to erawide coordinators.*

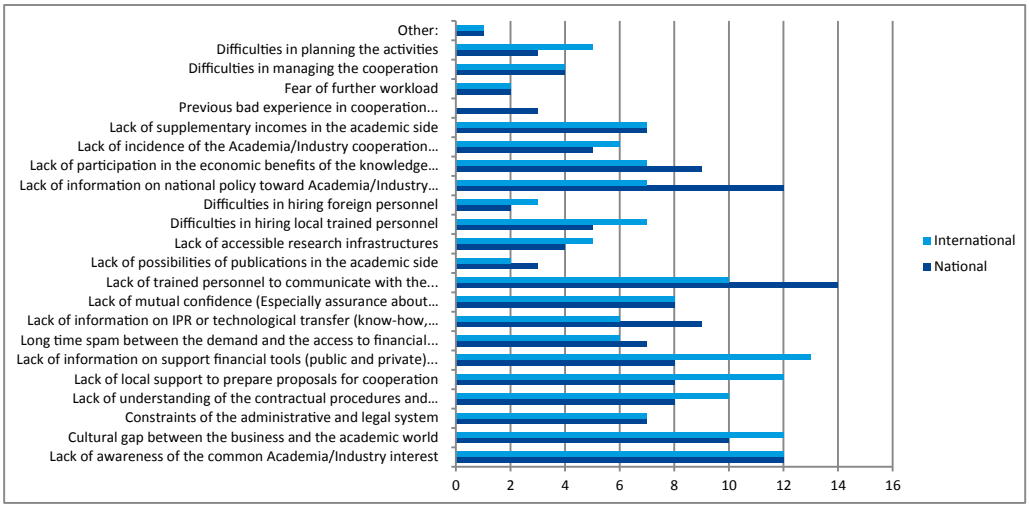

Figure 2. Cons in deciding to start cooperation projects with Academia/Industry.

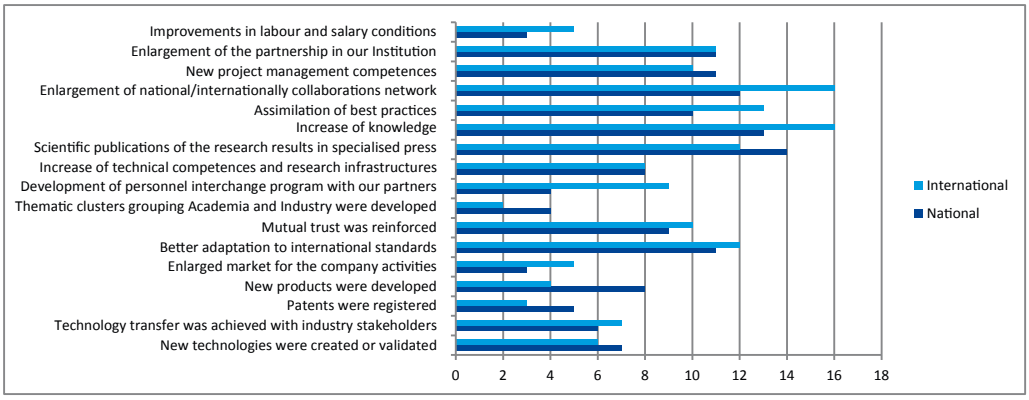

Figure 3. Main results/impact achieved when participating in the projects.

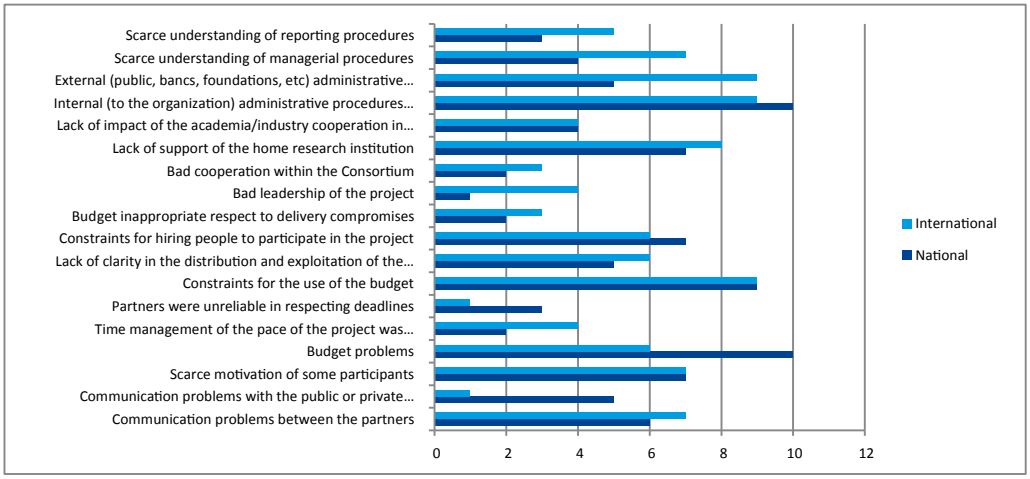

Figure 4. Main problems faced when participating in the projects.

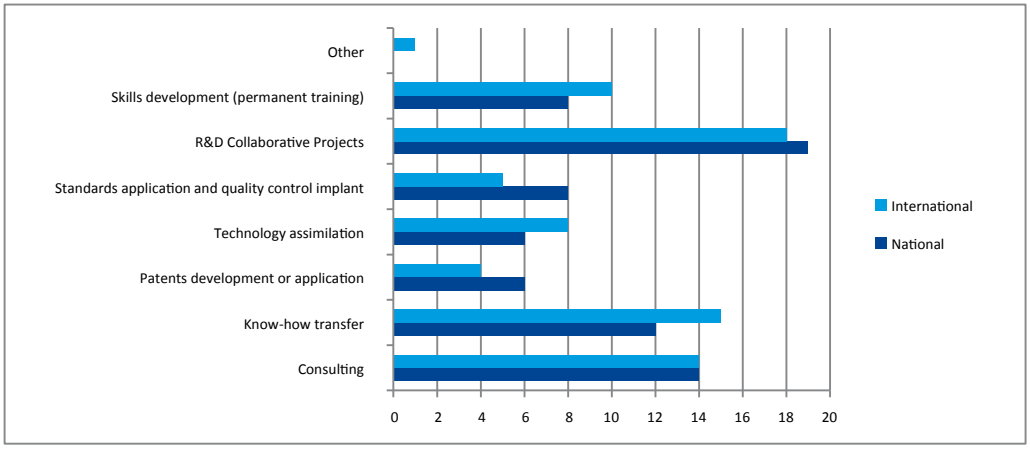

Figure 5. Instruments for Academia/Industry cooperation.

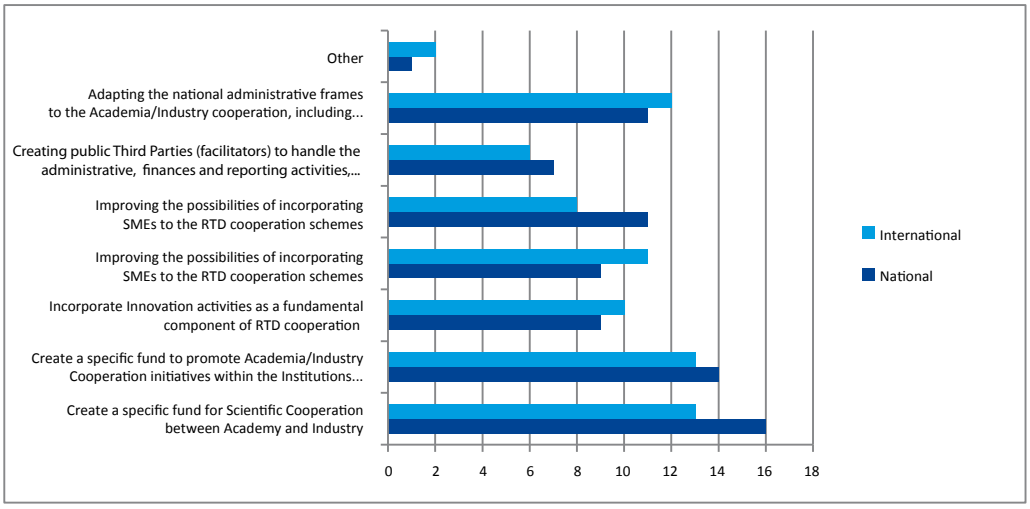

Figure 6. Suggestions to improve RTD cooperation between Academia/Industry.

III – Inputs and barriers to start cooperation between Academia and Industry projects

1. Inputs and barriers at national level

The opportunity to have a greater visibility and enlarge the scale and the scope of research at home is one of the main inputs to start cooperation projects involving both Academia and Industry at national level. Since the European Union is urging action to have industry more and more represented in cooperation projects co-financed by the European Commission, the possibility to start cooperation involving industries at national level is recently regarded as an opportunity to face competition in RI projects at community level (Fig. 1).

At the same time many problems still hamper Academia (Research)/Industry cooperation at national level.

First of all, many Mediterranean Partner Countries still have little awareness of the importance of this collaboration. The reasons range from the lack of incentives to mobility between the two sectors to the difficulties in finding proper partners, from cultural divide to poor communication about available opportunities.

It is a fact that industries and entrepreneurs are more often interested in fully recovering their investment in a short time. They know that research and academic activities may enhance and raise product standards, which in turn increases the benefits, but they lack a strategic long term vision that could be really useful to improve their technological skills. Moreover, the Industry in the Southern and Eastern Mediterranean Countries mainly consists of Small and Medium Sized Enterprises (SMEs) that have often no funds and no human capacity to start new cooperation projects with the Academia or projects in the arena of international cooperation. More information/ publicity and capacity building for such a “sophisticated” partnership is needed by the industrial sector, and some funds should be allocated to motivate industrialists to take the risk of investing time and human resources in these initiatives.

Several experts reported also that the level of awareness in the relationship between Industry and Academia is still in its infancy, also as regards research representatives, and that integrated initiatives and an extensive programme are required to bridge the gap.

It is worth mentioning here the efforts made by some governments in the Mediterranean countries such as Algeria with the ANVREDET - Agence Nationale de Valorisation des Résultats de la Recherche et du Développement Technologique -, and the ANDPME - Agence Nationale de Développement de la PME.

At the same time, little is known about the role that the International Financial Institutions could have in supporting cooperation between Academia and Industry in the Euro-Mediterranean region, especially for the infrastructure, while the potential for loan schemes and incentives to spur spin offs, incubators and labs should be increased.

As illustrated in Figure 2, other barriers hamper the process towards a closer cooperation between Industry and Academia:

- poor coordination among different institutions (Scientific Research/technical Ministries such as agriculture and industry);
- ad hoc measures to enhance capacity building of SMEs to trigger innovation processes.
- lack of joint initiatives of “training by doing”;
- lack of national incentives for Universities and Research institutions to make them closer to the business world;
- few networks of services providers and agencies specializing in research commercialisation (clusters, incubators, centralized and decentralized development of research, specialized financial institutions);
- non-effective communication strategies concerning opportunities for Academia-Industry cooperation;
- non-effective information on IPR issues;
- despite the encouragement and various efforts to develop Academia/Industry cooperation, effective cooperation remains very difficult.

2. Inputs and barriers at international level

With the forthcoming EU Framework Programme for RI, Horizon 2020, innovation will be the key issue in many cooperation initiatives that will be co-financed by the European Commission. Cooperation between Academia and Industry on specific objectives of common interest is therefore regarded as an urgent need.

The new EC strategies are a good incentive to start cooperation fully involving stakeholders and entrepreneurs. However the same barriers that hamper cooperation at national level seem to affect also international projects, as shown in Figure 2.

Indeed the experts indicated a large number of Academia-Academia international projects, dealing with innovation aspects, where they expected more impact and participation by Industry. However, in most cases, only services companies were involved, particularly those in the ICT sector.

At the international level, as on the national scale, the level of awareness about the relationship between Industry and Academia is still low and as a result, it is important to develop an intensive programme with a view to enhancing capacity building and spreading relevant information.

The encouragement and development of cooperation between Industry and Research should fall within various frameworks:

- Programmes under the Association Agreements with the EU.
- Twinning, joint projects co-financed by the European Commission.
- Programmes of the Mediterranean and Arabic area, co-funded by participating countries.
- Global partnership programmes on specific issues, such as those of ICARDA (International Centre for Agricultural Research in the Dry Areas), IWMI (International Water Management Institute), IFPRI (International Food Policy Research Institute) and so on.
- Bilateral cooperation.

In particular, new South-South cooperation projects should envisage the full involvement of Industry representatives and of the civil society.

The results will be two-fold: linking research to society and the economic needs while attracting Industry and young entrepreneurs to the new horizons opened by research. Finally it could be easier to understand the benefits that could derive from cooperation.

Other actions which have to be taken into account are the following:

- Possible future Academia-Industry collaboration out of ERAWIDE FP7 projects should be implemented.
- As at the national level, access to information and training is still limited. Awareness campaigns could be useful to promote Academia-Industry cooperation. Moreover, research institutes should use the media to inform about the specific benefits that the Industry could take from Research institutes capability.
- Adoption of appropriate legal, financial and administrative frameworks to facilitate the involvement of small and medium-sized enterprises (SMEs).
- Development of instruments more useful to support young entrepreneurs and innovative ideas (i.e. training/coaching).
- Further support to capacity building and mobility through ad-hoc schemes.

IV – Pros and Cons faced in projects involving Academia and Industry

1. Pros and Cons at national level

One of the main results of scientists' participation in projects involving both academia/research and Industry representatives at national level is a deeper knowledge of the impact that their work may have on production and competitiveness in their country. Both Academia and Industry representatives can witness that this may open new branches of activities and new prospects of cooperation at national but also at international level. They can together cope more effectively with national ST strategies while enhancing capacity building of their firm, body or institution.

Among the main results, mention should be made of the increased number of scientific publications, as reported in Figure 3. At the same time, there are many problems to be faced, as illustrated in Figure 4.

One of the most relevant issues is related to the heavy administrative and financial procedures. However, in practical terms, the biggest challenge is without doubt the heavy and complex procedure to mobilize funds (4-5 years minimum), which discourages many initiatives. Sometimes it also happens that the allocated budget is not available in the project starting phase and this makes things more complicated.

Moreover, poor communication and gaps in priorities are a difficult challenge to take up since each side does not fully understand the other`s motivation and language, due to the poor mutual knowledge of their respective cultural background (in terms of the day to day practice) and expectations. The result is the lack of trust.

Another issue is the lack of information about opportunities they have and also of knowledge about the infrastructure they could share, as it is – for example - in Palestine. One of the experts illustrated a particularly interesting problem: in the field of therapeutics, involving research on safety and efficacy of prototypes and production of recombinant therapeutic proteins. The main obstacles to cooperation between the research centre and Industry were the following:

- There was neither a collaboration context nor a clear contract procedure. All aspects concerning collaboration were discussed and decided at a personal level by the person responsible for the laboratory, without a clear legal framework, even if the collaboration experience deals with both governmental and private pharmaceutical companies: the main obstacle for governmental pharmaceutical companies was bureaucracy, while for the private companies the frequent change of the Company's head of research department reflecting on policies represented the main problem.
- The lack of clear rules on how to proceed with commercialization. Diagnostic kits for schistosomiasis and fascioliasis, for example, were kept on the shelf despite their proven efficacy at national level.

2. Pros and Cons at international level

Capacity building in dealing with international projects is one of the main results achieved, along with the use of best practices, increase in knowledge and technology base, as indicated in Figure 3.

This can partially balance the difficulties faced in implementing international cooperation activities: heavy administrative procedures, problems related to the harmonization of national and international rules, difficulties in reporting, as described in Figure 4.

Another aspect relates to some misunderstanding in the partners' role.

In several Mediterranean countries the following hurdles to regular cooperation still exist:

- Complexity of the procedure for the earmarking of funds based on several assessment and control steps, before being available to the research team. In addition, the procedure for the purchase of heavy equipment such as measuring devices, analysis or testing devices is extremely long.
- Hiring a person (assistant, technician, or even PhD to carry out an investigation for example ...) is submitted to the constraint of allowance threshold and the long time needed before signing a contract procedure. Thus, good quality candidates are not interested and the project coordinator spends his/her time in simple administrative tasks that could be performed by a less qualified person hired by a contract.
- A certain level of prejudice of EU Countries against the scientific quality of MPC partners to build real win-win relationships leads to waste opportunities.

The differences in time management and professional objectives, as indicated before, raise problems between researchers and industrialists: researchers want to have time for their R&D work and they wish to publish the results obtained as quickly as possible, while industrialists want to obtain and apply results quickly. The two groups have the feeling that they work according to a different time schedule, doing a different business.

Companies find it difficult to involve the University and research centres players in these programmes for which the latter receive no direct benefit. Research centres are exclusively focused on their core business: research.

As for national projects, there are also difficulties in communication between economic companies, administrative institutions and the research institutions. This landscape has to change incorporating the goal of supporting the production system innovation in the mission of the research centres.

In fact at present scientists and industrialists seem to talk a different language. This poses a communication problem that can be faced by improving the communication gates between the two sectors.

It is clear that policy makers, business people and also scientists involved in international cooperation strategies and actions should develop joint strategies and instruments to overcome these barriers that are seemingly insurmountable.

V – Suggestions to improve collaboration between Academia and Research

As reported in Figure 5, the survey was also useful to gain a better understanding of how to face the barriers described earlier.

It is suggested that, at both national and international level, a specific fund be created to spur links, new measures in EU funded projects be laid down to enhance participation of SMEs and improve Academia/Industry mobility schemes.

The results of the present survey were discussed in the "International Conference on Mediterranean Countries and EU Opportunities" (Pancera, 2012), held in Amman in October 22nd-23rd 2012, bringing together national and international policy makers, EC representatives, coordinators of projects co-funded by the European Commission, Industry representatives and stakeholders. The following suggestions were additionally included in the list reported in Figure 6:

- Need to design specific programmes more adapted to the Euro-Mediterranean region and field conditions.
- Further support capacity building and mobility through regional and co-financed schemes inspired from the ERA-WIDE, REG POT, IAPP and IRSES including South-South and North-North.
- Provide further support, guidance, coaching and expertise on how to turn the strategies into business plans complying with banks' criteria.
- Take advantage of ERA-WIDE experience as a basis for future activities through dissemination actions which should involve researchers, industry, the public and policy makers, clustering of EU funding recipients to show the impact, ROI (Return on Investment) as well as success stories to raise awareness about the importance of lifting barriers to success, maintenance of a regional platform to enhance the field experience.

VI – Comments

The survey analysis has highlighted some significant results which have provided the basis for an interesting discussion during the Amman Conference.

The starting point of cooperation at national or international level is more often the outcome of personal contacts, so gathering anonymous institutional information has a lower impact than favouring personal acquaintance.

There is a real public concern to improve Academia-Industry cooperation, but the available instruments - financial or of any other kind - are not appropriate and their management is discouraging. The internal organization of the research system and its legal framework are inconsistent in many regards and the qualification of the personnel in charge of the programme is low and consequently, the criteria adopted for resource allocation and management are not always relevant.

In the MPCs Academia and Industry should commit themselves more in joint research on standards, technology assimilation and knowledge transfer. A real patent policy should be developed with all the consequences involved, particularly in terms of financial and legal support, beyond voluntarism.

The Academia-Industry cooperation should be focused on strategic areas of national and regional interest in order to facilitate the internationalization of research and innovation efforts.

VII – Conclusions

As clearly indicated by the survey, at national level, most of the experts involved agreed on four main factors which hamper Academia/Industry collaboration:

- Cultural gap between the business and the academic world.
- Lack of qualified personnel.
- Lack of information about a policy directed towards Academia/Industry cooperation.
- Lack of participation in the economic benefits deriving from knowledge exploitation on the academic side.

At international level, the main issues are the following:

- Poor information on financial instruments and programmes (public and private).
- Difficulties in managing the resources allocated, poor capacity to prepare proposals for cooperation and scarce support by public administrations.
- Lack of awareness of the common Academia/Industry interest in the international arena.

At the national level the main hurdle to cooperation is represented by the internal administrative procedures in public administrations which are too complicated, along with the budget limits and the constraints on the use of resources.

At the international level the main problems are that the external (public, banks, foundations, etc.) and internal (inside the organization) administrative procedures are also too complicated, mainly due to the constraints on the use of the budget allocated for the international project.

In the light of the expansion of a Research, Development and Innovation (RDI) policy in the MPCs, the upgrading of education quality and the development of information and communication infrastructure prove to be fundamental to promote a knowledge-based economy. This could

also be a key enabler for MPC's efforts to meet the challenges of an innovation chain, i.e. all technical, financial and training mechanisms needed to support innovative projects throughout their duration, from the very beginning of the cycle to the final financing and exploitation phases.

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Annex 1

The list of ERA-WIDE Coordinators that answered the survey.

Name	*Surname*	*Project name*	*Country*	*E-mail address*	*Institution*
Abdessalam	El Khanchoufi	MAP2ERA	Morocco	elkhanchoufi@yahoo.fr	National Institute of Medicinal and Aromatic Plants (NIMAP)
Ahlame	Begdouri	MoICT	Morocco	abegdouri@gmail.com	Université Sidi Mohammed Ben Abdellah
Ali	Ferrah	FAWIRA	Algeria	aliferrah@gmail.com	Institut National de la Recherche Agronomique d'Algérie (INRAA)
Noureddine	Gabouze	NASERA	Algeria	gabouzenoureddine@udts.dz	Unité de Développement de la Technologie du Silicium (UDTS)
Latifa	Bousselmi	CB-WR-MED	Tunisia	latifa.bousselmi@certe.rnrt.tn	Centre de Recherches et des Technologies des Eaux (CERTE)
Hammadi	Ayadi	Probiotech	Tunisia	director.general@cbs.rnrt.tn	Centre de Biotechnologies de Sfax (CBS)
Sonia	Abdelhak	GM_NCD_in_co	Tunisia	sonia.abdelhak@pasteur.rns.tn	Institut Pasteur de Tunis (IPT)
Sanaa	Boutros	THEBERA	Egypt	sanaabotros@link.net	Theodor Bilharzias Research Institute (TBRI)
Khalid	Abdelghany	Adm-ERA	Egypt	kghany@rpcmrdi.org	Central Metallurgical Research and Development Institute (CMRDI)
Abd-Alla	Gad	SUDSOE	Egypt	agad@narss.sci.eg	National Authority for Remote Sensing and Space Sciences (NARSS)
Suzan	Kholeif	FORCE	Egypt	suzankholeif@gmail.com	National Institute of Oceanography and Fisheries (NIOF)
Hossam	Osman	RECOCAPE	Egypt	hosman@itida.gov.eg	Information Technology Industry Development Agency, SECC

Awadis	Arslan	SUWARESA	Syria	abarslan@scs-net.org	Administration of Natural Resources Research (ANRR) - General Commission for Scientific Agricultural Research (GCSAR) - Ministry of Agriculture and Agrarian Reform (MAAR)
Samira	Barghouthi	DEPBAL	Palestine	sbarghouthi3@hotmail.com	Al Quds University - Faculty of Science and Technology - Biology Department
Jad	Isaac	OLITREVA	Palestine	jad@arij.org	Applied Research Institute Jerusalem
Mustafa	Jarrar	SIERA	Palestine	mjarrar@birzeit.edu	Birzeit University - Sina Institute
Elise	Njeim	INCAM	Lebanon	enjeim@cnrs.edu.lb	Centre National pour la Recherche Scientifique (CNRS)
Maher A.	Sughayer	KHBCC	Jordan	msughayer@khcc.jo	King Hussain Cancer Center
Abeer	Al Bawab	JOCHERA	Jordan	drabeer@ju.edu.jo	University of Jordan - Hamidi Mango Center for Scientific Research
Sabah	Saifan	BOTERA	Jordan	saifan_sabah@yahoo.com	Royal Botanic Garden
Fida'a	Jibril	IJERA	Jordan	fida@emarcu.gov.jo	Environmental Monitoring and Research Central Unit of the Royal Scientific Society (EMARCU/RSS)
Abdoul Rauf	Rjoub	JEWEL	Jordan	abdoul@just.edu.jo	Jordan University of Science and Technology (JUST)

Participation of the MPCs in the European Research Area
Capacity building activities in MIRA Project

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Abstract. Capacity building, based on ad-hoc training initiatives on EU instruments and policies, is essential to improve international cooperation and enhance quality and quantity of Mediterranean Partner countries' participation in EU-funded projects. The final objective is to further enable scientists and institutions of Mediterranean Partner Countries to be key actors in the Euro-Mediterranean research and innovation partnership, while facing the main challenges of the years to come. Bottlenecks, proposed solutions and performed activities are illustrated and analysed.

Keywords. Capacity building – Instrument – Programme – Cooperation – Impact – Assessment.

Participation des PPM dans l'Espace Européen de la Recherche. Activités de renforcement des capacités dans le cadre du projet MIRA

Résumé. *Le renforcement des capacités, basé sur des initiatives de formation ad-hoc portant sur les instruments et les politiques communautaires, est essentiel pour améliorer la coopération internationale, au même titre que la qualité et la quantité de la participation des pays méditerranéens partenaires aux projets financés par l'UE. La perspective ultime est de continuer à permettre à des scientifiques et des institutions des pays partenaires méditerranéens de devenir des acteurs clés dans le partenariat euro-méditerranéen en matière de recherche et d'innovation, tout en faisant face aux principaux défis de l'avenir. Ce document illustre et analyse les obstacles, les solutions proposées et les activités réalisées.*

Mots-clés. *Renforcement des capacités – Instrument – Programme – Coopération – Impact – Evaluation.*

I – Introduction

Over the last years, the Mediterranean region has experienced a peculiar moment in its history due to the repercussions of economic crisis blowing across Europe and the socio-political changes in Arab countries. In the Southern Mediterranean area, the Arab Spring has completely changed the political, economic and social situation. The regional challenges can be summarized as follows: economic crisis, political and socio-economic instability, decreasing availability of research and development funds, reduction in international donors' funds, competition of comparable education/training institutions, discontinuous involvement of institutions.

Innovative and ambitious responses are needed to establish a renewed and closer partnership in research and innovation between the EU and its Mediterranean neighbours, namely capacity-building, cooperation in research and innovation as well as increased mobility opportunities for students, researchers and academics. The Euro-Mediterranean Ministerial Conference on Higher Education and Research (Cairo, 2007) stressed the need to move toward the creation of a Euro-Mediterranean Research and Innovation Area, also by promoting and supporting institutional capacity building and enhancing the participation of the Mediterranean Partner Countries (MPCs) in the FP, while taking into account their particular needs and the mutual interest and benefit. Throughout the Euro-Mediterranean Conference on Research and Innovation (Barcelona, 2012),

special emphasis was further placed on addressing urgent societal and economic issues in the Euro-Mediterranean region as effectively as possible, and helping transform the Mediterranean area into a zone for sustainable economic and cultural exchanges that benefit its inhabitants. The development of a Common Knowledge and Innovation Space and the EU's Innovation Agenda are two central aims of the Union's strategy, and its successful implementation and delivery of sustainable results depend also on activities aimed at building a common innovation and research-based culture. Among other aspects, this should unavoidably include the enhancement of national and regional capacity building.

Capacity building means to develop human, scientific and technological capacities and it is an approach toward development, which may be adopted by each Nation to respond to the multi-dimensional process of changing societies. It is not a series of events, training and workshops with default results and options. Therefore, any initiative, as also promoted in the MIRA project, could produce a relevant result if it is part of a larger and wider process aimed at facing the main challenges of international cooperation with the full involvement of national stakeholders. It may likely fill some of the main gaps and needs, while being related to other key projects and processes in the Mediterranean region.

Capacity-building activities for the MPC institutions (National Contact Points, Ministries, national research centres, etc.) could contribute to improved economic, environmental and social outcomes through some main pathways:

- Individual human capital that raises the productivity and hence the earning capacity of the individual, reflected in higher lifetime income.
- The efficiency of the institution, as it captures part of the returns from the individual improvement in productivity and, due to the "echo effect", it could improve the productivity of other workers, e.g. extension of their learning and adding to the local stock of knowledge. This is reflected in improved levels and/or reduced cost of services or outputs delivered by the institutions to local/national stakeholders.
- Innovation in the institution, as the culture and mindset changes, new and better ways of doing things are introduced and new services are developed. This is reflected in the changes in the services or outputs the institution delivers to local/national stakeholders.
- Effectiveness of the institution that interacts with the policy environment, targeting more to areas of need, attracting more resources and engaging more effectively in policy.

These pathways leading to '*changes in practice or behaviour'* reflect the capableness of the individuals and the institution they work for. The potentiality to utilize such capableness depends both on the quality of training activities (or any other capacity building action) and the degree to which the institution uses the skills, knowledge, networks and other capacities developed by the specific activities implemented.

II – Capacity Building of NCPs in Mediterranean Partner Countries: problems to be faced and first results

In the last ten years, a number of cooperation networks have been created through programmes that are either *bilateral* (state-to-state, or EU-single state) or *multilateral* (framework programme or major regional programmes), yielding significant achievements in building a common Euro-Mediterranean area of research and innovation.

Certain research fields offer real collaboration opportunities based on mutual interest, and a large part of the scientific community in the MPCs has forged and now maintains strong ties with

universities and research centres in the EU. In this complex framework, promoting the human resources development through capacity building within scientific and cooperation activities has always been a priority and, among other things, the National Contact Points (NCPs) played an essential role.

The NCPs all over the world have been established by regional or national authorities to ensure the necessary support to actions financed by the European Commission (EC). They provide information and assistance to the research community of their own Countries to take part in the Framework Programme (FP) for RTD, a set of EU programme instruments that pursue strategic objectives in selected areas, apply specific rules, support EU policies for Research and Innovation (EC, 2006), including international cooperation[1]. Therefore, to act as an NCP is not an easy task, especially for Mediterranean Partner Countries that, since 2004, have been working to represent and foster EU programmes and strategies in their own Countries.

Several specific projects have been co-financed by the EC to improve the basis for NCPs in the MPCs and building networks among them, in particular: EURO-MEDANET (funded under the 6th FP and implemented in 2004-2006) and ERAMED (funded under the 6th FP and implemented in 2006-2008), aimed at stimulating the participation of the MPCs in EU-funded R&D projects. Through a "mapping exercise", the ERAMED project identified national, public and large-scale R&D Programmes of the MPCs and compared the results coming from the participation of each MPC in the recent Framework Programmes (from the 4th FP to the 6th FP).

When MIRA project started its activities, in 2008, only one year had passed since the launch of FP7 (2007-2014) and although projects like ERAMED helped the Mediterranean NCPs, stakeholders and institutions understand and manage the FP, the changes about the role and the activities of international cooperation were not easy to be endorsed and explained to them. The change in structure and the identification of SICAs in each Work Plan of the thematic sectors under the FP7 Cooperation Programme were two of the main issues the NCPs of Mediterranean Partner Countries needed to face. Moreover, as reported by NCPs, a lot of scattered information and different rules of participation were among the main obstacles for the MPCs to take part in the FP projects. Finally, there were also problems related to the lack of recognition of the important role of the National Contact Points in some MPCs, the lack of networking with the NCPs of EU Countries and scarcity of human and financial resources to organise INFO-days and involve scientific communities. These difficulties clearly emerged from the results of the first survey on the NCPs of Mediterranean Countries carried out in 2008 in the framework of MIRA project activities. The survey was based on a Questionnaire sent to all those in charge of the International Cooperation Partner Countries (ICPC) Information Points of the Mediterranean region. The collected data, referred to the period 2004-08, contributed to better define activities, problems, achievements and prospects of the NCPs and clarified their role towards the EC, other EU NCPs and relevant stakeholders at both national and international level. Data collection and assessment were performed by the National Hellenic Research Foundation (NHRF) and consisted of 3 parts: general comments based on the replies to the Questionnaires, specific comments and condensed raw data (MIRA, 2008).

The participation of MPC institutions in the EU Framework Programme and, consequently, the spur of the Mediterranean scientific community to participate through the NCPs, reflect first of all a common political willingness to cooperate with the EU in ST. In principle, such a decision and commitment existed for all the MPCs in 2008, when MIRA project was still in its infancy, and most of NCPs had been established. Nevertheless, NPCs expressed many specific needs: being duly recognized by national authorities and equipped accordingly, helping MPC researchers to successfully coordinate EU projects; implementing an NCP network in the Mediterranean area to exchange best practices and relevant information.

Funding for their maintenance and activities is a delicate matter for NCPs. In most cases, financial resources were provided by two sources:

– the hosting Country: contributing substantially through allocation of permanent staff, office space, equipment and telecommunications;

– the European Union: through several FP projects, contributing mainly to their capacity building and providing funds to support the organization of their activities such as info-days, brokerage events, etc.

In spite of the recognition of the role of the European Commission in supporting their activities, it is clear that, starting from the forthcoming FP (Horizon 2020, 2014-2020), the NCPs of the Mediterranean Countries need to have the same "stature" and EC co-funding as their colleagues of EU Member States. In recent years, the organizational model of many MPC-NCPs has changed and it is now more similar to those of EU Member States. Some significant outcomes of the organizational structure of the MPCs, as in 2008, are provided in Table 1 and Table 2 that report – respectively - the type of host institution and the organizational model of the NCPs.

Table 1. Type of host institution of the Mediterranean NCPs. Legend: (R) Research Centre; (E) Educational Centre; (A): Administration (O): Other.

	Algeria	**Egypt**	**Jordan**	**Lebanon**	**Morocco**	**Palestine**	**Syria**	**Tunisia**
University	-	-	-	x (E)	-	-	x (E, R)	-
Research centre	x (R)	-	-	x (R)	-	-	-	-
Public body	-	x (R)	-	-	x (A)	x (E,R)	-	x (A)
Private Company	-	-	-	-	-	-	-	-
Other (specify)	-	-	Gov. Agency	-	-	-	-	-

Source: Report MIRA project – Evaluation of Contact Point structures of the MPCs, 2008.

Table 2. Organizational model of the NCPs

	AL	**EG**	**JO**	**LEB**	**MO**	**PA**	**SY**	**TU**
Network of thematic contact points	-	☑	-	-	-	-	-	-
Network of institutional Contact points	-	☑	☑	☑	☑		-	☑
Only National Contact Points	☑	-	-	☑	-	☑	☑	-

Source: Report MIRA project – Evaluation of Contact Point structures of the MPCs, 2008.

Although a centralised unit may prove to be very efficient, a more "decentralized structure" through the setting up of a network of (local) contact points/multipliers under the responsibility of a focal unit is more promising. Tangible advantages of the latter model are: a better knowledge

of the local research landscape, familiarity with "face to face" discussions with stakeholders, a more efficient organization of local events. MIRA Capacity Building activities (CBA) for the MPCs were adjusted to the specific situations and demands of the recipient Countries, also answering the needs that result when shifting from a specific organizational model to another one or solving specific problems (as in the case of the Palestinian NCP in November 2008 and of the Tunisian NCP, in 2010: in both cases, MIRA actions were useful to strengthen the NCPs and overcome obstacles to their activity).

Generally speaking, MIRA CBA may be divided into:

- training actions (on-the-job training, workshops and seminars);
- technical assistance and advice (e.g. on improving standards and standard operating procedures);
- development and dissemination of tools (manuals, guidelines, training materials, etc.);
- support to networking of NCPs.

Among other things, some significant MIRA activities implemented for promoting capacity building were the following: *Training seminar for officers of MPC-NCPs* (Egypt, 2009) and for NCPs *on Financial and Legal Issues* (Beirut, 17-18/01/2013), organised to handle financial rules and IPR issues while fostering a regional network of the NCPs in the Mediterranean; *Training course on auditing* (Tunis, 2010), *Training seminars for local scientists and administrative officers from the MPCs, to improve the quantity and quality of participation in FP7 projects and raise awareness of FP7 opportunities* (Bari, 2009 and 2011).

As reported in the analyses performed by the NCPs in 2012, great progress has been made in the last years (2008-2012). Achievements are summed up in Table 3 where the main issues to be faced in future, as perceived by the NCPs of the countries concerned, are also reported. The data were extrapolated from the assessment interviews carried out before the MIRA Management Board Meeting held in Casablanca in February 2012. On that occasion, also some suggestions from the MPC NCPs to spur participation in the FP and raise awareness on policies and instruments of EU were provided.

In particular, through the MIRA capacity building activities, the event organised in Egypt in 2009 for Mediterranean NCPs offered the opportunity to start a more intensive dialogue at regional level, to favour networking and give impetus to the debate on the role of NCPs at national level. Also the training seminar on auditors paved the way for discussion on the real/potential role of auditors, a remarkable figure for the Mediterranean Partner Countries. Most of the events urged the NCPs' staff to be more self-confident and also provided material for further training and info-days.

Table 3. Recent achievements and future challenges of the MPC-NCPs.

COUNTRY	*RECENT PROGRESS*	*FUTURE CHALLENGES*
 ALGERIA	Since 2008, the NCP has increased both the number of participations in FP7 co-funded projects and the number of contacts of IP with EU NCP.	To involve more personnel in the NCP, to propose twinning actions, to participate in regional projects.
 EGYPT	The IP has a great deal of contacts also with industrial representatives, and Egypt has a considerable number of participations in FP7. The use of mobility schemes co-financed by the EC has increased.	To apply the principle of co-ownership and co-funding in EU projects, in line with MoCo conclusions.
 JORDAN	Success rate in terms of participation in FP7 of Jordanian researchers has increased. The most important recent change is the official nomination of six Jordanian thematic NCPs covering the following sectors: KBBE, Health, Environment, Energy, NMP and ICT. The BILAT EU-JordanNet is supporting the thematic NCPs through developing their action plans and, in collaboration with MIRA, some events to enhance awareness of EU policies and opportunities were envisaged.[2]	To develop the capacities of the newly established thematic NCPs; to build the capacities of the new project coordinators (7 ERAWIDE projects have been funded so far); to give more visibility of the Jordan RDI community to European countries.
 MOROCCO	The number of participations in FP7 has increased and organization of IP is moving towards a decentralized network. Call for proposals have been launched by the Moroccan Ministry of Research to have thematic NCPs for the following sectors: FAB, ICT, ENERGY, ENV, HEALTH, SMEs. Also dissemination and training activities have increased significantly: 26 info-days and training seminars (from June 2010 to December 2011) were organized.	– Researchers' motivation suffering from heavy financial and administrative procedures; – Poor participation in large scale CP; – Urgent need to have more involvement in EU projects with socio-economic impact; – Addressing IPR and ethical issues.
 PALESTINE	The number of Palestinian project proposals submitted to the EC and the involvement of the scientific community has increased. At present, no. 4 ERA-WIDE projects co-funded by EC under FP7 involve Palestinian representatives.	To further improve networking with other IPs.
 TUNISIA	Tunisian NCPs moved towards a set-up based on different contact persons for the main FP7 thematic sectors: KBBE, Health, ICT, Environment, Energy, and NMP. For three of these sectors, a network with EU NCPs was created, thanks also to the coordination between MIRA and other projects co-funded by the EC for NCPs and, above all, to the BILAT coordinated by the Tunisian NCP.	To implement networks also in other sectors, to spur clustering and foster innovation activities.

Source: Elaboration by M. Rossano, MIRA project report on Capacity building in the MPCs, 2012.

When assessing the activities implemented in the last five years by the NCPs, one should also consider that they were planned and designed in 2007, when the social, economic and institutional framework of many Mediterranean countries was different. Uprising in many countries and political changes in the areas concerned have inevitably influenced, and in some cases weakened, the activities of the NCPs.

Some MPCs - and Morocco in particular - stressed that some critical questions still need to be addressed in future:

- "*Act as being one*": consolidating achievements, notably by elaborating a database of training material, including practical exercises and useful guides for the MPCs; adopting a "Handbook of good practices of MPC NCPs" as reference document;
- *Maximize complementarities*: possible synergies on capacity building events could be achieved in future, also with reference to TEMPUS events.

The same issues were highlighted during the MIRA International Conference on the MPCs and EU opportunities (Amman, 2012). During the conference, the need for *"a Mediterranean set"* of capacity building activities, shaped and conceived to respond to regional specific issues was also emphasized as a must to create an environment conducive to South-South Cooperation, while further integrating the MPCs into ERA.

III – Training activities on FP7: methodological aspects and instruments for training assessment

Training activities are a useful tool to improve the quality of MPC participation in the projects co-funded by the European Commission by increasing skills and understanding of the administrative and technical issues related to the handling of FP projects, while heightening awareness of EU programmes and regional strategies. In this framework, the training activities implemented from 2009 through 2012 involved about 150 trainees from 8 MPCs and were carried out following a highly flexible approach, with the academic contribution by speakers coming from partner research institutions and international organizations. Lessons were integrated with exercises, open discussion and technical documents, under the supervision of tutors.

To assess the implemented activities, a feedback questionnaire was provided for each training activity to improve the future CBAs, as well as to propose priorities/suggestions to be addressed to the European Commission.

In particular, figure 1 shows the national composition of a sample of 76 trainees attending the CBA *for "Local scientists and administrative officers from the MPCs, to improve the quantity and the quality of participation in FP7 projects and raise awareness of FP7 opportunities"* (organized in Bari in 2009 and 2011 and also in Tunis in 2010).

The assessment of the results of the questionnaire emphasized that participants appreciated training activities, both in terms of understanding FP7 and its rules, becoming aware of EU strategies and activities. Many of the participants were very pro-active and asked for further training activities in their Countries. They pointed out difficulties and suggestions to improve cooperation with the MPCs. As a general suggestion, they asked for training modules more linked to thematic workshops and other activities in their countries in order to avoid fragmentation of efforts and gain out of synergies.

For data completeness, the participants who responded to the feedback questionnaire were 15 trainees in 2009 and 13 trainees in 2011. Some of the most significant results are reported in Annex I.

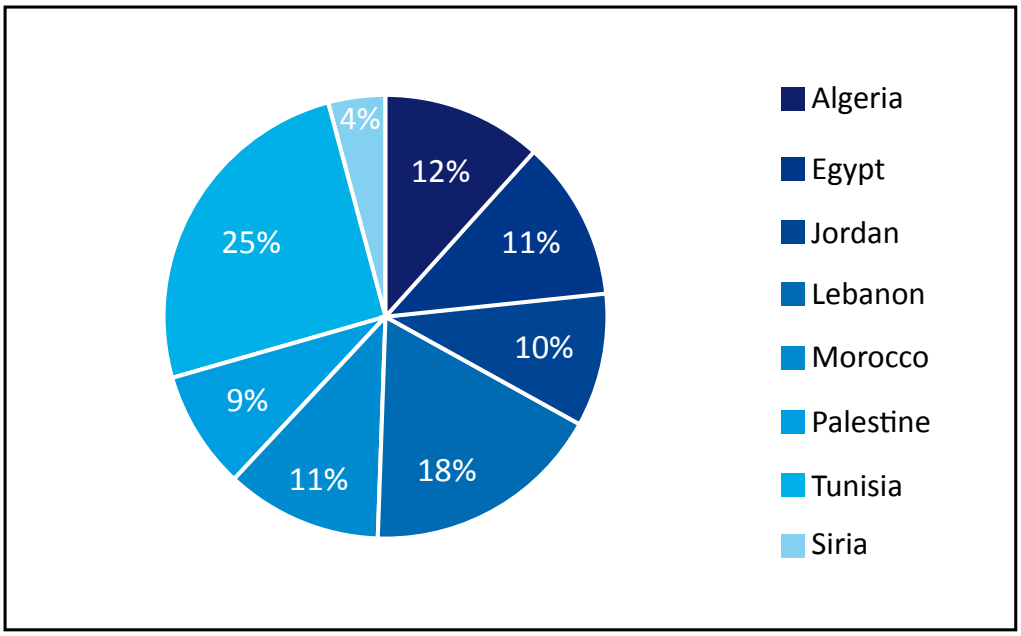

Figure 1. Country of origin of the 76 trainees involved in MIRA training activities.

Source: MIRA Project report WP3, Task 5, Feedback questionnaires, year 2009, 2010 and 2011.

The results of the Questionnaire emphasized that participants appreciated the training activities that allowed them to get a good grasp of FP7 and its rules, and to be aware of EU strategies and activities. Many of the participants were very pro-active and asked for further training activities in their Countries. They also pointed out difficulties and suggestions to improve cooperation with the MPCs. As a general suggestion, they asked for training modules more linked to thematic workshops and other activities in their countries in order to avoid fragmentation of efforts and gain from synergies.

Specifically for the training activity implemented in Bari in 2009, the most significant results concerning the three phases of building a cooperation activity under FP7 (Survey, 2009) were assessed and they are reported in Table 4.

IV – A proposal of analytical framework: from inputs to benefits of capacity building activities

The application of an analytical framework is the first step to assess benefits of training and other capacity building initiatives. The framework described in this paragraph aims to elucidate the linkages between the training provided and the intended or observed benefits, thus facilitating the attribution of benefits to specific capacity building investments. The value of capacity building depends on impacts resulting from the change in practice and behaviour of institutions. For estimating impacts, the transferability of experimental results to practice should be known. Therefore, this analytical framework aims at clearly linking benefits, such as increased institutional performance, with specific investments in capacity building activities, and presents the array of pathways through which capacity building investments can result in benefits. The pathways may be direct or indirect, strong or weak, certain or highly uncertain. As far as MIRA CBAs (Capacity Building Activities) are concerned, the analytical framework is illustrated in Figure 2. In this case

study, the focus is on CBAs related to the participation of the MPCs in FP7 projects, so the benefits accruing to the involved institutions and research communities are the main concern. The benefits for the individuals involved in training (and resulting indirectly from the scientific development in the country) can also be identified and assessed for MIRA CBAs, as shown in Figure 2:

Table 4. Problems and suggestions to write and manage FP7 projects.

	MAIN PROBLEMS	***SUGGESTIONS***
Partnership building for participating in FP7	- It is not easy for the MPCs to identify project partners, especially because it is not evident to find common interests in research areas of mutual interest and benefit; - Information on Cordis partner service is not continuously updated; - Lack of confidence when a non-European country tries to build a consortium and act as a coordinator to set up projects on specific themes (e.g. migration); - It is difficult to build a strong partnership without mutual trust, and sometimes partnerships are based only on personal relations; - Lack of awareness on common interest research topics for the Mediterranean region.	- List of partners categorized according to their specialities. These partners should be from the EU or associated countries; - To organize meetings with researchers experienced in participation in FP6 and FP7. - Participation in info-days; - More specific actions to foster the participation of the MPCs in the FP.
Writing a project proposal	- Overload of administrative tasks; - Often administrative staff are not well informed on how to fill European projects forms; - Lack of experience in writing a project and lack of knowledge of project evaluation process by the EC; - The time granted for drafting the projects is usually short, and it is then difficult to respond in time especially when the partnership has been recently established; - A gap in scientific interest between Northern and Southern countries.	- Support from organizations specialized in project management; - To provide some templates of projects already accepted, and also assistance to researchers during the planning phase; - More training courses for improving MPC capacity building - Exchange of experience with persons who have managed and written projects; - Specific courses for project coordinators.
Managing a project under FP7	- Difficulties in financial issues and in technical reporting; - Misunderstanding of the EU rules. Lack of experienced administrators for managing this kind of projects; - Lack of competence for financial management; - Complexity in project management and inadequacy in complying with the national regulations.	- To adopt a more streamlined and clear procedure; - To enhance trustful relations between the coordinator and partners to get guidance in any financial issue; - Organization of training seminars and workshops concerning FP7 project management; - To consider the specific institutional system of each country and identify and agree upon applicable rules, especially for the financial process, since the beginning; - Tutoring support to benefit from experts' or officers' experiences.

Source: Elaboration by C. Morini from results of "MIRA – Assessment Questionnaire of the Training Seminar on writing and management of FP7 projects for local scientists and administrative officers of Mediterranean Partner Countries - Bari, 2009.

1. Capacity building inputs are: expenditure on training by suppliers and participants, including the value of time and in kind support.
2. Changes in practices and behaviour: i) for individual trainees: knowledge gained; skills developed; awareness and understanding enhanced; contacts and networks formed; ii) for the institution they work for: training of other staff (which in turn leads to: application of the capacity to work to improve quality, effectiveness and/or efficiency of service delivery, policy advice utilization of new tools; greater networking, accessing information, improved internal communications, etc.).
3. Impact of changes arising from capacity utilized on the local stakeholders: developing partnership, favouring information access, spurring participation in EC calls for proposals, regulations knowledge, creation of internal planning office;
4. Benefits: besides measurable benefits (government's cost saving, increased participation in EU calls, etc.) there are long-term ones requiring an in-depth analysis that considers external factors such as policy stability, governance hindering factors, and operating framework.

In a nutshell, in order to evaluate the impact of any CBA two steps are generally followed:

Step 1: Utilize the framework to identify the changes occurring as a result of training (map the pathways). In order to demonstrate that a capacity building activity has led to the benefits observed, it is first necessary to identify linkages between a capacity building activity and the benefits attributable to it. These linkages are the existing or potential changes that occur between the different levels as set out in the analytical framework. Therefore, identification of changes is required at each level, by mapping the links on the pathway from inputs to benefits or expected benefits. This approach includes measures and "indicators of change", using a combination of quantitative and qualitative data.

The framework provided is intended as a general model and may vary according to particular CBAs. However, the reported categories and examples are not exhaustive, the framework should be regarded as a living document and thus updated as new pathways and categories emerge.

Step 2. Determine measures and indicators to verify the identified changes. Once the change occurring as a result of training has been identified at the respective level, measures and/or indicators that enable the validity of this link in the pathway towards the benefits to be verified must be identified. Ideally, measures will be available at each level.

For example, taking into account the above-mentioned MIRA CBA experience:

- Measures for inputs may be: financial cost, in-kind contribution, time associated with the capacity building activity.
- Measures for changes in practices and behaviour: i) at the individual level, assessment of learning achieved, clear perception and application of new skills; ii) at the institutional level: adoption of more innovative approaches, expansion and/or improvement of quality of services provided.
- Measures for impact: number of new procedures adopted, improved quantity of trainees, increased number of national/international collaborations/partnerships.
- Measures for benefits in the medium term could be the "spread" between the "expected benefits" with most favourable external conditions and the "real achieved benefits", once the impact of the external factors has been duly analysed and correlated to the external conditions envisaged when conceiving and planning the CBA.

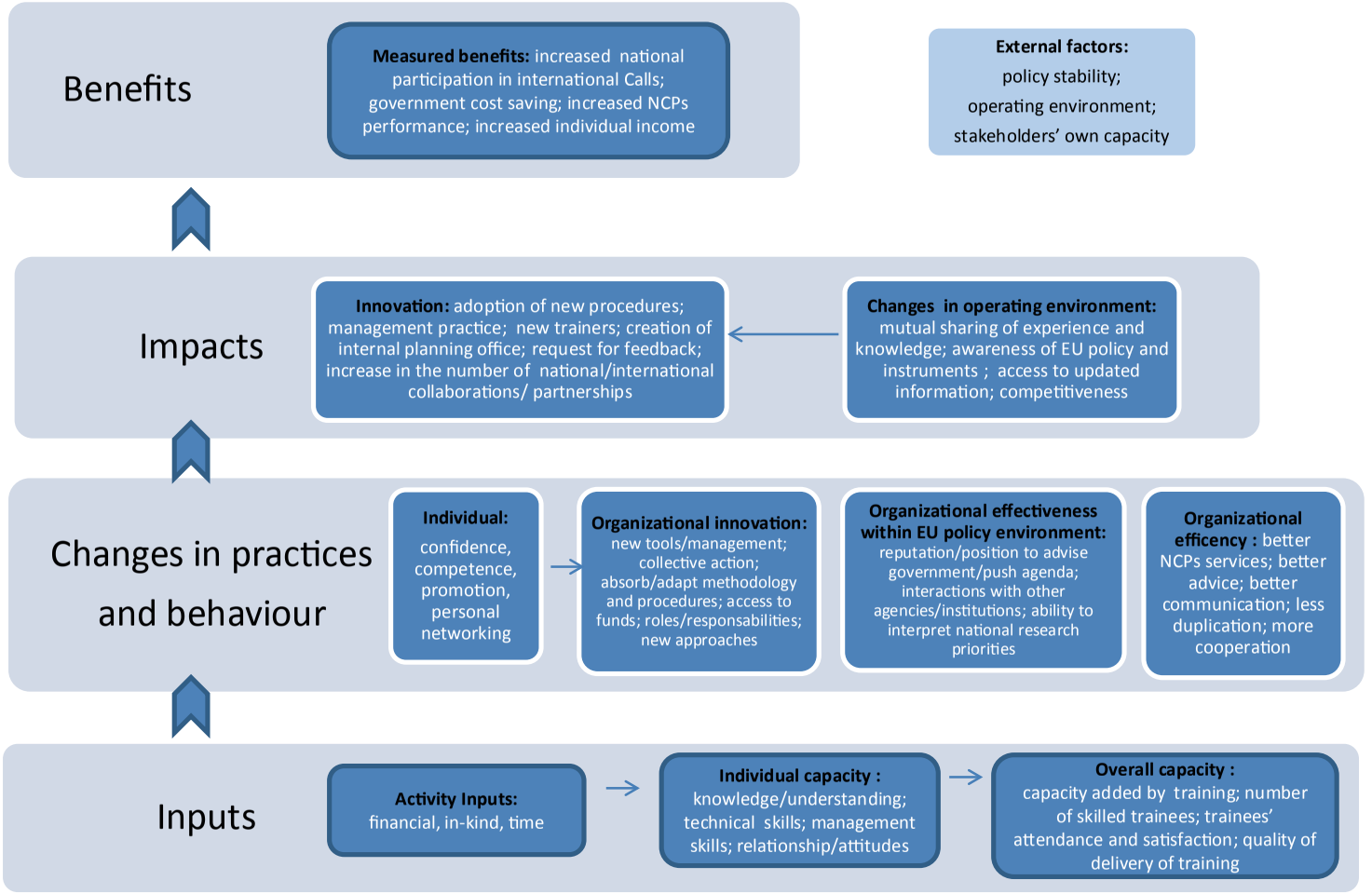

Figure 2. The analytical framework: from input to benefits of capacity building activity, especially training on FP7 for MED countries. (Data processing based on results of post-training surveys by C. Morini and M. Rossano; Graphic design: A. Errico, 2013).

V – Lessons learnt and future challenges dealing with EU projects for Euro-Mediterranean cooperation

As shown by the feedback questionnaire, the addressees reacted positively to their training. They considered it very useful for their job, for enhancing awareness of EU opportunities and possibilities to integrate the MPCs in the European Research Area, and achieving a better understanding of FP projects planning, writing and management. They were also made aware of the importance to measure the impact of projects and build initiatives where the MPCs may act as co-owners. The results pointed out a "thirst for knowledge" about these topics, the efforts made for improving RI in the Mediterranean region, cementing cooperation and partnership through the impressive work done so far, and the future steps. This assessment also highlighted the importance of working as a team during training implementation, sharing documentation and exercises, and exchanging useful suggestions when needed. Sometimes, capacity building activities connected scientists of different background, promoting knowledge exchange and mutual trust, and creating landmarks for promoting high quality cooperation initiatives.

The major trends and changes outlined in this analysis are at the same time opportunities and challenges for institutions in Mediterranean partner countries, which are called upon to play a vital capacity building role in support of cooperation development. As far as training is concerned, the use of "*edutainments*" tools (educational – entertainments) that actively involved the trainees was quite successful. Seminars with on-line exercises, web-based activities, access to digital libraries, promoting familiarity with EC procedures and websites are examples of the new learning enhancing opportunities that increased connectivity can offer to research centres and institutions in the Mediterranean Countries. This allowed us to share experiences, lessons learnt and best practices. Moreover, combining regular training courses with practical activities gives more opportunity for human interaction and development of the social aspects related to learning. For the future, NCPs suggested that to further motivate scientific communities and spur decision makers to support NCPs and their activities, Regional Fora could be organized periodically to show statistics on co-financed projects, case histories, value added for the Mediterranean Countries involved, in the presence of national policy makers and the major representatives from both EU and MP countries. Training participants also recommended performing systematic monitoring and evaluation in order to consolidate the project implementation conditions and measure their related impacts.

Many problems still need to be solved for improving the process of cooperation in its multiple dimensions: scientific, administrative and financial. The heavy and cumbersome administration of the EU projects is one of the barriers to cope with. In the last years, excellent scientists from the MPCs progressively distanced from the Framework Programme due to the difficulties in handling the administrative aspects of participating in a project, as they have very little technical and administrative support from their administrations - though this aspect is slowly being solved - and to the enormous amount of effort and time required for reporting and other tasks that are not strictly related to scientific activity. One main problem the scientific community faces is the administrative constraint of complying with the principle of strict control of expenses related to the project and the consequent financial and personnel burden for reporting, audits and other activities based on this principle. In contrast, the scientific content and results of the activities and its impacts do not rank among the main issues of the projects.

To stimulate or support the necessary EU-MPC cooperation in research and innovation, further capacity building of administrators in the MPCs is needed and the specific characteristics of international cooperation must be considered in the EU Financial Rules. The "Third Parties" concept, i.e. support structures or companies for handling the funding received by MPC partners, must be developed and stimulated in order to leave the managerial tasks of accounting and reporting in professional's hands and provide services to the MPC participants in the cooperation

projects. At this moment in time, there is a wide perception that the opportunities offered by the European Programmes for ST cooperation to the MPCs are much more “difficult to handle” than the Chinese, American, Brazilian or Russian programmes (Rodriguez and El-Zoheiry, 2012), and there is a net transfer of partnering from the traditional European partners to those coming from other Countries.

VI – Conclusions

Capacity building is at the heart of tomorrow’s regional employment, innovation, stability and prosperity. All the Mediterranean countries will benefit from it, if it becomes easier for individuals, research institutes, universities and companies to cooperate. Any obstacle to the cross-border flow of people, ideas and funding has to be removed. Mutual benefits will emerge from increased cooperation between North and South Mediterranean, between academia and industry, between national and European initiatives, between European programmes and activities such as Structural Funds, Horizon 2020, EU neighbouring policy, and so on. Therefore, there is urgent need to capitalise on what has been done so far. Capacity building also facilitates the construction and use of critical mass of competences and stimulates cross-fertilization among national and international research teams. To facilitate capacity building and empowerment of transformative networks, major recommendations concern also the need for a well-structured approach of both “capacity” and “power” building. Both dimensions – capacity building and empowerment - are key factors. On one hand, it is necessary to strengthen project and institutional management capabilities; on the other hand, it is also necessary to facilitate building up efficient transformative networks and coalitions of change. These networks and coalitions, operating as a bridge between the Southern and the Northern rims, include many different types of people, beyond the scientific communities. Particularly important are: the business sector (that needs to be involved as much as possible in project design and implementation, by matching funds and appropriate public/private partnership mechanisms); the civil society and young researchers. Thus, capacity building should be the interface between Research and Innovation systems that, in general, have only random contacts as they fit different demands and expectations. The creation of mutual acknowledgement and trust between the actors of these systems is a prerequisite to make the most of the efforts in knowledge exploitation in the MPCs.

Thus, the main intervention strategy for capacity building should include a vaster array of actions such as organizational reforms, institutional strengthening, science-policy interfacing, training and networking, as well as participatory approach implementation. Taking into account the new approaches that will prevail in Horizon 2020, notably co-funding and co-ownership, the activities of capacity building may require a combination of various competences from EC and EU/MPC countries. The new schemes of R&D cooperation and new rules of management require that training plan for trainers be prepared. Moreover, training seminars could be followed by twinning activities in order to extend the scope of cooperation while putting capacity building at the core of the new regional strategic Research Agenda. In a time of increased global competition, it is urgent that Europe and Southern Mediterranean countries pool their resources of talent and knowledge for a better and shared future.

Notes

[1] Some of the several tasks of an NCP: a) *Informing, awareness raising* (to circulate general and specific information, i.e. calls for proposals, possibilities and rules for participation; organising promotional activities with the European Commission; raising awareness for general EU objectives; giving notices of other EU programmes); b) *advising, assisting and training* (to explain the modalities for participation; advise on administrative and contractual issues, responsibilities of partners, costs, IPR, etc; assisting in partner search, stimulating participation of new partners; advising in project management); c) *Signposting* (to inform the European Commission about planned activities and involve EC staff; to signpost the path for other EU network services; to give feedback to the EC; to signpost the path for national or regional funding and support organizations where appropriate). An efficient NCP should represent a centre of expertise on EU RTD opportunities, be impartial, have knowledge of the local research landscape, understand innovation processes, reach the national research community and other stakeholders, have skills in RTD management and financing, be an active and accepted partner of the international system for partner search, be in contact with all the other NCPs. Moreover, it needs to cooperate with other RTD networks at national and regional level, to ensure transnational exchange of experiences and best practice, to have communication skills, and ability to moderate meetings and to organise promotion actions, to assess the work and provide feedback.

[2] Within the ST Co-operation Agreement, Jordan has identified energy, sustainable development, health, ICT and agriculture as priorities for international co-operation in research, which will help Jordan authorities in formulating and implementing national Research Strategies.

[3] It is the so-called bottom-up approach, which is useful to see the results of each activity but less useful in evaluating the cumulative effects of different types of interventions spread over time. For example, if an organization receives capacity support from a number of different stakeholders in the same area of its work, the bottom-up method is less suited to dealing with the complexity. Additionally, the bottom-up method makes no attempt to measure the overall capacity of an organization. It is only interested in those areas of capacity that are being supported through capacity building activities.

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- *Evaluation of Contact Points structures of the MPCs (2008).* www.miraproject.eu
- *Report on Auditing Training Workshop* - www.miraproject.eu/workgroups-area/workgroup.wp2/workgroup-documents-library/training-seminars/audit-training-workshop/Minutes%20MIRA%20Audit%20Training.pdf/view)
- *Report on the IP Training Seminar for Palestine – Deliverable no.18* - www.miraproject.eu
- *Report on the Training for officers of the IP of the MPCs regarding specific issues related to the setting and evolution of FP7 projects.* www.miraproject.eu

ANNEX I

PROBLEMS, NEEDS AND SUGGESTIONS TO IMPROVE MPC PARTICIPATION IN FP7

The main results of problems, needs and suggestions to improve MPC participation in FP7 resulting from MIRA Feedback questionnaires administered in 2009 and 2011 are graphically presented in the following figures. The answers given by interviewees are on ordinate and the number of interviewees is on abscissa.

I – MAIN PROBLEMS/BOTTLENECKS

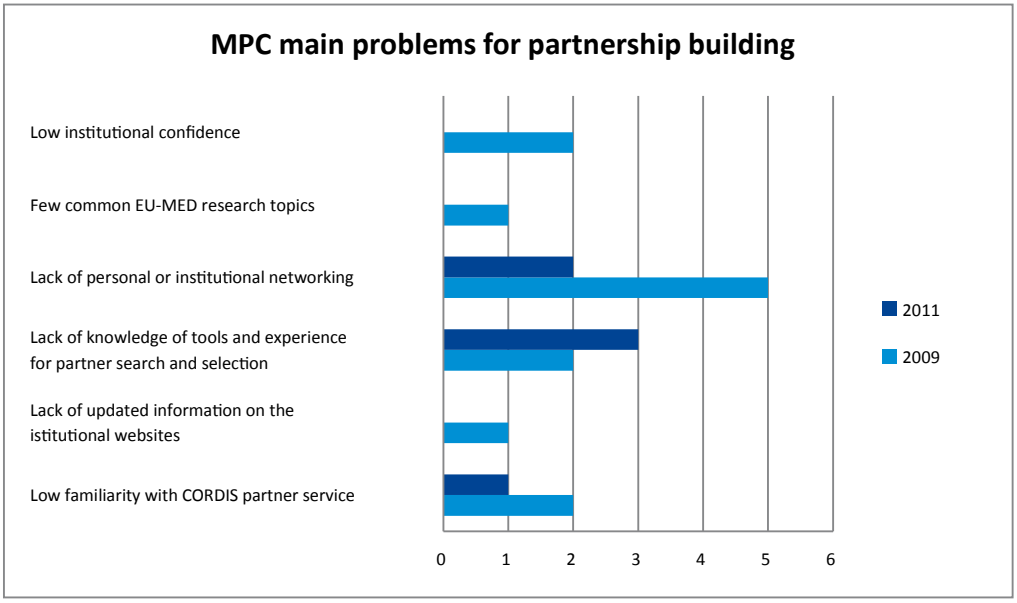

Figure 1. MPC main problems for partnership building.

Source: Compiled by C. Morini based on the results of the feedback questionnaires (2009 and 2011).

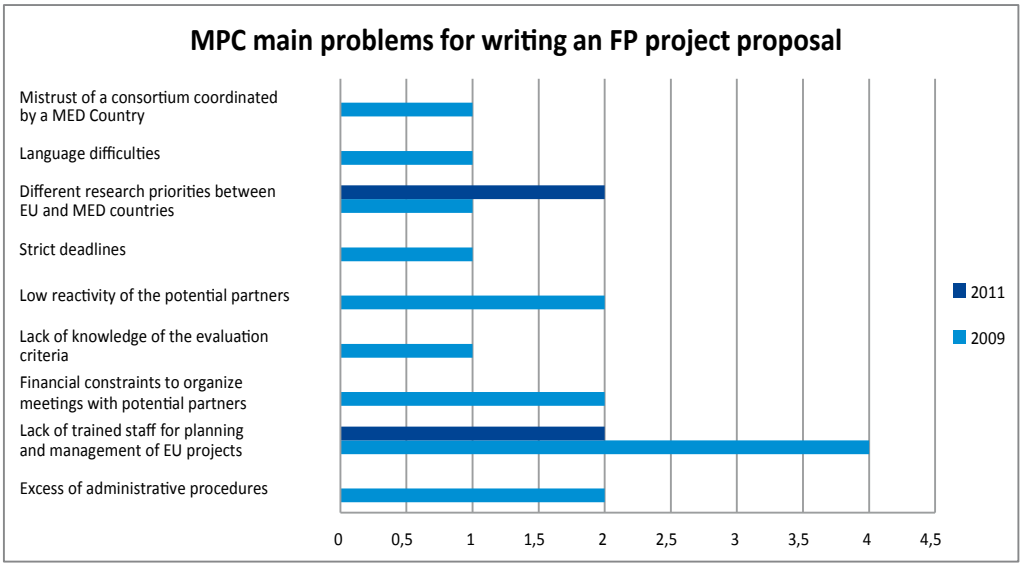

Figure 2. MPC main problems for writing an FP project proposal.

Source: Compiled by C. Morini based on the results of the feedback questionnaires (2009 and 2011).

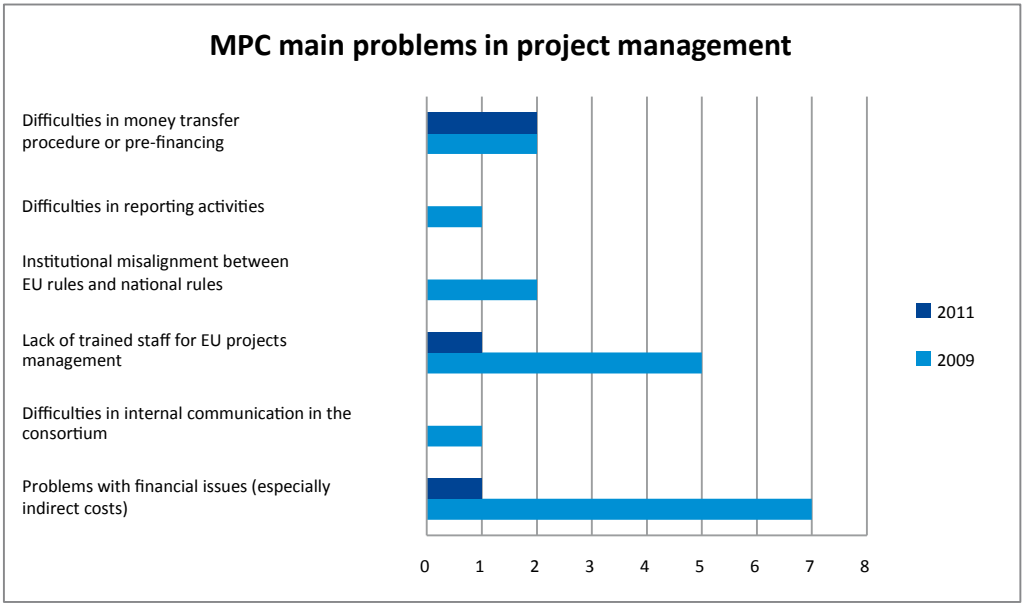

Figure 3. MPC main problems in project management.

Source: Compiled by C. Morini based on the results of the feedback questionnaires (2009 and 2011).

II – MAIN NEEDS

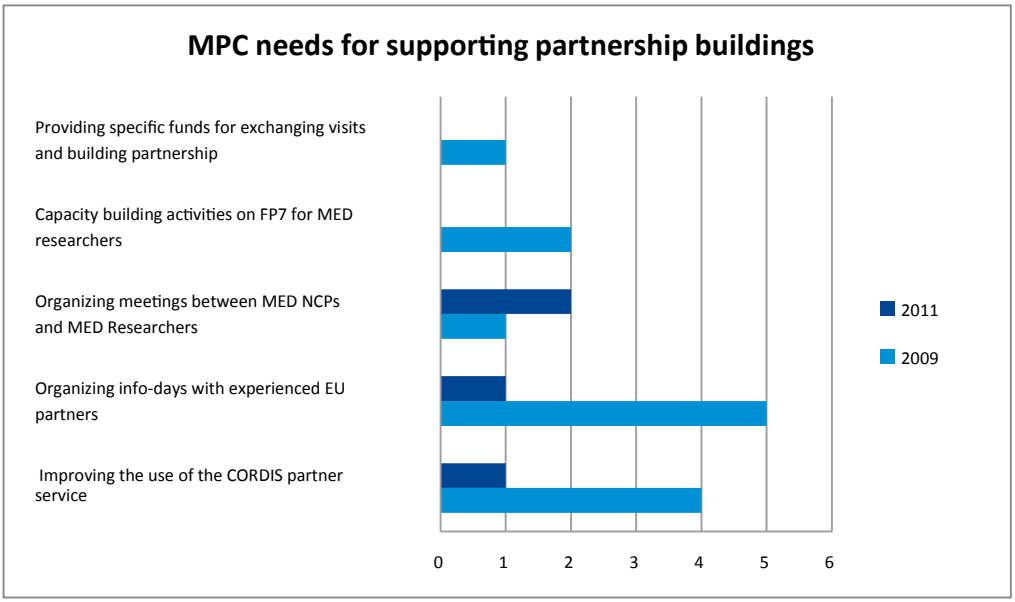

Figure 4. MPC main needs for supporting partnership building.
Source: Compiled by C. Morini based on the results of the feedback questionnaires (2009 and 2011).

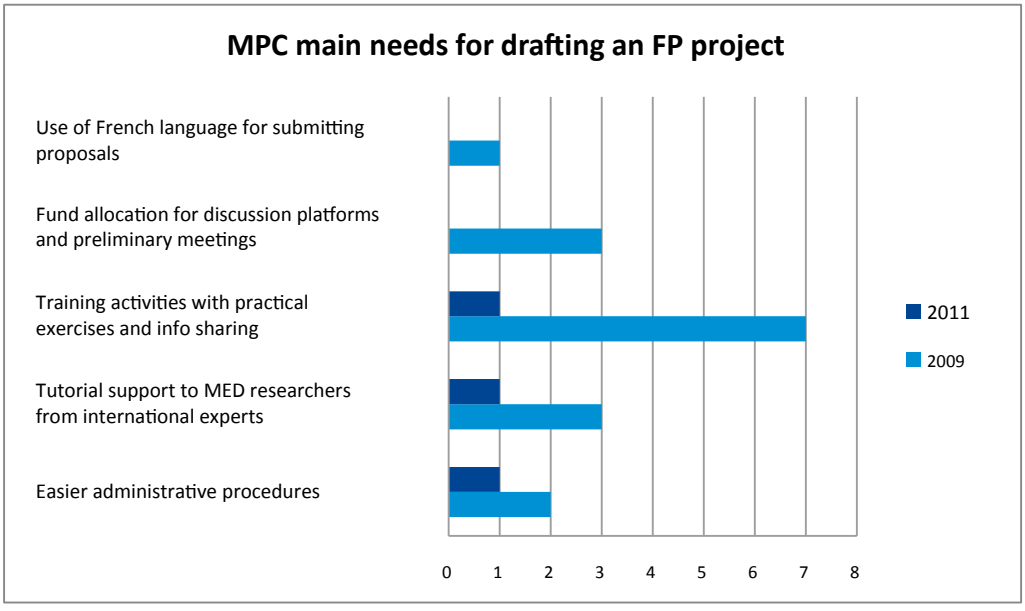

Figure 5. MPC main needs for drafting an FP project proposal.
Source: Compiled by C. Morini based on the results of the feedback questionnaires (2009 and 2011).

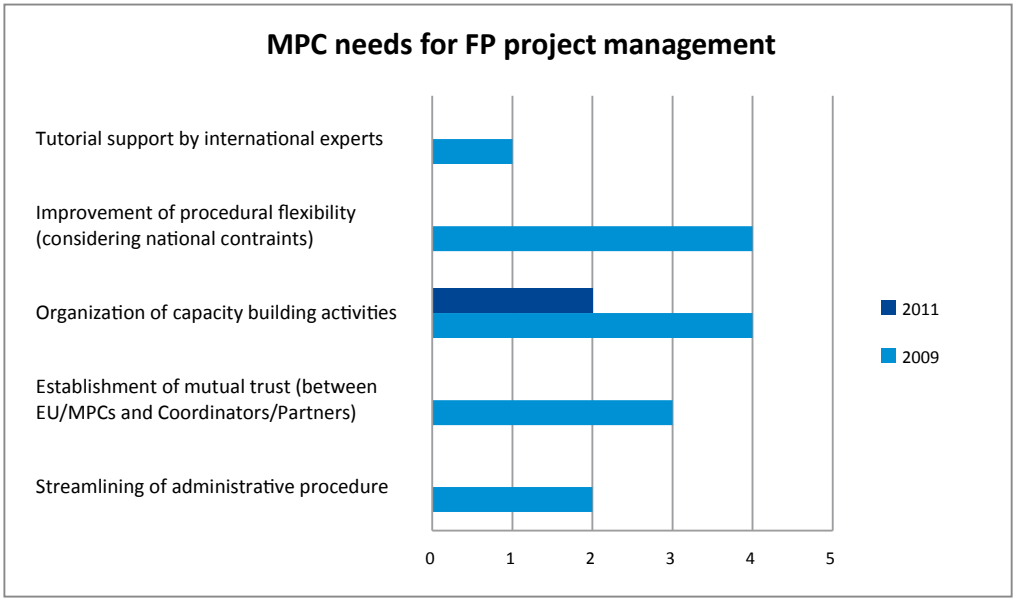

Figure 6. MPC main needs for FP project management.

Source: Compiled by C. Morini based on the results of the feedback questionnaires (2009 and 2011).

III – SUGGESTIONS

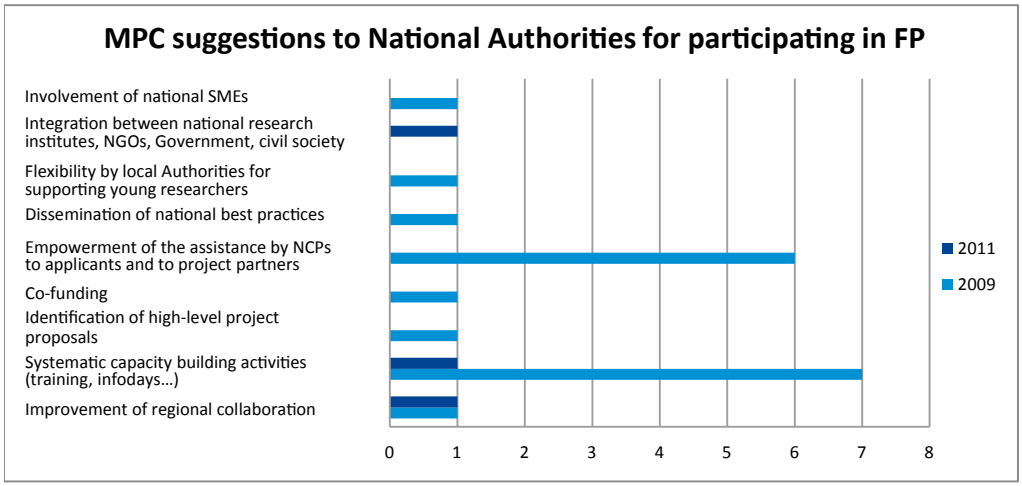

Figure 7. MPC suggestions to National Authorities for participating in FP.

Source: Compiled by C. Morini based on the results of the feedback questionnaires (2009 and 2011).

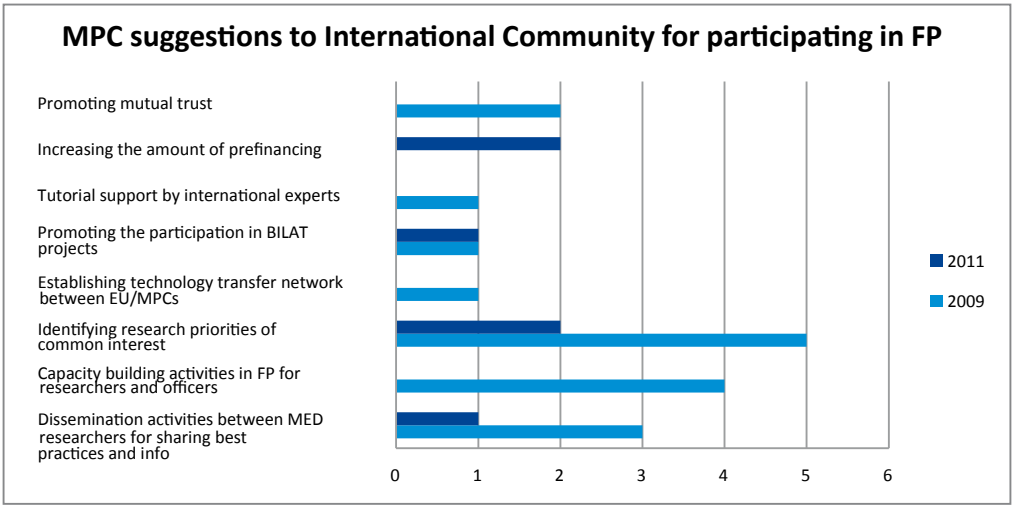

Figure 8. MPC suggestions to International Community for participating in FP.

Source: Compiled by C. Morini based on the results of the feedback questionnaires (2009 and 2011).

Dealing with a common research agenda between the EU and Mediterranean Partner Countries
A methodological approach

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Abstract. This paper outlines a methodology developed and adopted in the framework of MIRA project thematic workshops, as well as the process of setting regional research priorities implemented through a multidisciplinary and participatory approach. Furthermore, an overview of the key findings and research topics of mutual interest for developing a common EU-MED research agenda, and of the experiences and lessons learnt is presented.

Keywords. Research policies – Regional policies – Coordination – Mediterranean region.

Elaboration d'un programme de recherche commun entre l'UE et les Pays Partenaires Méditerranéens. Une approche méthodologique

Résumé. *Ce document décrit une méthode élaborée et adoptée dans le cadre d'ateliers thématiques du projet MIRA, ainsi que le processus de fixation des priorités de recherche au niveau régional mises en œuvre à travers une approche multidisciplinaire et participative. En outre, il donne un aperçu des principales conclusions et des sujets de recherche d'intérêt commun pour l'élaboration d'un programme de recherche UE-MED commun, ainsi que des expériences et des leçons apprises.*

Mots-clés. *Politiques de recherche – Politiques régionales - Coordination – Région méditerranéenne.*

I – Introduction

The recent revolutions in the south Mediterranean have driven the region in the throes of major political, economic and societal transformations, the effects of which will extend beyond the Mediterranean region.

Education, research policies, sustainable development, and democracy, among others, are emerging as fundamental areas of transformation in the region. Rethinking the EU-MPC cooperation agenda is a necessity to address such dynamic transformations.

In May 2011, by addressing the ongoing transformation in the Mediterranean, the EU issued a Joint Communication - "*A new response to a changing Neighbourhood"* - stressing the need for a new approach to strengthen partnership between the EU and the ENP countries. Working towards the development of a "common knowledge and innovation space" is underlined as a cooperation priority. The EU member states and the MPCs share the responsibility and commitment of putting these words into action, as recommended during the *Euro-Mediterranean Conference on Research and Innovation* held in Barcelona in 2012.

Research is an important ingredient and determinant of the innovation process and innovation always needs new knowledge based on the outcomes of research. Thus, research and innovation (RI) offer significant opportunities for Mediterranean countries to develop and exploit their assets for the benefit of their economies and their peoples, especially as drivers of economic

development. Increased knowledge and RI are keys to the successful deployment of specific solutions which, in turn, may provide economic benefits on a wider scale.

The development of a Common Knowledge and Innovation Space and the EU's Innovation Agenda are essential for building a common innovation and research-based culture. As reported in the outcomes of the abovementioned Euro-Mediterranean Conference, a renewed partnership in Research and Innovation should be based on the principles of co-ownership, mutual interest and shared benefit. In this framework, for a sustainable Euro-Mediterranean Cooperation in Research and Innovation it is essential, among other things, to define the objectives and main elements of a medium to long-term agenda based on the views of leading scientists and senior policy makers as well as the experience gained from ongoing initiatives.

II – Background and Rationale

The experience of the last 20 years clearly shows that the Agenda for the Euro-Mediterranean partnership defined in Barcelona in 1995 cannot be implemented due to political and social constraints. On the contrary, the scientific cooperation, driven by curiosity and sharing of common language and long-term interests, has always been maintained, even between hostile countries, and has considerably improved along these years, reaching a stage where further developments are blocked mainly by procedural obstacles.

Most of the surveys dealing with improvements of the Euro-Med ST cooperation activities acknowledge the blocking effects of the administrative and financial management barriers to make the most of the many bilateral and multilateral programmes aimed at supporting the EU-MPC ST cooperation. On the other hand, the new perspectives in the European Neighbourhood Policy and the upcoming EU Framework Programme Horizon 2020 place emphasis on the co-ownership of the International Cooperation actions and the target of mutual benefits of these actions.

Numerous approaches exist to design research agendas in national and international contexts. Studies, foresight, road mapping and expert committees are only some of the approaches used in the last years. In the framework of INCO (*International Scientific Cooperation Activities*), various approaches have been adapted to the specific needs of the international scientific cooperation that requires a common research agenda based on mutual benefit and interest, for a real partnership between the EU and the Southern Mediterranean countries. The EU's INCO-programme has been the reference and funding frame for these activities.

Over the last 25 years, the European Union has developed INCO activities to address the needs and opportunities of an interconnected world, and to contribute to peace and prosperity for European citizens. In this respect, the MIRA project (Mediterranean Innovation and Research Coordination Action) as part of the INCO-NET actions of the European Union, was set up to establish a structured dialogue between the EU and the Southern Mediterranean countries. The project activities were aimed at setting priorities for ST cooperation based on mutual interest and benefit and thus achieving a more targeted use of available resources. Moreover, the activities under the INCO-NET scheme identified ST priorities with Third countries in line with the themes of the FP-Cooperation Programme.

Across the themes of the FP7 Cooperation strand, all research activities and areas are open to cooperation with Third Countries, through also the SICAs (*Specific International Cooperation Actions*) within the FP7 Cooperation Programme. SICAs are directed towards collaboration with third countries to tackle issues of common interest, issues of joint and mutual benefit and to address specific problems faced by third countries. Thus, these SICAs offer opportunities for bi-regional (EU/Southern Mediterranean countries in this particular case) research collaborations. Hence, the formulation of SICA proposals played a central part within MIRA project.

Identifying priorities for ST cooperation, areas and topics for SICAs based on mutual interest, shared benefit and common challenges is a strategic effort, and dedicated methodology and processes were established within MIRA's Work Package (WP)4, which was led by MHESR (Egypt) and co-led by DLR (Germany). The overall aim of WP4 was to enhance the EU/Southern Mediterranean countries ST cooperation, especially within FP7, whereas another activity was aimed at elaborating ST activities, areas and topics of mutual interest and benefits during the EU-FP7 by conducting dedicated "Thematic Workshops". Within these Thematic Workshops, several research activities and areas – specific to the Mediterranean region – were selected for further investigation. The workshops focused on the main challenges and strategies of common interest to the EU and Mediterranean partner countries, capitalizing on previous experiences and research results and providing suggestions for the implementation of ST international cooperation. They were essential elements for a common research agenda.

This paper outlines the methodology developed and adopted in all MIRA workshops and the process of priority setting implemented through a multidisciplinary and participatory approach. Furthermore, an overview of the key findings and the SICA topics of each of the research workshops is presented, along with the experiences and lessons learnt, based on desk research, workshop documents and interviews with experts and chairs of the workshops.

III – Methodological Approach

In order to enhance the dialogue between the EU-MPC, MIRA project proposed the thematic workshops as a regional discussion platform, pursuing the following main objectives:

- identifying research areas/topics of mutual interest in the Mediterranean region;
- planning joint research activities within the EC-funded Programmes, and particularly FP7;
- identifying and addressing certain challenges & opportunities in fostering the participation of the MPCs in the Framework Programme;
- assisting the EC thematic directorates in defining/shaping the Specific International Cooperation Actions.

During the MIRA Screening Conference, held in Cairo in April 2008, the process and methodology for the identification of the regional research priorities were discussed and agreed by MIRA project partners, and the following thematic areas of the FP Cooperation Programme were considered as being of mutual regional interest.

The proposed methodology was further elaborated and presented for endorsement to the Monitoring Committee for the Euro-Mediterranean Cooperation in RTD (MoCo), in an *ad hoc* meeting in Cairo in April 2008, and the plenary MoCo meeting in Istanbul in November 2008.

The workshops were designed as an opportunity for researchers, stakeholders and international experts to debate the main issues relating to the Euro-Mediterranean research area, and they focused on challenges and strategies of common interest to the EU and Mediterranean partner countries, capitalizing on previous experiences and research results. Researchers, observers, decision makers and stakeholders were involved to actively contribute to the achievement of the objectives of the workshops.

The workshops approached the research issues not only from the traditional technical point of view, but also in socio-economic and governance terms, helping assess how research can contribute to addressing the above issues. Outputs from other European projects were also considered. The workshops covered relevant issues linked to the existing global economic crisis and its impact on regional research and activities, and an intellectual analysis of the research themes and their links to real problems was carried out.

A “toolbox” for the successful implementation of thematic priority setting workshops was created. It contains a detailed “Story Board” for the preparation, implementation and follow-up of thematic workshops including various templates (e.g. expert’s profile template, guideline on the structure of workshop documents, standard template for the formulation of SICAs).

Each workshop is an integral part of a methodological path that can be divided into three phases: preparation, implementation and follow-up (Fig. 1).

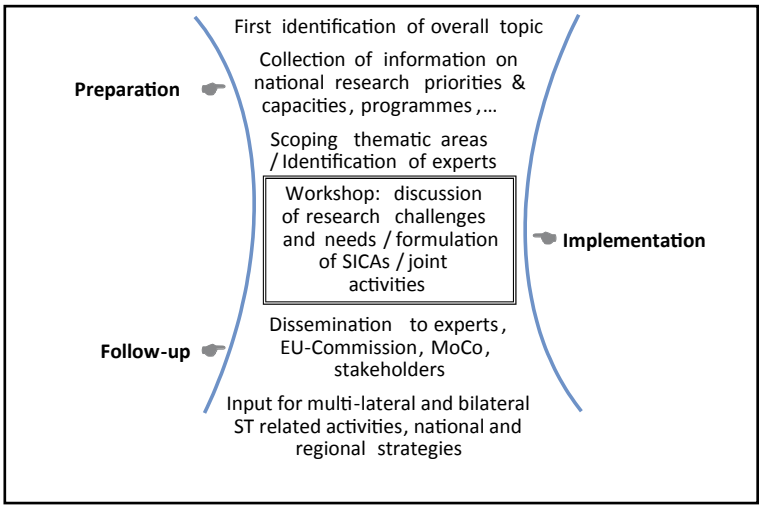

Figure 1. Schematic layout of the methodological approach for the thematic workshop (elaborated by Noetzel and El Zoheiry).

1. Preparation Phase

The **preparatory phase** plays a crucial role for the successful implementation of the workshops. Hence, a sound ex-ante assessment of potential common ST activities, areas and topics was carried out by performing an evaluation of previous EU-Med-projects and Med 7 in particular as a first step. As a second step, a questionnaire among the MIRA partners was circulated to figure out research activities and areas of mutual interest and benefit. The selection of the ST activities and areas of mutual interest and benefits took place on the occasion of a screening conference (Cairo, 2008) with participants from the EU and Southern Mediterranean countries research community, and the following themes of mutual interest were fixed: Environment, Energy, Health, ICT, Food, Agriculture, Fisheries and Biotechnology, Social Sciences. During this screening conference also the process and methodology of regional priority setting were discussed at length and agreed upon by the MIRA partners.

A. Mediterranean stakeholders’ involvement

The selected institution responsible for each thematic workshop was experienced in workshop organization. The main stakeholders involved were: the workshop coordinator, the members of the scientific committee and the panel of national experts, with the active participation and involvement of the relevant EC Thematic Directorates. Also members of national associations participated in the priority setting process.

Each workshop coordinator elaborated the “thematic working document” taking several documents as references, in order to identify common research areas based on national research priorities provided by each MPC. As an example, the following documents were considered in the case of the Workshop on food and agriculture:

- results of previous and current programmes/projects between the EU and the MPCs, especially within FP7 Cooperation Work Programme;
- outputs from previous brokerage events to set regional priorities;
- list of research topics that are of high common interest for researchers from the MPCs (e.g. results of the Scoping questionnaire);
- results of previous regional programmes to identify regional priorities (e.g.: Project MED 7 Output; Project WASAMED Vision Document);
- relevant policy documents (e.g. FP7 Cooperation Work Programme; MPC National Priorities research document);
- regional strategic documents (e.g. Declaration of the Conference for the "Union for the Mediterranean" UfM, 2008; Meeting of the Ministers of Agriculture of CIHEAM, 2008; G8 Agriculture 2009 – Final declaration; World Water Forum 2009; Blue Plan Intervention Framework 2007 – 2015);
- list of Previous SICAs of FP7 Work programmes (Thematic area 2 – Food, agriculture and biotechnology).

The working document was submitted to the **members of the scientific committee** (5/7 experts) appointed among EU and MPC experts who have an overview of their countries' research landscape. This comprehensive document supported the validation of the main areas of the workshop, for choosing the main activity areas of the workshop based on several criteria, e.g. alignment with the FP7 activity areas, conformity with national priorities and relevance to the capacity of the MPCs as shown by data from previous participation.

Table 1. Main steps for preparing a workshop following the participatory approach.

Timeline (week)	Scheduled Activity
- 18	"Screening Conference" to identify overall research themes Sharing experience with other workshop organisers Forming a Scientific Committee (5-7 experts). Experts should have an overview of the research landscape. Tasks of the Scientific Committee: supporting the identification of research areas and topics, drafting the agenda, co-ordinating and supervising the workshop, chairing and facilitating sessions Gathering Information through the MIRA partners on: national priorities, research capacities, research strengths and weaknesses, needs, funding programmes, related projects (MED7, …), as well as on past and future FP7 Research Programmes (data to be considered to avoid duplicating items already covered in previous calls: Previous SICAs under 2007, 2008 & 2009 Work programmes) The Scientific Committee discusses the gathered information, drafts an agenda and shares it with the thematic Directorates -> scoping thematic research areas out of the overall research theme for the workshop, final agenda Meeting with thematic Directorates of the EU Commission The Workshop organiser asks MIRA partners, NCPs, EC Thematic Directorates, NCPs to nominate/suggest experts according to the required expert profile The Scientific Committee agrees on a final list of experts to be invited (incl. "substitute list"). Average number of participants, 20-25 for each research area
- 12	The workshop organiser invites the identified experts Experts receive: ▪ a questionnaire on national research priorities/suggestions for SICAs ▪ a guideline to the workshop, documents for reflection on past and future FP7 Research Programmes, related projects, etc. Establishing an expert discussion forum on the MIRA platform to narrow down the themes to research areas/activities of common EU/MPC interest. Discussion among the experts via MIRA webpage.
- 4	Identification of chairmen, facilitators and rapporteurs for the workshops. Pre-meetings for detailed workshop activities
0	Workshop

The workshop coordinator also requested the project partners to appoint a **panel of national experts** for the working groups on different thematic areas, and the final list of experts was subjected to the approval by the scientific committee. A sound identification and selection of **experts** in the requested field were performed. Invited participants were chosen on the basis of their expertise in a related field and their participation in a larger network, institution, European project or organization. Participants were also selected in order to ensure a wide geographical spread; often, several Euro-Mediterranean countries were represented.

Successively, the national experts invited to attend each workshop were assigned to the different working groups (according to the pre-determined activity areas and their field of expertise) and received the guidelines and relevant working documents (results of the questionnaire). Each working group included a chairman and a rapporteur.

Summarising these findings, Table 1 shows the main steps for preparing a workshop following a participatory approach, in a total time period of 18 weeks.

B. The assessment of MED-EU research priorities

The MPCs thematic national research priorities were assessed through the result of a "*Scoping questionnaire for the establishment of national research priorities for the future MED–EU research collaboration*", carried out in 2009 for implementing this methodology.

The questionnaire collected relevant information on the research priorities in selected topics for the Mediterranean Partner Countries. The collected inputs described a framework of the MPC policies on the topics of the thematic workshop and their relation with the FP7, so as to validate the most important subjects to be addressed during the workshop. The questionnaire was filled by the responsible ICPC Contact Points and by a competent national research institution, involving also the national experts appointed for the MIRA thematic workshop.

For example, referring to theme 2 of the FP7 cooperation WP 2009, the FAB workshop coordinator prepared a questionnaire submitted to the national Contact Point of Algeria, Egypt, Jordan, Lebanon, Morocco, Palestine, and Tunisia. In this way, relevant information regarding the research priorities on agriculture in the Mediterranean Partner Countries was collected. The questionnaire was aimed at providing the thematic workshop with a clear picture of the Med research priorities in relation to the FP7 Cooperation FAB research. For this reason, the thematic area taxonomy used throughout the questionnaire was based on FP7 taxonomy.

In particular, for the establishment of national research priorities for the future MED–EU research collaboration, the Scoping questionnaire considered:

- **Mapping of current national research landscape** (*Results on level of priorities of the FAB areas in which research activities have been carried out in each Country in the last five years*);
- ***National* research areas strength** *(where strength is defined in terms of research capacity and innovation, e.g.* research performance, quality of human resources, relevant R&D infrastructures, etc. These may reflect research output, as number of publications or participation in international research projects, research staff qualification, etc.);
- **National research priorities related to relevant Previous Euro-Mediterranean thematic programmes setting regional priorities**: (*Results of ranking the level of priority of national research areas with the outputs of thematic project as, for example, MED 7 project);*
- **National research priorities and their alignment to the Union for the Mediterranean** (UfM) (Results of ranking the level of priority of national research areas with the "fields of

cooperation to be pursued in 2009" proposed in the final "Declaration of the Conference for the Union for the Mediterranean", Marseille, November 2008);

– **The future national research priorities** (results of identification of the top three research priorities for MP Countries over the next five years and the research areas that may contribute to the national economy, justified by estimating the importance of: research and technological opportunities, economic impact, social impact, research and technological potential, application potential).

Therefore, the selected **key research topics of common interest for future Euro-Mediterranean research and cooperation,** to be discussed during the thematic workshop, came from a matrix of different data resulting from the scoping questionnaire (an example for FAB workshop, Table 2).

Obviously, the obtained results are not expected to represent an exhaustive study, but rather a common starting point for the discussion of the working groups during the workshop.

Table 2. Future key research topics of common interest for FAB research and cooperation in the MPCs: matrix of national research priorities and FP7-FAB research priorities. (An extract from the MIRA FAB working group, Morini, 2009).

Country	FP7 Research Activity 2.1 Sustainable production and management of biological resources from land, forest and aquatic environment		FP7 Research Activity 2.2 Fork to farm: Food (including seafood), health and well-being		FP7 Research Activity 2.3 Life sciences, biotechnology and biochemistry for sustainable non-food products and processes			Other Regional Challenges proposed
	2.1.1 Enabling research	2.1.2 Increased sustainability of all production systems; plant health and crop protection	2.2.1 Nutrition	2.2.2 Food quality and safety	2.2.4 Consumers	2.3.1 Novel sources of biomass and bioproducts	2.3.5 Environmental biotechnology	
Algeria	3		2			1		-
Egypt	3		2					Climate Change
Jordan		3			1			Climate change
Lebanon		3			2		1	-
Morocco		3			2			Climate change
Palestine		3		2		1		-
Tunisia		1		3		2		-

Legend: 3/green = high priority, 2/blue = moderate priority, 1/yellow = limited priority/none.

2. Implementation Phase

The workshops were conducted by various hosting organizations in the Mediterranean area, and assigned to a coordinator selected from the MIRA partners. Each workshop was a two-day event with an average of 20-25 thematic experts and policy makers from the EU and the MPCs.

Each event included the following activities:

- a plenary session, to present general issues concerning the joint research between the EU and the Mediterranean region in the thematic research areas;
- the parallel working groups in the pre-selected fields identified among the main areas of common interest for the Mediterranean regions taking into account the specific programme of the 7th FP RTD;
- a plenary session to share conclusions and recommendations.

During the workshop implementation, the scientific committee coordinated and supervised the working groups, chaired and moderated the parallel sessions of the working groups, prepared the final conclusions of the workshop. Parallel working groups were chaired by members of the scientific committee, in which the invited national experts were requested to spur EU and Mediterranean countries' participants to debate relevant Mediterranean needs and priorities, and to provide suggestions for the implementation of ST international cooperation.

During each workshop, invited experts actively participated in open debates with the purpose of identifying common research areas and subjects for the EU and the Mediterranean region, in compliance with the Specific Programme of the 7FP on RTD and aligned with the national priorities.

The invited experts' role in these events did not merely consist in presenting their papers and research activities, but also in making an effort to increase the international dimension of the 7FP on RTD, acting as a link between different scientific communities. Thus, they helped address how international cooperation on research in MPCs may be better integrated within the 7th FP RTD, and how to link the scientific community of the south Mediterranean region to the European scientific community.

The expected outputs included, but were not limited to, suggestions for SICA topics, coordination actions, building thematic networks, developing ideas that could shape regional cooperation programmes, addressing ENPI regional issues and coordination with other INCO-nets, where possible.

For each research topic to be considered as an output for proposing SICAs, the Working groups provided the following information: Title, Call line, Funding structure, Wording of Call, Keywords, European partners, Justification and Expected impact.

Table 3 shows an implementation proposal for the thematic workshop agenda.

3. Follow-up Phase

The main outputs of the Workshops consisted of a frame of identified regional topics and challenges to be considered in the future EU research agenda, particularly the Research Framework Programme, and the most adequate instruments to address them. The Workshops also delivered outputs for the development of future policy dialogue on Science and Technology.

Once organised, the thematic workshops and proposed SICAs were submitted to the MoCo for their endorsement. The endorsement by the MoCo played a crucial role for the follow-up activities within MIRA. Through this endorsement, the proposed SICAs received more attention for the dissemination and communication to the EU and to national and regional institutions. More precisely, dedicated follow-up meetings with thematic directorates of the EU-Commission enhanced the opportunities to integrate the workshop findings into the forthcoming work programmes. Moreover, a customised dissemination strategy based on the endorsed SICAs targeting Programme Committee Members, NCPs, related projects and the wider research community, decisively contributed to the sustainability of the workshop results.

Table 3. Main steps for the implementation phase (Proposal for the workshop agenda).

TIMING	ACTIVITY
Evening before start	Briefing session of the Scientific Committee or facilitators, chairs, rapporteurs, presenters
Day 1 / Morning Session	Opening & Welcome
	Setting the Frame I: Relevance of the theme and research area for EU-MPC cooperation activities/information on the MIRA project/objectives & results Setting the Frame II: Information on presentation of related projects Setting the Frame III: Information on the DG Work Programme in question
Afternoon Session	Presentation of national priorities gathered beforehand and/or Presentation of the "State of the Art" from a scientific point of view
	Working Group(s): Introductory remarks on objectives (formulation of SICA recommendations), results (SICA Call text following a standard template) and processes (discussion, priority setting, filling the template). Working Group discussion I - Brainstorming
Morning Session	Working Group discussion II - Priority setting and elaboration of SICA calls following a template.
Afternoon Session	Plenary Session Presentation of the working group conclusions (SICAs) by the facilitators/ rapporteurs Synthesis of results/discussion and conclusions/next steps Optional: Poster Session/FP7 brokerage with pitch presentations

IV – Research topics of mutual interest for developing a common research agenda

Thematic workshops were held between January 2009 and July 2011 in different Mediterranean Countries. These workshops, following a replicable methodology, identified areas for common research activities (present and future) and formulated topics of mutual interest and benefit to be considered in the form of proposals for SICAs, in order to initiate common research activities, thereby enhancing the participation of southern Mediterranean experts in the EU's Framework Programme.

The following thematic workshops were held:

- *Environment:* 26-27 January 2009, Cairo, Egypt;
- *Energy*: 23-24 March 2009, Cairo, Egypt;
- *Health:* 4-5 June 2009, Malta;
- *ICT:* 18-19 June 2009, Istanbul, Turkey;
- *Agriculture, Food, Fisheries & Biotechnology*: 13-14 July 2009, Bari, Italy;
- *Social Sciences and Humanities*: 6-7 July, 2011, El-Gouna, Egypt.

1. Thematic Workshop on FAB

The thematic workshop on Food, Agriculture, Fisheries and Biotechnology (FAB) was organized in Valenzano, Bari, Italy, on 13-14 July 2009. The workshops focused on the aspects of Mediterranean sustainable agriculture under climate change. More than 55 experts discussed

challenges in two parallel working groups: food chain, food safety and food security; water and land resources management.

Proposed Specific International Coordination Actions (SICAs)

Water and Land Resources Management

- Design, development and dissemination of appropriate and sustainable technologies through multi-scale and multidisciplinary approaches to promote the efficient and productive use of available water in agriculture.
- Development of affordable technologies (emphasizing biotechnologies) for waste water treatment and safe agricultural reuse in the Mediterranean.
- Development of new tools to target more effective measures to assess and manage climate risks, to enhance adaptation to drought and climate change and contribute to mitigation via land and water management.
- Development of new plant materials specifically adapted to climate change, drought and salinity in the Mediterranean.
- Exploring new governance, institutional mechanisms (or models) and economic tools enabling the implementation of sustainable water use.

Food Chain, Food Safety and Food Security

- Measures to adapt the crop chains of Mediterranean products (i.e. olive, citrus) to the effect of climate change.
- Reducing post-harvest losses and contamination.
- Improving the access to nutritious and safe food.
- Low environmental impact for the quality improvement of Mediterranean fruits (dates, citrus, olive, etc.) and vegetable production.
- Competitiveness of agricultural products from non-EU Med countries to global market.
- Networking for data and technology exchange in the Med Area.
- Governance and institutional aspects for sustainable development.

2. Thematic Workshop on Information and Communication Technologies

The thematic workshop on Information and Communication Technologies was organized in Istanbul, Turkey, on 18-19 June 2009. ICT might be considered a global research and development domain with little or no regional and geographical specificities. This may lead to the assumption that there are no topic areas in the southern Mediterranean countries that would be of mutual interest for international co-operation. However, the outcome of this workshop gives a slightly different picture. Through the ICT-workshop, it was possible to set up strong links between the “MIRA-ICT research community” and the FP7-ICT JOIN-MED project. As described in the workshop report “Establishing the EU-Mediterranean ICT Research Network”, an Arab-EU partnership in ICT research will expand the pools of research areas and researchers. It will also facilitate the formulation of medium-to-long-term research programmes that address the economic and social needs of both regions and are relevant to the existing and evolving capacity of the MPC researchers. Moreover, it will nurture the inter-MPC ICT research cooperation. This EU-MPC partnership can contribute to both advancing the research capacity of MPC ICT researchers and academics, of research and industry institutions, and establishing an internationally competitive Arab MPC ICT sector through developing ICT products and innovative solutions for the region and its common challenges and becoming a major player in providing ICTs and ICT-enabled services.

Proposed Specific International Coordination Actions (SICAs)

- **Human Language Technologies – HLT**: The support for research collaborations between EU research institutes and southern Mediterranean players in the field of language processing, or Human Language Technologies – HLT, with the focus on Semitic languages (Arabic, Hebrew, Maltese, etc.), is of great significance for EU/Southern Mediterranean countries research activities and has a wide application potential.
- **Pervasive and Trustworthy Network and Service infrastructures**: A second important research area is related to Challenge 1 (Pervasive and Trustworthy Network and Service Infrastructures) because of the very good research capacities in the Southern Mediterranean countries and a significant application potential.
- **ICT and Health**: Support to research collaborations on sustainable and personalised healthcare linked to health activities targeting diabetes in the Southern Mediterranean countries, this being an all-important research topic for EU/Southern Mediterranean countries collaborations.
- **Application-oriented domains**: All e-application fields (e-Government, e-Banking, and e-Procurement) have a significant potential for EU/Southern Mediterranean countries cooperation.
- **Human Resources**: The lack of human (IT) resources throughout Europe on one hand, and the surplus of IT graduates in the Southern Mediterranean countries on the other hand, offer many opportunities for joint ICT research activities.

3. Thematic Workshop on Health

A high-level expert group consisting of 25 scientists from European and Mediterranean Partner Countries convened in Malta on June 4 – 5, 2009 to discuss health sub-themes for the Euro-Med area. Four health sub-themes, falling within the scope of the current EU 7th Framework Programme, were identified for discussion in separate panels.

Proposed Specific International Coordination Actions (SICAs):

Diabetes

- Genetic and environmental factors causing the geographic variation in prevalence and incidence of Type 2 Diabetes, diabetic complications and obesity in the Mediterranean origin population.
- Monogenic causes of abnormal glucose metabolism and/or obesity in the genetically diverse populations of the Mediterranean basin.
- Genetic predictors of response to diabetes therapy in the Mediterranean populations;
- Mediterranean Diabetes College.
- Culturally appropriate lifestyle intervention programmes for the prevention and treatment of Type 2 diabetes and obesity.

Infectious Diseases

- Integrated multi-parametric approach for epidemiology, surveillance, and diagnosis of sand fly-associated diseases.
- Implementation of a cross-party approach for inventory of pathogens (viruses, bacteria, and other micro-organisms) causing acute respiratory infections (ARI) in Mediterranean countries.
- Identification of nodes for a network of cooperative transnational research in Mediterranean countries.

Public Health

- Research capacities in public health.
- Challenges to health systems: ageing populations.
- Challenges to health systems: prisons - a neglected population.
- Equity in health: current status, determinants, comparisons and opportunities in Southern Mediterranean countries.

Rare Diseases

- Developmental disorders with unknown genetic aetiology in populations with endogamy and consanguinity.
- Rare Mendelian phenotypes of autoimmune disorders.
- Treatment and therapies for haemoglobinopathies.

4. Thematic Workshop on Energy

The MIRA workshop on Energy Research Priorities in the EU/Southern Mediterranean countries was held in Cairo, Egypt, on March 23-24, 2009. The workshop was organized by the Ministry of Higher Education and Scientific Research, which is responsible for Work Package 4 within MIRA. The workshop design strongly referred to the Strategic Energy Technology Plan from the EU-Commission, on the one hand, and to the Mediterranean Solar Plan on the other hand. In its Strategic Energy Technology Plan, the EU-Commission sees the need for actions to deliver sustainable, secure and competitive energy.

Proposed Specific International Coordination Actions (SICAs):

Photovoltaic

- Advancement of PV system components including cells, storage devices, inverters, and controllers for micro-grid applications.
- Integration of PV/CPV systems in industrial grid connected applications.
- Development of operation and maintenance training programmes to support deployment of PV technology.
- Policy research, legislation development and awareness building for integration of PV technology application into energy management and resource planning.

Concentrating Solar Power

- Local manufacturing of components.
- Advanced materials and surfaces.
- Improved weather forecasts models for direct normal Irradiation.
- New joint test facilities for CSP in the MENA region combined with pilot power plants.
- CSP Dissemination and Education Programme “Educate the Educators”.
- Evaluation of Hybrid Concepts.

Wind Energy

- Wind Energy Conversion Systems in Desert “extreme” Conditions (industrial aspects).
- High penetration of wind energy in electric grid for Southern Mediterranean countries.
- Stand-alone Autonomous wind systems.

Energy Efficiency

- Energy Efficiency Road Map (Prospects and Challenges).
- Developing optimized energy-efficient buildings for the region.
- Increasing efficiency and reliability of the solar collectors through developing new materials, specific coating materials & cleaning techniques.
- Large energy intensive industries: energy intensity improvements through Energy Efficiency.

5. Thematic Workshop on the Environment

The MIRA workshop on the Environment Priorities in the EU/Southern Mediterranean countries was held in Cairo, Egypt, on January 26-27, 2009. The workshop was organized by the Moroccan Ministry of Higher Education, Executive Training and Scientific Research – Direction of Technology together with the Ministry of Higher Education and Scientific Research in Egypt. The following research areas and topics were discussed in detail by the experts: climate change, pollution and its risks; sustainable management of resources; environmental technologies.

Proposed Specific International Coordination Actions (SICAs)

– Response of coastal Mediterranean ecosystems to anthropogenic pressures.

– Responses and adaptation of freshwater ecosystems/systems in the Mediterranean region to climate change.

– Integrated assessment of hydro-ecological functioning at catchment basin scale for sustainable management of natural resources.

– Sustainable technologies and alternative management options for agricultural and agro-industrial activities in the Mediterranean region.

– Natural hazards analysis and construction of scenarios for natural risks.

6. Thematic Workshop on Socio-economic Sciences and Humanities (SSH)

In line with the instrumental role MIRA project has played in the Euro-Med region, through creating a dialogue platform to identify common interests in research areas, setting up ST priorities and supporting capacity building activities, a thematic workshop addressing the FP7 Theme 8 - Socio-economic Sciences and Humanities - was organized. This was done also in view of the importance of research and of the recent demand in the field of social sciences and humanities in Southern Mediterranean countries, and to deal with regional priority settings in a field considered to be a pressing issue.

This Workshop on the role of Social Sciences and Humanities in the Reform process in the Arab Countries was held in El Gouna, Egypt, on 6-7 July 2011. It was attended by 30 experts: researchers specialised in various fields (politics, economy, sociology, education, etc.), members of the Civil Society and Non-Governmental Organizations, Ministry Representatives

and EC Representatives. The concept of Regional Integration and Urban Sustainability of the Mediterranean Cities emerged as the priority area of the workshop. Urban Sustainability was regarded as an entry point with possible links to other topics that would include foresight and social innovation, touching upon multi-thematic areas.

Proposed Specific International Coordination Actions (SICAs)

- Environmental challenges of urban development (policies) in the Mediterranean.
- Urban Sustainability, Innovation and Empowerment in the Mediterranean.
- Social media, youth empowerment, and citizenship in the Mediterranean region.
- Changing Social Values of the Youth in Mediterranean Cities.

V – Results and lessons learnt

The transition towards knowledge-based economy in Mediterranean Partner Countries (MPC) requires setting up national and regional research and innovation programmes (to generate synergies with the industrial sector, research centres and, in general, the socio-economic apparatus in the MPCs) and developing regional demand-driven research/innovation and entrepreneurship programmes (that would engage the growing population, especially of the youth in the MPCs).

All these actions must be incorporated in common EU-MPC strategies, merging actions of the European Neighbourhood Policy, the national innovation action plans and other political instruments aimed at using knowledge as a driver of economic development.

In this framework, from 2009 through 2011, **more than 250 ST** national and international **experts** from the EU and the Southern Mediterranean countries were involved in 6 international workshops, and **55 SICAs** were formulated. Their character reflects the different research patterns and thus differs in their specifications. Successively, with the endorsement of the MoCo, the SICA proposals were transmitted to the EU-Commission for them to be integrated into the next Work Programmes.

Themes and research areas were identified through an ex ante assessment of research activities and priorities at national level, involving different stakeholders to share this effort. MIRA consortium played a very active role in all phases and contributed to the success of the proposed methodology implementation. Key elements as well as success factors and potential pitfalls related to the preparation, implementation and follow-up of the thematic workshops were analyzed, also based on personal interviews with chairs, experts and hosting organizations of the workshops.

The key success factors for the "*preparation phase"* were:

- pre-meeting with the EU-Commission on research areas of interest and experts to be invited
- installation of a Scientific Committee for scoping thematic areas and identifying experts
- identification and involvement of the ideal expert/stakeholder
- sound preparation of documents on national priorities, previous FP-calls, SICAs, Work Programmes, previous projects (MED 7)
- pre-briefing of facilitators and rapporteurs on objectives, method and approach
- workshop methodology paper provided by WP 4 leader
- the preparation of the draft agenda for the workshop was shared with the scientific committee and the EC thematic directorate for review and feedback.

The following key factors in the "implementation phase" were:

- information on national priorities as well as on previous and future Work Programmes
- professional facilitation during the workshops to achieve the workshop objectives
- participation of contact persons involved in related projects, e.g. ERA-NETs, in order to connect project activities and share experiences.

The participation of representatives from ERA-NETs or other related projects was very helpful to set links with other projects and to support the follow-up activities. For example, through the ICT-workshop it was possible to establish strong links between the "MIRA-ICT research community" and the FP7-ICT JOIN-MED project. Also synergies with national/regional priorities set through the ENPI are recommended.

The Workshops preparation phase involved an appropriate number of national experts since the early stage. A pre-meeting of the scientific committee (if in place) or the rapporteurs, facilitators and moderators, in some cases facilitated gaining a common understanding regarding the workshop objectives and its process. A pre-meeting of chairs, facilitators and hosting organizations might be also recommended for future thematic workshops. Definitely, some effort was necessary to reach the appropriate mind-set during some workshops. Different views about the workshop objectives and process emerged among the rapporteurs, facilitators and moderators during the implementation phase.

The workshop itself can be regarded as a complex group dynamic and participatory process that should result in the precise formulation of research areas and topics of mutual interest and benefit (SICAs**),** as stated before. Moreover, building on previous experiences was possible only to a limited extent. Thus, an appropriate motto for carrying out the workshop would be "*invest in communication and facilitation"* during these activities.

This reflects the nature of the thematic workshops, as a group dynamic process, for which the following is a must: a clear formulation of objectives, professional facilitation (moderation), and a smart process structure.

VI – Conclusions

A regional approach is the preferred option for cooperation with Mediterranean Partner Countries, as it could bring a strategic value added to bilateral cooperation. Due to the gap in research capacities and between state-of-the-art technologies on both sides of the Mediterranean, Euro-Mediterranean cooperation on technologies has only partially been in the scope of RI cooperation in FP7.

The identification of priorities, covering the mutual interest of EU-MPC within the FP 7 thematic areas, is certainly an urgent challenge that cannot be postponed further.

New approaches for designing the research agenda will likely fail if they are not supported by real participatory communication among interested stakeholders, local associations and citizens, institutional strengthening, relevant education, common knowledge, and mutual awareness of interested parties.

This methodological proposal, based on the analysis of the previous experiences and participation of interested stakeholders, was intended to support the process definition/shaping of the Specific International Cooperation Actions in the Thematic Priorities. Due to their multidisciplinary and participatory approach, the research workshops for setting regional priorities of research activities and topics of mutual interest and benefit for international cooperation in the Mediterranean area could be an effective instrument for promoting them.

Developing a research agenda for cooperation between the EU and the Southern Mediterranean countries could be successful if European and Mediterranean countries work together and promote bi-regional partnership to address the common challenges, as the renewed partnership in Research and Innovation should be based on the principles of co-ownership, mutual interest and shared benefit.

Some actions to be taken in this line will be:

- linking the International ST Cooperation Programmes to targeted objectives of the national Innovation strategies and, if possible, associating them with the business sector;
- facilitating the mobility of research people to places, companies or research institutions where good practices of technological transfer or knowledge are used;
- capacity building in creating an interface between Research and Innovation systems that, in general, have only random contacts as they fit different demands and expectations. Favouring mutual acknowledgement and trust between the actors of these two systems is a prerequisite to make the most of the efforts in knowledge exploitation in the MPCs;
- specific actions and instruments, including those necessary to achieve the objectives, e.g. training, technology transfer, capacity building, support to reforms, investment opportunities, etc.

However, the necessary condition for EUMPC cooperation aimed at mutual benefits, co-ownership and mutual financial responsibility, is the common acknowledgement of legal and management mechanisms and shared appropriation of the defined structure and its functioning. The key point is to identify a legal structure where the identification of common priorities and funding mechanisms can practically express themselves independently of the national frames, though respecting the national legislation in international cooperation mechanisms, control of expenses and auditing requirements. On the other hand, the implementation mechanism of the decisions of such cooperation frame must be independent and professional at the same time in order to meet sound expectations from handling cooperation projects, by proposing ex ante and ex post evaluation mechanisms under international standards, mechanisms of knowledge exploitation and a fair share of the exploitation results. A legal frame that fits these requirements could be the use of Article 185 of the Treaty on the Functioning of the EU (TFEU), where some member states can decide to implement an action not shared by the rest of the members. This kind of actions could obtain limited support from the EC and could be governed by the agreements between participating countries. These actions are open to international partnership, and could be one of the possible instruments to be used.

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Financial, legal and administrative management of INCO-NET projects

Difficulties, solutions and recommendations for the future

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Abstract. Since 2008, International Science and Technology Cooperation has become one of the major focus areas of the 7th Framework Programme. FP7 has been broadly opened to the participation of third countries and is aimed to promote political cooperation, dialogue and trust and to exemplify the free circulation of knowledge at a global level – the "Fifth Freedom". However, although international cooperation has been strongly encouraged in the FP7 and many projects with an international component have been funded, the management of projects can become problematic if it is not sufficiently recognised and effectively supported. INCO-NET Projects include complex consortia where raising awareness of the FP7 management system is crucial; actually one of the main difficulties encountered in the management of these projects is directly linked to the existing differences within the European Commission's system to manage FP7 projects, and to the internal administrative system of each beneficiary. This article aims to reflect on the main distinctions between the different systems, while proposing solutions and recommendations that could be taken into account for future International ST Cooperation projects.

Keywords. Science – Technology – Cooperation – INCO-NET Projects – Management.

Gestion financière, juridique et administrative des projets INCO-NET. Difficultés, solutions et recommandations pour l´avenir

Résumé. *Depuis 2008, la Coopération Scientifique et Technologique Internationale est devenue l'un des axes principaux du 7ème Programme-Cadre. Le PC7 a été conçu pour s´ouvrir à la participation de pays tiers et a été proposé pour promouvoir la coopération politique, le dialogue et la confiance, et incarner également la libre circulation des connaissances au niveau mondial - la « Cinquième Liberté ». Cependant, bien que la coopération internationale dans le 7ème PC ait été fortement encouragée, et que de nombreux projets avec une composante internationale aient été financés, la gestion de projets peut devenir un problème majeur si son importance n'est pas suffisamment reconnue et le soutien qui lui est attaché se révèle insuffisant. Les projets INCO-NET comprennent des consortiums complexes où la sensibilisation au système de gestion du 7ème PC est cruciale, et l'une des raisons principales des difficultés rencontrées dans la gestion de ces projets est directement liée aux différences existant au sein de la Commission Européenne pour gérer ce type de projets, et aux systèmes administratifs internes de chaque bénéficiaire. Cet article propose une réflexion sur les principales distinctions entre les différents systèmes, ainsi que des solutions et des recommandations qui pourraient être prises en compte dans les futurs projets internationaux de Coopération Scientifique et Technologique Internationale.*

Mots-clés. *Science – Technologie – Coopération – Projets INCO-NET – Gestion.*

I – Background

International Science and Technology Cooperation has become one of the major focus areas of the 7th Framework Programme[1] (from now, FP7), which has been broadly opened to participation from third countries since 2008, when the "Ljubljana Process"[2] was launched and

five new initiatives, including “International Cooperation”, were tabled by the Commission to begin implementing the European Research Area (ERA) Policy on concrete topics[3].

In this context, the “Strategic European Framework for International Science and Technology (from now, ST) Cooperation”[4] Communication proposed a new partnership to strengthen the international dimension of the ERA, improve the framework conditions for international ST cooperation and promote European technologies in the world. In this line, international cooperation in ST was proposed to promote political cooperation, dialogue and trust, and embody the ‘Fifth Freedom’, i.e. the free circulation of knowledge at a global level.

In this way, projects with an international component have been funded across different programmes of FP7. More specifically, the FP7 ‘Capacities’ Programme – in which the INCO-NET instrument is included - has funded actions to support international ST cooperation policies and reinforce scientific relations with third countries. In this line, potential participants from and outside Europe have been encouraged to build new partnerships benefiting from the support of FP7 and third-countries’ programmes.

However, although international cooperation and the building of new international partnerships in the FP7 has been strongly encouraged, supported and even rewarded, and even though a range of funding instruments have been introduced to cover the specific needs of the cooperation between the EU and other regions[5], the management of these projects can become problematic if it is not sufficiently recognised and adequately supported.

The huge differences existing within the European Commission’s (EC) system to manage FP7 projects, and the internal administrative system of each beneficiary are among the main reasons of the difficulties encountered in the management of projects.

This article is aimed to analyse the concrete case of the INCO-NET instrument[6], an FP7 initiative specifically designed to build, develop and reinforce large regional partnerships through its projects in the previously identified regions. In this way, we will try to reflect on the major features of different systems, while proposing solutions and recommendations that could be taken into account for future International ST Cooperation projects.

II – INCO-NET financial, legal and administrative management

INCO-NET projects[7] include complex consortia[8] where raising awareness of the FP7 management system is crucial. During the project’s life, Project Managers devote a considerable amount of time and a strong effort to clarify the administrative rules and procedures, in order to fulfil some of the obligations – such as delivering an annual justification of the committed costs - agreed by the beneficiaries in the Grant Agreement. In most INCO-NET projects, there is the distinction between the scientific coordinator and the financial/administrative manager, due to this complexity.

However, fulfilling these obligations becomes complicated if we consider the difficulties related to the internal administrative systems of some beneficiaries as well as the Participant‘s Portal, which is the EC’s tool to deal with the project administrative, financial and legal management of FP7. On one hand, some of the INCO-NET beneficiaries have no internal administrative systems adapted to the European context, so they do not apply/understand some of the EC’s rules to participate in FP7 projects. The poor understanding of these rules may cause, in some cases, mistrust and a lack of confidence between the beneficiary and the project coordinator when the latter requests to apply the EC conditions in the management process. In this regard, and to illustrate this idea with some examples, most misunderstandings derive from issues such as choosing the most appropriate method for calculating indirect costs according to the kind of organization, charging personnel costs to the project, or recording every day the work-time dedicated to the project per person and per Work Package.

Furthermore, having a system that is unfit or unfamiliar with the management of international projects can cause more difficulties to the project's life, such as the lack of flexibility in having the use of the budget received from the coordinator. In this respect, due to their internal administrative procedures, some beneficiaries may need too much time to identify, allocate and use this budget, thus jeopardizing the correct development of project activities.

On the other hand, continuity in the management strategy of a project is essential for the coordinator to ensure consistency. In this way, the consortium will follow the same strategy over the entire life cycle of the project and, therefore, each progress report and financial statement will be easier, since all partners will be accustomed to the same process. In fact, for some beneficiaries that participate for the first time in a European project, this experience can be useful to understand the basic financial rules of the EU with a view to adapting, step by step, their internal administrative systems to the requirements of European projects.

However, to gain this continuity, the coordinator needs a unique reporting strategy established by the European Commission, which is the institution providing the guidelines and tools for project management and reporting.

In the case of FP7, the European Commission has implemented, over the last four years, a new system to manage and report projects step by step through the Participant Portal[9] - mainly SESAM and FORCE. This new system has modified important aspects on how to justify FP7 projects. However, its full implementation by the EC - that is still under way - and its understanding by the project coordinators and consortia, and even by EC officers, has taken too long and this has been detrimental to projects' life. For example, regular information provided, for example, by the coordinator and/or the beneficiaries to the Unique Registration Facility (URF) or the Research Executive Agency (REA) is not automatically updated in other relevant databases (FORCE, SESAM, and NEF). It is then up to the coordinator to detect such inconsistencies and make the EC involved officers aware of the situation.

In addition, the continuous improvements and changes to this system since 2009 have involved a transformation in the domestic management strategy of the project. This management has become more complicated in the sense that coordinators have not been able to present and maintain one justification protocol, and would rather have to adapt it to the continuous updating of the system. This would not be a problem if the consortia were fully aware and experienced in FP7 projects, but this is usually not the case for INCO-NET projects. Taking into account the complexity of the INCO-NET consortia, fulfilling all the EC requirements to correctly justify the projects, such as compiling all the information and documents needed to correctly prepare in time the yearly report of the project, as well as getting back to the partners even several times because of additional information requirements from the Financial Officer (FO), can be an arduous process, which can be jeopardized if only one beneficiary does not collaborate, or if his/her back office has problems to prepare the different data requested by the coordinator.

In this regard the Commission does not offer clear solutions to coordinators to avoid such situations, and excluding the justification to a "non-collaborative" partner that has not sent the information on time has been denied as an option for all INCO-NET projects. As a consequence, full submission of the progress and financial reporting could be extremely delayed so that the entire consortium would suffer from late reimbursement of costs, while another project could be unblocked thanks to a different solution provided by the Commission.

The reporting requirements should be the same, at least, for all INCO-NET projects. Taking into account that many INCO-NET projects "share" beneficiaries, since they involve two eligible regions (for example, Mediterranean and West Balkans, or Mediterranean and Africa) in the past they sometimes followed two different approaches when reporting to the individual projects. This shows a serious lack of consistency from the "European" side.

III – The INCO-NET Project Manager/Administrator Networking

To face the common difficulties in the management of INCO-NET projects, mainly associated with the EC's system to manage projects and report on them and with the complexity of the INCO-NET consortia, collaboration and experience-sharing among the project managers or administrators has proved to be a good solution.

Such collaboration helps project managers/administrators solve common problems through the exchange of experiences, keep updated with the latest innovations implemented by the EC concerning the FP7 electronic system to manage projects, share with the EC the difficulties and solutions concerning the management of projects and build on the EC mutual trust and continuous dialogue, which is not always obvious.

In the concrete case of the INCO-NET project managers/administrators, they started to collaborate in 2009 during the preparation of the first report of the projects, when the EC implemented FORCE, the new system to justify FP7 projects. By that time, FORCE had been tested internally by the EC but not with large consortia, as was the case for INCO-NET projects. Many difficulties and technical problems mainly emerged during the first year. This necessitated the establishment of the project network which, for the first time, made the legal, financial and administrative difficulties in managing this kind of project, visible to the EC. These difficulties would likely have gone unnoticed if FORCE and the new internal policy for the justification system had not been implemented. The daily collaboration of the network (via e-mail), the annual gatherings to share experiences and the meetings with the EC Financial Officers to discuss common difficulties and recommendations helped recognize management as an important issue in project development. This allowed some improvements to be introduced in project management: the EC allocated the same Financial Officer to CAAST-NET, MIRA, WBC-INCO.NET, SEA-EU.NET and EULARINET, the first INCO-NET projects approved in 2008. This made the preparation and correction of the subsequent justifications much easier, since the same criteria were imposed to all projects when reporting.

This network, currently composed of the project managers/administrators of WBC-INCO.NET, CAAST-NET, SEA-EU.NET, ENLACE, EULARINET, PACE-Net, INCO CA/SC, INCONET GCC, EUCARINET and MIRA, has also produced common documents about FP7 Projects' Financial, Legal and Administrative Management (subsequently submitted to the Commission) and other contributions (comments on Green Paper and the RESPOTNET and TRANSREG NCP workshop contributions), in order to facilitate the management of future INCO-NET and other FP7 projects.

As an example of the work developed together, we hereby list the main difficulties encountered in project management also shared with the EC after the first INCO-NET Project Managers' meeting held in 2009, aimed at improving the implementation of these cooperation projects:

a. **Unfamiliarity with EC procedures**. Many beneficiaries were involved for the first time in an EU project; so they were unfamiliar with EC jargon and guidelines. It proves to be difficult for the project coordinator to summarise the available information in an easy and understandable way.

b. **Seniority of Beneficiary Representatives.** As some beneficiaries' representatives are senior officials in their organizations, they do not prioritize the administrative or financial completion of the project nor do they understand the implications of a late submission for the whole Consortium. Due to their position in their organizations, this issue is not at the top of their agenda.

c. **Communication with the European Commission.** The European Commission has failed to understand that projects face particular difficulties in the reporting process. Communication was difficult for some beneficiaries in INCO-NET that could not rely on the same infrastructures as the European beneficiaries (for example, no Internet

access or inadequate phone system wiring). This created severe limitations on how and when the project coordinator could communicate with beneficiaries about reporting.

d. **Unclear Guidance.** The information provided by the European Commission was found to be unclear and limited. The key documents for project reporting ("Guide to Financial Issues relating to FP7 Indirect Actions" and "Project Reporting Notes") were not easily comprehensible and limited in their guidance. This was especially the case for the Project Reporting Guidance Notes that have no explanation on how to complete the Form C – Financial Statement.

e. **Contradictory Help and Advice from EC Financial Officers (FO).** Much of the assistance provided by the Financial Officers at the European Commission has been contradictory and limited. Frequently when further clarification was sought on already available guidance, the EC Financial Officers referred back to the guidance notes and did not provide extra help.

f. **EC Databases**. The problems faced with the mix-up of information about organizations and non-partners induced changes in the EC databases, resulting in a cumbersome and time-consuming process, in particular if they were discovered too late during the reporting period, as the tracking and correction of such mistakes needs a lot of time.

g. **FORCE and SESAM** are highly appreciated and they have been improved a lot since their launch. However, less duplication of necessary information would be highly appreciated.

IV – Conclusions and recommendations

As presented above, the management of INCO-NET projects is a complex process that needs specific attention from the beginning.

Establishing the same justification protocol for all INCO-NET projects will provide the INCO-NET Programme with consistency and will also help their consortia adapt their individual administrative systems to the "European" mode, when participating in European projects. In addition to this, more pro-active communication and information from the EC towards the INCO-NETs would be appreciated with regard, for example, to the changes in the EC databases and online tools such as FORCE.

Regarding the two systems – FORCE and SESAM – to report and justify costs through the Participant Portal, the process must be simplified if the European Commission wishes to extend their use beyond the project coordinators. It would be very difficult for some INCO-NET beneficiaries to use SESAM effectively due to infrastructure problems. A low-tech alternative must still be available or greater flexibility must be allowed on how documentation is submitted.

Furthermore, the 60-day deadline has proved to be very tight for project reporting. The poor and slow communication between beneficiaries and with the project coordinator makes the project coordinators unable to submit a full report to the European Commission before the deadline. The EC may wish to consider greater flexibility with its deadlines, especially if project coordinators inform in advance that they may not be able to submit their report on time.

To ensure the awareness of the project management strategy, there should be a meeting for the administrative representatives of beneficiaries (representatives from the back-office) in parallel to the kick-off meeting. Such a meeting, involving if possible the Financial Officer of the project, would give much more importance to the issue of administrative and financial management than a time slot in the presentation of the project management in the regular kick-off meeting, where

participants are usually scientific representatives of the beneficiaries and are not familiar with administrative and financial issues.

In this respect, the presence of an EC FO at the kick-off meetings would help establish procedures and allow the coordinator to address questions more authoritatively. It is important to tackle financial/legal issues during these meetings and dedicate quite some time in a specific session that will be of interest for most beneficiaries and for the coordinator to make it clear since the start that the cost statements will have to be prepared in time.

Furthermore, if the EC FO announces from the beginning of the project or of the reporting period what is the level of detail required in the justification, this would help the consortium better understand the rules and save precious time when justifying.

Finally, a workshop on financial issues and reporting should be organised about 4-6 weeks before the end of the first reporting period, with a view to providing the latest available information and updating the starting one. Although generating additional costs, this would improve the reporting that may be more precise and smoother if the rules and regulations are correctly understood by all persons involved. The full support and involvement of a National Contact Point in this event on legal and financial Issues, or the participation of a second-level auditor, aware of the management of INCO-NET projects, could be helpful to remove all doubt from the project partners.

Notes

[1] The "7th Framework Programme of the European Community for Research, Technological Development and Demonstration Activities" (from now, FP7) is the funding instrument for scientific research sponsored by the European Union, and covers the 2007-2013 period. The broad objectives of FP7 have been grouped into four categories: Cooperation, Ideas, People and Capacities. For each type of objective, there is a specific programme corresponding to the main areas of EU research policy.

[2] Agreed by the Competitiveness Council of 29-30 May 2008, the Ljubljana Process aimed at getting enhanced governance based on a long-term vision on ERA developed in partnership by Member States and the Commission with broad support from stakeholders and citizens.

[3] The topics were: Researchers, Knowledge Transfer, Joint Programming, Research Infrastructures and International Cooperation.

[4] COM (2008) 588

[5] The regions covered are Pacific, South-East Asia, Latin America, Sub-Saharan Africa, Central Asia and South Caucasus, Eastern Europe, Middle East, Mediterranean and Western Balkans. Please see "List of regions affected by the INCO-NET instrument and websites of the INCO-NET projects" in Annex I at the end of this article.

[6] Through the INCO-NET instrument, the FP7 "Capacities" Programme funds actions to support international Science and Technology cooperation policies and reinforce scientific relations with Third Countries.

[7] The INCO-NET projects establish balanced partnerships, by grouping multiple international stakeholders (partners from research, industry, government and civil society) for research actions. They aim at supporting bi-regional dialogues in order to: 1/ Promote and structure the participation of third countries in the activities of FP7; 2/ Promote regional integration as well as identification and prioritization of common research areas of mutual interest and benefit; 3/ Facilitate the uptake and use of common identified research areas and the monitoring of performance and impacts of international ST cooperation across the Specific Programmes of FP7.

[8] Please see some examples of INCO-NET Project Consortia in Annex II at the end of this article. For complete information, please visit each website already included at the end of this document.

[9] The Participant Portal (http://ec.europa.eu/research/participants/portal/page/home) is the entry point for electronic administration of EU-funded research and innovation projects, and it also hosts the services for managing proposals and projects throughout their lifecycle.

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Annexes

Annex I - List of regions affected by the INCO-NET instrument and websites of the INCO-NET projects

- **Mediterranean - MIRA** Project: http://www.miraproject.eu/
- **West Balkan Countries - WBC-INCO.NET** Project: http://wbc-inco.net/
- **Africa - CAAST-NET** Project: http://www.caast-net.org/xwiki/bin/view/Main/
- **South East Asia - SEA-EU.NET** Project: http://www.sea-eu.net/
- **ENLACE** Project: http://www.enlace-project.eu/
- **Latin America - EULARINET** Project: http://www.eularinet.eu/
- **PACE-Net** Project: http://www.pacenet.eu/
- **INCO CA/SC** Project: http://www.inco-casc.net/
- **INCONET GCC** Project: http://www.inconet-gcc.eu/
- **EUCARINET** Project : http://www.eucarinet.eu/
- **INCO-NET EECA** Project : http://www.inco-eeca.net/

Other websites:

- FP7 Participant Portal :

  http://ec.europa.eu/research/participants/portal/page/home

Annex II – Some examples of INCO-NET Consortia

A. CAAST-NET Consortium

CAAST-NET Consortium

COUNTRY	ORGANIZATION
Botswana	Department of Research, Science and Technology
South Africa	Department of Science and Technology
Cape Verde	Direção Geral de Ensino Superior e Ciência
Senegal	Ministère de la Recherche Scientifique
Rwanda	Ministry of Education
Egypt	Ministry of Higher Education and Scientific Research
Kenya	Ministry of Higher Education, Science and Technology
Madagascar	Ministry of National Education and Scientific Research
Cameroon	Ministry of Scientific Research and Innovation
Nigeria	National Office of Technology Acquisition and Promotion
South Africa	ResearchResearch (Africa) (Pty.) Ltd
Ghana	ST Policy Research Institute, Council for Scientific and Industrial Research
Uganda	Ugandan National Council for Science and Technology
Turkey	Scientific and Technological Research Council of Turkey
United Kingdom	Africa Unit, Association of Commonwealth Universities (on behalf of the UK Department of Universities, Innovation and Skills)
France	Centre de Coopération Internationale en Recherche Agronomique pour le Développement
Portugal	Fundação para a Ciência e Tecnologia
France	Institut de Recherche pour le Développement
Germany	International Bureau and National Contact Point Life Sciences of the German Federal Ministry of Education and Research
Spain	Ministry of Economy and Competitiveness
Sweden	Swedish Governmental Agency for Innovation Systems
Norway	The Research Council of Norway, Division for Strategic Priorities
Finland	University of Jyväskylä/ Finnish Universities' Partnership for International Development (on behalf of the Finnish Ministry of Foreign Affairs)

B. WBC-INCO-NET Consortium

WBC-INCO.NET Consortium

COUNTRY	ORGANIZATION
Austria	Zentrum für Soziale Innovation/Centre for Social Innovation
Albania	Ministry of Education and Science - Albania
Albania	Ministry of Economy, Trade and Energy - Albania
Albania	Agency for Research, Technology and Innovation
Bosnia and Herzegovina	Ministry of Civil Affairs - Bosnia and Herzegovina
Bosnia and Herzegovina	Foundation for Higher Education World University Service
Croatia	Ministry of Science, Education and Sports - Croatia
Croatia	Ivo Pilar Institute of Social Sciences
FYROM	Ministry of Education and Science - FYRo Macedonia
FYROM	Ministry of Economy - FYR of Macedonia
Montenegro	Ministry of Science
Montenegro	Directorate for Development of Small and Medium Sized Enterprises
Serbia	Ministry of Education and Science
Serbia	Mihajlo Pupin Institute
Kosovo	Kosova Education Center
Austria	Federal Ministry of Science and Research
Austria	Austrian Research Promotion Agency
Belgium	Slovenian Business and Research Association
Belgium	Turkish Research & Business Organizations Public & Private Partnership
Bulgaria	Ministry of Education, Youth and Science
Germany	Federal Ministry of Education and Research
Germany	International Bureau of the Federal Ministry of Education and Research at the German Aerospace Centre
Greece	Ministry of Education, Lifelong Learning and Religious Affairs
Greece	South-East European Research Centre
Italy	Agency for the Promotion of European Research
Netherlands	United Nations University MERIT- Maastricht Economic and Social Research and Training Centre on Innovation and Technology
Belgium	European Commission - Joint Research Centre - IPTS
Slovenia	Ministry of Education, Science, Culture and Sport
Turkey	Scientific and Technological Research Council

C. MIRA Consortium

MIRA CONSORTIUM

COUNTRY	ORGANIZATION
Spain	Agencia Estatal Consejo Superior de Investigaciones Científicas
Morocco	Ministère de l'Education Supérieure, de la Formation des Cadres et de la Recherche Scientifique, Direction de la Technologie
France	Institut de Recherche pour le Développement
Tunisia	Ministère de l'Enseignement Supérieur, de la Recherche Scientifique et Technologique
Egypt	Ministry of Higher Education and State for Scientific Research
Germany	International Bureau of the German Federal Ministry of Education and Research
Italy	Consiglio Nazionale delle Ricerche
Greece	National Hellenic Research Foundation
Algeria	Ministère de l'Enseignement Supérieur et de la Recherche Scientifique
Turkey	Turkish Academy of Sciences
Malta	Malta Council for Science and Technology
Jordan	Higher Council for Science and Technology
Italy	Centre International de Hautes Etudes Agronomiques Méditerranéennes
France	Euro-Mediterranean Universities Network
Germany	WIP GmbH und Co.
Algeria	Centre de Développement des Energies Renouvelables
Israel	Israel-Europe R&D Directorate
Egypt	Academy of Scientific Research & Technology
Lebanon	Conseil National de la Recherche Scientifique
Cyprus	Planning Bureau
Spain	MADRI+D
Lebanon	Arab Open University
Turkey	The Scientific & Technological Research Council of Turkey
Bosnia and Herzegovina	Ministry of Civil Affairs
Palestine	Directorate General of Development & Scientific Research
Morocco	National Centre for Scientific and Technological Research
Montenegro	Ministarsstvo Prosvjete i Nauka
United Kingdom	British Council
Portugal	Fundação para a Ciência e a Tecnologia
Spain	Ministerio de Economía y Competitividad

D. ENLACE Consortium

ENLACE Consortium

COUNTRY	ORGANIZATION
Italy	APRE, Agenzia per la Promozione della Ricerca Europea
Spain	UPC Universitat Politecnica de Catalunya
Greece	HELP-FORWARD Hellenic Project for Wider Application of R&D
Austria	LAI The Austrian Latin America Institute
Belgium	MENON Research and Innovation network
Hungary	BZN Bay Zoltán
Costa Rica	UCR Universidad de Costa Rica
Nicaragua	CONICYT Nicaraguan Council of Science and Technology
Guatemala	USAC Dirección General de Investigación de la Universidad de San Carlos de Guatemala
Honduras	UPNFM Universidad Pedagogica Nacional Francisco Morazan
Panama	UNACHI Universidad Autonoma de Chiriquì
Mexico	ECOSUR El Colegio de la Frontera Sur
Guatemala	CSUCA Central American University Superior Council
Guatemala	FECAICA Federation of Industry Chambers of Central America

MIRA project self-evaluation

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Abstract. This article describes the background, development and lessons learnt of INCO-Net Project MIRA, aimed at supporting the Euro-Mediterranean cooperation in the field of Research and Innovation.

Keywords. Euro-Mediterranean cooperation – Research – Innovation – Capacity building.

Auto-évaluation du projet Mira

Résumé. *Cet article décrit le contexte, le développement et les enseignements tirés du projet INCO-Net MIRA, conçu pour soutenir la coopération euro-méditerranéenne dans les domaines de la recherche et de l'innovation.*

Mots-clés. *Coopération euro-méditerranéenne - Recherche - Innovation – Renforcement des capacités.*

I – Introduction

INCO-Net Projects are instruments designed in FP7 to support the political dialogue on issues related to research and innovation cooperation between the EU and other world regions. They have been addressed to countries, such as China or India, or neighbouring groups of countries, such as the West Balkan Countries, the Eastern European Countries, ACP (Africa, Caribbean, and Pacific) countries, or the Mediterranean Partner Countries (MPCs).

This new instrument, previously tested through the increasing policy exchanges between the Mediterranean countries and the EC, has soon appeared well adapted to the Mediterranean area where an institutionalised policy dialogue had already been established in the Monitoring Committee for Euro-Mediterranean Cooperation in ST (MoCo), created within the context of the Barcelona Process of Euro-Mediterranean Partnership (started in 1995). The MIRA project was thus designed as the first INCO-Net, in close connection to the MoCo, with the following specificities:

1. The MoCo was designed as the Steering Committee of MIRA; it was the result of the former experience, where the MoCo proposals had been instrumental in identifying projects that described the state-of-the-art of the EU-MPC cooperation in RI (ESTIME and ASBIMED projects), improving the capacity building to support the EU-MPC cooperation (EUROMEDANET), or identify the common priorities in research (MED7). In this sense MIRA capitalised upon the previous experience and was drafted by persons and institutions previously involved in the above mentioned projects.
2. The consortium of MIRA was designed by gathering the MPC stakeholders responsible for promoting the EU-MPC cooperation in RI, i.e., the Ministries in charge of this policy and some Institutions and, even companies, committed to this objective.
3. The project intended to launch actions going well beyond bilateral initiatives; it defined a work programme that targeted regional and EU common interests, following the recommendations of the Steering Committee, where most of the MPC partners were represented.

II – The MIRA consortium

The composition of the consortium implied some risks, since the MoCo composition incorporates national interests, whereas the MIRA Project could only address common regional issues. This apparent difficulty, however, did not seem to influence the normal development of the project, and all the partners accepted its regional character. In this sense, MIRA is an interesting example of a specific policy space, where national interests agree to participate together with, but also separately from, the EU entity, by defining a specific agenda including items that are common but also different from national agendas. It is also a very rare case of international relations involving both national authorities and multilateral arrangements and creating shared governance of research and, to a lesser extent, innovation. We can only underline that the unsuccessful cases of common governance were the result of actions that did not share the characteristics assumed by MIRA and that we would like to clearly describe in the following pages. MIRA, and its coupling with the MoCo, was not only a good case study: it is a rare example of effective collaboration between MPCs and the EU. Paradoxically, science (as well as culture and agriculture) had not been contemplated in the initial drafts of the Barcelona process. It is now clearly apparent that any EU-MPC collaboration should rely on the research and innovation experience embodied by the MoCo/MIRA activities.

III – The project life

We can state that the development of the project allowed the partners to envision the common problems and identify the need to harmonize and cluster efforts. This coordination was not only understood on the grounds of efficiency (tackling issues in a coordinated way to save money and effort), but also as a process aimed at creating a common identity. In the course of the project, there has been a clear evolution from an initial attitude of a “Europe-driven action” (as stated in the Project Technical Annex) to a series of initiatives demanded and supported by MPC partners, whose involvement and expectations have notably increased over time. This positive evolution has, however, pointed out the enormous difficulties of the MPC partners to properly handle the funds received from the European projects and the urgent need to adapt their financial and administrative systems to the international cooperation procedures in the fields of research and innovation. Needless to say, this increased activity and mobility of the MPC partners was continuously hampered by the Visa policy of the EU MS. This chief problem needs to be solved in the shortest period if we really want to advance toward a Euro-Mediterranean Research and Innovation Area.

Nevertheless, as mentioned above, the most important impact of MIRA is, perhaps, the functioning of an “ad-hoc” forum of MPCs animated by the common interest in drafting national research and innovation systems aimed to promote and enhance research for the benefit of national development, and support the link, even the integration, of these systems in a possible Euro-Mediterranean Research Area. In that sense, MIRA acted not only as an EU-driven forum, but also as a regional tool of high relevance. However, this makes the process very fragile mainly because at all times, the legitimacy of the forum can be challenged by any member of the consortium. This is also true for the EU Commission, since there is a continuous interaction with Brussels. Increasingly, MIRA has been understood not as an independent European-funded project, but as the policy instrument of the MoCo.

The relation between MIRA and the MoCo has been very fluid and the work programme of MIRA has evolved according to the suggestions or new demands agreed in the MoCo Meetings. MIRA has confirmed and reinforced its role as arm of the MoCo and instrument executing the policy demands of the MoCo. The latter, acting as Steering Committee of the project, has always

endorsed the yearly activity report of the project. It also transformed the membership in the consortium of MIRA as a political statement.

The relations between MIRA and the European Commission have been an interesting exercise of assessment of the INCO-Net instrument, and of the relevance of this type of project in supporting international cooperation, specifically the INCO policy of the Framework Programme. The management of the FP7 Projects by the Commission has suffered the inconveniences of a dispersed responsibility. By opening practically all calls and programmes to third countries, international cooperation dissolved into a collection of projects whose impact is difficult to be evaluated as a whole. Moreover, the responsibility has been dispersed also on administrative grounds: scientific officers are no more the single entry point for project coordinators in all aspects related to the management of projects; financial and legal officers have an increasing share of control on the development of the projects. This fact, added to the unstable computer-based services provided by the Commission in the name of simplicity-in-management, have made the relations with the Commission a cumbersome issue, softened only by the good individual attitude of these officers. Better coordination inside the Commission services and improvements in the ICT facilities might simplify the Consortium in the execution of the work programme and orient most human contacts to interesting policy issues instead of spending enormous amounts of time and energy in administrative and financial issues. Finally, the frequent changes of the Commission officers (scientific and others) in charge of the project, and the overload of work due to the lack of trained personnel, increase the difficulties of managing projects.

Having said that, the attitude of the Officers in charge of INCO towards promoting the acknowledgment and coordination of different types of projects (notably BILAT, ERA-Wide, and INCO-Net), has created an enormous momentum for a process of integration of activities across the region and between the two shores of the Mediterranean. This period covered by MIRA, and we dare to say also because of MIRA, has created the framework for a real Euro-Mediterranean Research and Innovation Space that is a concrete engagement of the national systems of research. We support this claim by noting that MIRA has promoted the discussion on policy initiatives and has been the adequate forum to test new ideas: EMIS, the thematic clustering of projects, the measurement of collaborative effort, and the like, have been discussed and examined in MIRA. The ERA-Wide Programmes aimed to support centres of high quality in the MPCs for their promotion in the ERA arena and focused on the regional research priority areas, have been another initiative favouring the link between research and the innovation system, providing the ground for Mediterranean-wide networks of high competence in key areas.

The internal functioning of MIRA project has been highly influenced by the internal restructuring of partners' organizations. However, a progressive involvement of most partners has resulted in a sense of "appropriation" of the project. It has been finally identified as an effective Euro-Mediterranean project, with a consolidated team of partners, sharing a sense of mutual trust and acting as an engine to move forward in the topics of mutual interest. Another important factor is that the public administration, represented by the Ministries, suffered the internal logics and dynamics of the political scenario. Even though the personal involvement of partners in the project has been deep and intense, their capacity to interact within the road map of the project has been limited by their own political agenda. Nonetheless, their presence in the project is the guarantee that actions will be motivated by a real national demand, and outputs will be useful for the scientific and innovation communities. That said, the political actors need to rely on institutions less involved in the political dynamics, if we want to implement activities in favour of the above mentioned communities. The MIRA project has shown that a balance of political and implementing actors inside the consortium could be an effective means to cope with this inherent contradiction in supporting a common EU-MPC research agenda. Maybe the actual evolution of MIRA towards a more politically sound forum has been a way of solving this contradiction. At a time where more transparency and accountability is demanded, a political response really could be to mingle more closely the policy personnel and the more technically-oriented personnel. The

way to create this interconnection is to accept each other and claim no “absolute truth”; in this sense, MIRA has been a great lesson in trimming pretentions of expertise and fitting science and policy in a common future.

The activities of MIRA have been quite diverse, ranging from training on participation in the FP (awareness on calls, writing of proposals, etc.) to quantitative and qualitative analyses of the EU-MPC cooperation in RI, as well as the identification of thematic priorities, opportunities and obstacles to such cooperation. As a tool to support cooperation, an Observatory on such activity was envisaged as a key activity of the project. Just after launching the project, some difficulties related to this objective emerged. No one contested the need and the opportunities of such an initiative; however, there was a certain mismatch between this regional initiative and the projects to create National Observatories on cooperation in RI. In fact, in some countries there was a competition between institutions to host the Observatory, while in other countries the established Observatories were disbanded after a change of government. The actual experience of setting-up an observatory has been difficult both politically and technically. Moreover, there was no accepted set of indicators that could provide a regional vision. This issue was addressed by MIRA, and a consensus was reached about a minimum number of common indicators to describe the evolution of cooperation between the EU and MPCs in the RI domain. However, other problems are still pending, such as the establishment of data repositories at national level, the quality control of data and the swiftness in sharing these data. The only sources that have provided till now significant insights on cooperation are statistics linked to publications and patents, making it possible to measure the domains of specialisation and assessing the number of publications and affiliations of authors in international refereed co-publications. The limits of this exercise have also been examined in the MIRA project and alternatives have been proposed, all of them being included in a “White Paper” (in the pages of this issue).

On the other hand, the good quality of engagement and participation of the MPC partners in capacity building activities in favour of the research community in their countries must be emphasised. Some activities, such as the training in writing of proposals and management of projects, have been successful, with training seminars being repeated on demand from the MPC partners. Similarly, other un-programmed activities, such as the training of MPC legal and auditing experts, were very successful, and the material is now being used by other projects.

IV – The Euro-Mediterranean Innovation Space

The support to the Euro-Mediterranean Innovation Space (EMIS), a long-term engagement, marked as a key activity of MIRA, has been one of the most important focuses of activities providing significant results. The initial ambition was to go beyond the definition of “innovation”. Instead, the activities have been defined in a pragmatic way, by addressing the issues as viewed by multiple stakeholders. Positive interactions have been established with DG Enterprise and its programme on the “Euro-Mediterranean Charter for Enterprise”, the European Investment Bank (EIB), the Network ANIMA and other stakeholders in this domain. The most important deficit found in the evaluation of the impact of innovation in research within the productive system was the lack of proper instruments of Technological Transfer (TT) from the knowledge creation system to the productive system. MIRA focused its activity in this important domain, by organizing Workshops on TT and training of experts, and promoting Thematic Forums to provide a platform of interaction between the MPC productive and academic worlds. The two following domains were chosen: water and waste water management (Casablanca, December 2011), and renewable energies (Tunis, June 2012).

Other activities such as the promotion of Research-Driven Clusters at regional level or the promotion of a Thematic Network of Metrology Laboratories and Medical Technologies Laboratories complete the fruitful results of this activity of MIRA and provide a “portfolio” of

experience to support the deployment of a Mediterranean-wide Innovation strategy. In this regard, as in other domains of activity, the involvement of the MPC MIRA partners has been very intense and, in some aspects, it has been a driver to launch or support a national debate on how to couple research and innovation activities. However, this effort is still at an early stage, and the effective outcomes will depend on multiple decisions, legislative activities, accumulated experience and profound changes needed in the productive systems. Nevertheless, an interesting output has been the perception of common problems from all the countries of the region and the need to cooperate and share experiences in a process of mutual learning. This particular area of activity of MIRA, where research meets innovation and production, where research and the economic system need to complement each other, has interested other INCO-Net projects, and some joint activities on Innovation issues were devised with neighbouring regions, such as Sub-Saharan Africa and the Western Balkans.

V – The interaction of MIRA with other Euro-Mediterranean policies

The connection with other EU policies has been a main objective of MIRA, as mandated by the MoCo. Among its activities we draw attention to innovation issues and to the high interaction with the Programme Horizon 2020 of De-Contamination of the Mediterranean, where the activity of MIRA has produced a recommendation of a Joint Research Agenda on the matter, to support the implementation of the programme.

The Euro-Mediterranean Conference on Research and Innovation, held in Barcelona last April 2012, represents an interesting turning point in the European Policy of research cooperation with the MPCs. The stated objective was to intensify the relations between the EU and the MPCs following the wave of the “Arab spring”. New principles of co-design, co-funding and co-ownership in this collaboration were announced. To some extent most of these concepts emerged in the continuous policy dialogue between MPC members and EU officials both within the MoCo and MIRA. Some of these concepts can be easily traced back to intense policy discussion in setting-up specific funding, shared funding programmes, with results more or less satisfactory that, however, contributed to keep links between both shores. This opened the discussion on instruments and funding from the EU to support this EU-MPC cooperation or partnership, as it was labelled in Barcelona in 2012.

The year 2012 will be known for the opening of a discussion and negotiation process aimed at creating a common instrument to handle this co-responsibility and partnership on an equal footing. MIRA organized a Working Group to extract from the conclusions of the Barcelona Euro-Mediterranean Conference on Research and Innovation, the MIRA Thematic Workshops recommendations and other relevant policy and technical documents agreed in a multinational EU-MPC partnership, a Common Research and Innovation Agenda to be discussed in the coming Euro-Mediterranean Ministerial Conference on Research and Innovation.

VI – Communication and delivering issues

Another important element observed along the project is the increased use and impact of the website (www.miraproject.eu). The original expectations of this website were the design of an INTERNET management tool and of a discussion platform; unfortunately they have not been fulfilled. The interaction has been less virtual and more related to face-to-face meetings. In fact, the project has offered several meeting opportunities; the Management Boards or all Workshops, Seminars or Conferences organized, were lively discussion forums. On the other hand, the functioning of the website as a portal for Euro-Mediterranean Cooperation in SI where

all partners posted their information, has not been as fruitful as expected. The site acted more as a management tool for the Coordination of the Project rather than as a point to collect and post information, since most of the uploaded material was gathered by the coordination team.

The lesson learnt is that the debates in the Mediterranean cultural environment need the physical presence of the actors, and the management of information requires a centralized structure well connected with the sources; perhaps a greater use of social networks would be more efficient in improving the information exchange. Moreover, the virtual tools in the management of projects have still not been sufficiently tailored to meet the actual needs and capacities of partners.

Formally, MIRA has achieved most of the expected Deliverables and Milestones. It is worth mentioning, among others, some key Deliverables and Milestones scheduled in the MIRA Technical Annex or resulting from non-scheduled specific demands of the MoCo, Steering Committee of the project, such as:

- Screening Conference of the State of the Art in the EU-MPC cooperation in SI.
- Recommendations of the Thematic MIRA Workshops on identifying common EU-MPC research priorities that were used as key elements in the setting of Specific International Cooperation Actions (SICA) of the Thematic Priorities of FP7.
- The results of the Training Seminars on writing and management of FP Projects, organised for scientists and administrators of the MPCs, which are being used now as reference material in the BILAT Projects. In this line it is also important to mention the evaluation of the MPC NCPs and the Training Seminar for Auditors.
- The agreed list of Indicators of International Scientific Cooperation to be used in the description of the EU-MPC scientific cooperation.
- The “portfolio” of the Euro-Mediterranean Innovation Space (EMIS-MIRA WP8) activities promoting research-driven innovation and capacity building in the MPCs, such as Technological Transfer training, setting Networks of Laboratories (Metrology and Biological testing), promoting Research-Driven Clusters, organizing Thematic Forums (Water and Waste Water, Renewable Energies) with the participation of Industry, Administration and Academia.
- The Documents of the “Horizon 2020 Programme of De-Contamination of the Mediterranean Research Agenda” and the “Common Euro-Mediterranean Research and Innovation Agenda (CRIA)” created by EU and MPC Groups of Experts, at the request of the MoCo.
- The promotion of a Mediterranean ERA.Net proposal.

However, some of the targeted objectives have not been attained for different reasons; we hereby mention some of the most important ones:

- Setting of a Euro-Mediterranean Observatory of Scientific Cooperation. MIRA found enormous difficulties due to internal reasons in promoting single national Observatories in the MPCs, to be federated into a regional one.
- The creation of the MIRA Internet Forum and the Political Dialogue Platforms through the MIRA Website was not enhanced by most of the MIRA partners, and the communication within the project that was done, unfortunately, via e-mail messages, rather than using the Web facilities, produced a considerable exchange of multiple messages and replies, making it difficult to evaluate the real engagement of partners in the development of the project as measure of their contribution through the Web.
- The dialogue with other EC DGs was limited to the issue of the “Horizon 2020 De-Contamination of the Mediterranean” and DG Enterprise. The expected Workshop of

the MoCo with different DGs to be organized by MIRA has, unfortunately, not yet been organised.

VII –Lessons learnt and future expectations

The experience of MIRA provides some Lessons Learnt and insights on the future of the EU-MPC scientific collaboration expectations that we can list as a conclusion of the self-evaluation exercise:

- A fluid cooperation dynamics has produced a demand for shifting from a somehow unidirectional setting of the scenario and decision-making process to a partnership with co-ownership of programmes on all aspects of collaboration.
- This new scenario is being assumed by most of the MPCs, but it is highly dependent on political difficulties, on both sides of the Mediterranean. Networking of thematic actors from the EU and MPCs, including Technology Platforms, must be promoted and maintained for the mutual interest. A structure providing a minimum management of these networks should be created and co-owned.
- The political debate structured by the MoCo and the Ministerial Conferences should build a shared instrument to implement the actions needed to boost and improve the quality and focus of the cooperation. This instrument must be co-owned by all parties.
- The identification of demands should be the result of analysis, debate and, if possible, consensus. No common shared agenda will ever be the result of a purely national dynamics. Also, no agenda can ever be built uniquely on political discourse: experts from all sides of the Mediterranean need to be involved in actual projects that assess the cooperation potential, the issues open to research and development and the instruments to be mobilised. The shared partnership cannot be made at the expense of a documented analysis.
- The debates in the Mediterranean cultural environment need the physical presence of the actors, and the management of information necessitates a centralised structure well connected with the sources.
- The political actors need to rely on institutions that are less involved in the political dynamics to guarantee the long-term sustainability of scientific cooperation.
- MPC partners have had enormous difficulties in handling the funding received from the European projects. There are urgent needs to adapt their financial and administrative systems to the context of scientific cooperation. May be the use of “third parties” and/or an independent co-owned structure to cope with the handling of the EU-MPC cooperation in RI could be a solution.
- The MPC scientific community is claiming for a better research environment: less bureaucracy and more linkage to the societal challenges of their countries. The actions will seek greater involvement of the industrial sector/SMEs. Duplicating actions from other regions is not a solution.
- The participation in research and innovation activities must be better rewarded. The EU-MPC cooperation must address this as a common challenge, research needs to be given a strong footing inside the EU-MPC relationships and innovation should be on the political agenda rather than relegated to some subaltern activity. Innovation activities must be associated to most of the actions launched by international cooperation in research.
- Finding success stories and best practices in South – South cooperation and transforming them into initiatives will help mutual learning between actors sharing similar challenges.

Look at neighbours before asking to the supposed advanced countries.

- Innovation push needs a joint action plan for the creation of an international platform to cooperate on the technology transfer area. MoCo should support the establishment of this platform/network on technology transfer and innovation as a priority for achieving a Euro-Mediterranean Research and Innovation Space.
- Big investment supported by political decision should follow, not precede, an innovation and research strategy centred on improving human capacities, building or improving the innovation and research environment adapted to the national circumstances, and guaranteeing the sustainability of investments and the job security of the actors. Research needs a long term strategy, a continuous effort, with priorities linked to national and regional challenges on social, economic and environmental demands.
- The building of trust between cooperating parties results frsom the involvement in well-drafted actions that engage all parties. Prejudices do not resist the proof of cooperation in topics of mutual interest.

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End aid now: a prospect of financial synergies for a long-term Euro-Mediterranean cooperation on science, technology and innovation

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Abstract. The Mediterranean region has traditionally been an area of interest for the EU external relations. Several cooperation initiatives have been focussed on this region, within the framework of a "Mediterranean dimension" encompassing security, economic, social and political aspects. In 1995, the Barcelona Conference reinforced this framework in order to create a "shared peace, prosperity and security" area. This ambitious goal, re-launched by the creation of the Union for the Mediterranean (UfM), has not been fully achieved yet. With particular reference to Science, Technology and Innovation (STI), the EU cooperation policies with the Mediterranean Partner Countries (MPCs), supported by different co-funding tools, have not completely defined a harmonized institutional and regulatory co-ownership framework at multi-lateral level. This partial failure is mainly due to a poor governance of STI Euro-Mediterranean cooperation, and to the political scenario that has characterized the area in the past 20 years. The objective of this paper is to give food for thought on the rethinking of Euro-Mediterranean STI cooperation policies and tools by proposing a new governance that might ensure the sustainability of such cooperation. Considering the current political, social and economic conditions of the Mediterranean region, the first section of the paper describes the background of Euro-Mediterranean STI cooperation. In the second part emphasis is laid on stocktaking and critical assessment of co-financing instruments such as ERA-NET, ERA-NET plus and Article 185 of the Treaty on the Functioning of the EU, in order to identify their strengths and weaknesses. The third section highlights the need to renew the EU STI cooperation policy in the Mediterranean region on the basis of co-ownership and co-funding principles, through shared actions able to support co-development.

Keywords. Euro-Mediterranean relations – Cooperation in Science – Technology and Innovation – Co-ownership – Governance.

Mettre fin maintenant à l'aide : une perspective de synergies financières pour une coopération euro-méditerranéenne en matière de science, technologie et innovation

Résumé. *Traditionnellement, la Méditerranée a représenté un espace très intéressant pour les relations extérieures de l'UE. En effet, de nombreuses initiatives de coopération ont été entreprises en faveur de cette région, dans le cadre d'une "dimension méditerranéenne" qui réunit divers aspects concernant la sécurité, l'économie, la société et la politique. En 1995, la Conférence de Barcelone a renforcé ce dispositif en vue de contribuer à la création d'une zone de "paix, sécurité et prospérité partagée". Cet objectif ambitieux, relancé par l'Union pour la Méditerranée (UpM), n'a pas été entièrement réalisé. En particulier, dans le domaine de la Science, de la Technologie et de l'Innovation (STI), la politique de coopération entre l'UE et les pays partenaires méditerranéens, soutenue par plusieurs instruments de cofinancement, n'a pas défini un cadre institutionnel et réglementaire de copropriété harmonisé au niveau multilatéral. Cet échec partiel est dû principalement à une faible maîtrise de la coopération euro-méditerranéenne en matière de STI et au scénario politique qui s'est dessiné dans la région ces 20 dernières années. L'objectif de ce travail est de réfléchir à une refonte des politiques et des instruments de coopération euro-méditerranéenne en STI, en proposant un nouveau cadre de gouvernance qui puisse assurer la durabilité de cette coopération. Compte tenu des conditions politiques, économiques et sociales actuelles dans la région, nous allons dresser dans un premier temps l'état des lieux de la coopération euro-méditerranéenne en STI. Ensuite, nous allons proposer une évaluation critique des instruments de cofinancement tels les ERANETs, ERANET+ et les initiatives basées sur l'article 185 du Traité sur le Fonctionnement de l'Union Européenne. Dans une troisième partie, l'accent sera mis sur la nécessité de renouveler la politique de coopération en STI dans la région Méditerranéenne, sur la base des principes de copropriété et cofinancement, à travers des actions communes visant à soutenir le codéveloppement.*

Mots-clés. *Relations euro-méditerranéennes – Coopération en Science – Technologie et Innovation – Copropriété – Gouvernance.*

I – Introduction

"Events happening in neighbouring Arab countries since the start of the Arab Spring are in continuous development and need the revisiting of EU policies in the Mediterranean" (Hollis, 2012). Inspired by this comment by Rosemary Hollis, the authors of this paper intend to present a critical overview of Euro-Mediterranean relations, with a particular focus on Science, Technology and Innovation (STI). The paper is divided into three parts. The first describes the background of Euro-Mediterranean cooperation and identifies its main weaknesses; the second carries out an assessment of existing Euro-Mediterranean STI cooperation tools; the third aims at identifying a good governance scheme for a renewed and sustainable cooperation.

II – Background

Even if it might sound trivial, one could state that the main problem of the Euro-Mediterranean STI cooperation lies in the word "cooperation" itself, at least as it has been interpreted so far. In fact, cooperation, defined by the Oxford dictionary as "*the action or process of working together to the same end*", can hardly be considered at present the right expression to describe the state of play of Euro-Mediterranean STI relations. As we will see later, this is not due to the *object* of cooperation *per se* (Science, Technology, and Innovation) but rather to the *actors* of cooperation: the EU on one side and the MPCs on the other.

Thus, a critical assessment of Euro-Mediterranean STI cooperation cannot be carried out without considering the political framework that has given an impulse to the Euro-Mediterranean cooperation process since 1995 in Barcelona. As a matter of fact, a weak political framework cannot sustain a stable cooperation, in any of the thematic areas touched by the Euro-Mediterranean partnership. For this reason, a short outline of the current policy framework is necessary to carry out a constructive analysis of STI cooperation.

Euro-Mediterranean STI cooperation can be divided into two main categories: bilateral and multilateral. At the bilateral level, it is based on agreements concluded between the EU and a single MPC. These agreements are authentic international agreements, and rule the respective roles and commitments of the two parties to achieve specific objectives. So far bilateral Science and Technology cooperation agreements have been signed by the EU with Algeria, Egypt, Jordan, Morocco and Tunisia.

Bilateral STI Agreements between the EU and the Mediterranean countries associated to the 7th Framework Programme, Turkey and Israel, are also in force.

In general, STI bilateral agreements focus on strengthening the bilateral policy dialogue and promoting mutual cooperation on common challenges. Even if their importance is significant, and witnesses the willingness of the parties involved, they are not fully relevant to the analysis carried out in this paper, since they are not representative of regional cooperation.

At the multilateral level, STI cooperation falls mainly within the broader scenario of the Euro-Mediterranean relations, which has been characterized by **three major policy initiatives**, whose main traits are shortly described below.

The first is the Euro-Mediterranean Partnership, launched with the Barcelona Conference in November 1995. The new framework of relations inaugurated in Barcelona was divided into three main pillars: i) Political and Security Dialogue; ii) Economic and Financial Partnership; iii) Social

Cultural and Human Partnership. Cooperation in science and innovation has been included in the Economic and Financial pillar, and an article of each Association Agreement concluded by the EC with MPCs has been devoted to "Scientific, technical and technological cooperation".

The second policy initiative is the European Neighbourhood Policy (ENP), launched in 2004. The ENP was established with the objective of strengthening EU relations with Southern and Eastern neighbours, in order to avoid the emergence of new dividing lines in the region and to offer to EU neighbours a privileged relationship based on common (or at least claimed to be so) values. Among the objectives of the ENP, there is the integration of scientific communities and the opening of the European Research Area (ERA) to partner countries. To this end, specific sections of ENP Action Plans include actions related to science, technology, research and innovation, tailored on partner countries' needs and conditions. Within the ENP context, in May 2011 the EC presented a new approach to strengthen the partnership between the EU and the neighbouring countries (COM(2011)303 final). In terms of research and innovation, the EU suggests to work towards the establishment of a Common Knowledge and Innovation Space (CKIS), which pulls together policy dialogue, national and regional capacity-building, cooperation in research and innovation and increased mobility of researchers.

The third initiative is the Union for the Mediterranean (UfM), known as a "re-launch" of the Euro-Mediterranean Partnership, inaugurated in 2008. UfM includes all 27 EU member states and 16 partners[1] across the Southern Mediterranean and the Middle East. Its main aim is to infuse a new vitality into the Partnership and raise the political level. Higher education and research are included among the six key areas of cooperation of UfM.

In addition to these three initiatives, that constitute the policy and legitimate basis of Euro-Mediterranean cooperation, some other key-elements – specifically focused on STI and Research and Development (R&D) – should be recalled to complete the framework.

First, the conference of Lisbon of 2000 and the Lisbon Agenda for Europe's competitiveness, jobs and growth recognize the strategic importance of higher education, scientific research and innovation. In this regard, with particular reference to the Mediterranean, an EC Communication of 2008 (COM (2008) 588 final) setting out a strategic European framework for international cooperation in science and technology calls for a stronger involvement of the MPCs in the ERA.

Second, higher education and research were addressed by an *ad-hoc* Euro-Mediterranean Ministerial Conference held in Cairo in 2007. This conference represents the **highest level of political dialogue**, since North and South ministers were directly involved and committed their countries to the achievement of concrete objectives. At the Cairo Conference Ministers recognized that education and Research and Technical Development Infrastructure (RTDI) did not receive enough attention in the Euro-Mediterranean Partnership and agreed on the creation of a common research area through the enhancement of MPC participation in the Framework Programmes, taking into account their particular needs, areas of mutual interest and benefits. Also, Ministers announced that the integration of MPCs in the European Research Area (ERA) was to be achieved by (*inter alia*) exploring the **possibility for co-financing by MPCs in FP7**.

Third, the Euro-Mediterranean Conference on Research and Innovation, held in Barcelona in April 2012, laid emphasis on the need to establish a renewed partnership in RI, based on co-ownership, mutual interest and shared benefits. Also, the Conference conclusions underlined the importance of moving away from a "bilateral" approach and building on a more strategic "**region to region**" approach. In Barcelona the EC announced the preparation by interested EU Member States and South Mediterranean countries of a bi-regional programme based on **Article 185** of the Treaty on the Functioning of the EU (TFEU) that would be a major initiative contributing to the implementation of the common agenda. On the same occasion, the EC recognized that the success of the cooperation initiatives lies in the commitment of the EU Member States and MPCs,

which should be obtained through a new Euro-Mediterranean Ministerial conference on Research and Innovation.

Last but not least, the policy framework is completed by the Monitoring Committee for Euro-Mediterranean Cooperation in RTD (MoCo), whose periodical conclusions and recommendations made by senior officers represent a high level response to the challenges to be faced in order to boost cooperation. MoCo has also the task of submitting recommendations to the EU for the joint implementation of RTD policy priorities. The last MoCo meeting, held in Brussels in June 2012, agreed on the need to revisit the past achievements of cooperation based on the principles of partnership, co-ownership, mutual interest and shared benefits. MoCo also agreed on the need to establish a medium to long term common RI agenda.

The policy framework outlined above has led to a cooperation that can be defined "perfectible". Of course, since the launch of the Euro-Mediterranean partnership in 1995, many cooperation objectives have been reached and significant progress has been made thanks to the contribution of several initiatives and projects, especially on RI cooperation. On the other hand, as for the whole Barcelona Process, now evolved into UfM, the translation of principles into practice reveals that the relations between the two shores of the Mediterranean suffer from some **structural weaknesses**.

First, despite the efforts, such a relationship is not a "peer-to-peer" one (Attinà, 2003). Second, the significant amount of resources invested in this partnership is not producing the expected results, and is therefore partially ineffective (Youngs, 2006).

The consequence of these weaknesses, as pointed out by Shoefthaler, is that "*cooperation*" has often become "*assistance*" and partners have divided into "*donors*" and "*beneficiaries*" (Shoefthaler, 2006). Perhaps this has produced some short-term good results, but will worsen the gap in the long run, contributing to the future instability of the region.

For this reason, a strategic re-thinking of Euro-Mediterranean relations is needed in order to turn the existing "framework" into good governance, which will ensure long-term, stable and sustainable cooperation. In particular, in our view a further thought on STI cooperation is necessary and of utmost importance for two key reasons:

1. The opening of global economy has caused a growing competitiveness of MPCs and consequently the shift from a resource-based towards a knowledge-based economy is a necessity, not a choice (Sid Ahmed, 1998). A telling case is the one of Chinese imports that represent a strong incentive for increasing innovation in Maghreb countries (Gerraoui and Richet, 2004). There is no doubt that the capacity to innovate helps countries achieving advantageous positions in key industrial and service sectors.
2. The increasing necessity of MPCs to adapt their products and processes to international standards, following the development of the Euro-Mediterranean Free Trade Area (EMFTA). In this regard, the standardization pathway changes according to the category of goods (Pasimeni *et al.*, 2007).

Having said that, the re-thinking of Euro-Mediterranean STI relations should start from existing cooperation tools (this is why we used the term "perfectible"), in particular the ones that entail co-financing synergies. In fact, co-financing is the only way to guarantee an effective cooperation scheme, based on co-decision and co-ownership. Despite the principles, reality teaches that when money is in play, who pays can have a say and sit in the driving seat. The following paragraph will provide an assessment of the main existing EU co-financing tools available today for the Euro-Mediterranean STI cooperation: the ERA-NET scheme and initiatives based on Article 185 of the Treaty on the Functioning of the EU (TFEU).

III – Stocktaking and assessment of main co-financing instruments

Since the Lisbon Conference, science and research have been considered an integral part of the European development strategy and key topics to promote growth and competitiveness in the EU. Meantime, at the beginning of this century the effects of globalization have become evident in the Mediterranean area in terms of wider international trade, a larger variety of products, joint ventures among enterprises, greater integration, increasing of capital movements. In fact, in the last 10 years, there has been a strong growth of international flows of private capitals toward developing countries that had political repercussions on the EU-MPC dialogue and cooperation. In order to maintain its own role in the region, the EU has to support STI initiatives having a big socio-economic impact and visibility in all Member States and MPCs.

The EU recognizes the importance of developing STI in order to guarantee competitiveness on the international markets, as claimed in the Green Paper of 2011 (COM (2011) 48). Horizon 2020, the future Research and Innovation Programme of the EU, envisages the improvement of the ERA to achieve the ambition of Europe in providing a critical mass[2] and an international profile to research excellence, on the basis of a large participatory approach.

In this view cooperation among EU, Member States and third countries is of utmost importance. In fact, cooperation has economic implications and favours the creation of good and stable diplomatic relationships that ensure peace and, indirectly, international security. Even if the present paper is not intended to analyze in detail the political and economic scenario, for the sake of completeness we deem it necessary to highlight the strategic role of cooperation with MPCs, thanks to the geographical position of the EU in the Mediterranean and the strong synergies existing in the region.

The following part of the paper aims at analyzing the existing coordination tools within FP7 in order to identify contributions and benefits that such tools can give for a full co-ownership in the EU cooperation with MPCs.

ERANET scheme aims at developing and strengthening the coordination of national and regional research programmes in Member States. This instrument was launched to contribute to restructuring the European research framework, by improving coordination actions, reducing the level of fragmentation of the research funding system, establishing a long-term cooperation and encouraging the mutual opening of national and regional research programmes (Pérez and Guy, 2010). Thanks to the success achieved by the ERANET scheme, ERANET-Plus was designed to encourage owners and managers of national and regional research programmes to collaborate. The added value of “Plus” is that the Commission provides an incentive for the organization of joint calls by “topping-up” the joint transnational funding with Member States funds.

Currently, 31 ERANET/ERANET-Plus are active within the FP7 addressing the Mediterranean area; they mainly focus on a specific research topic, although some of them address horizontal issues and innovation. Only one ERANET Plus (iMERA+) had a bridge function towards the implementation of a long-term and stable legitimate form of cooperation like Article 185.

MPCs participate in only three ERANET schemes (Algeria, Egypt, Morocco and Tunisia in ARIMNET, Egypt in ERAFRICA and Algeria, Morocco and Tunisia in FORESTERRA), about 10% of the total. The main constraints of MPCs are the low capacity at thematic, coordination and financial level. Despite the intention and efforts of the EU to promote a shared vision with MPCs using instruments like ERANET and the two calls foreseen in the Work Programme 2013 for the extension of ARIMNET and the launch of an ERANET “capacities”, the above percentage is not sufficient to guarantee cooperation with MPCs based on co-ownership and co-funding principles. It seems that the EU and MPCs are not yet capable to establish a process of cooperation beyond a simply allocation of funds to promote North–South economic integration and development.

Article 185 of TFEU (ex Article 169 TEC) goes beyond the coordination of joint calls (like ERANET) and requires integration of national research programmes at three different levels: scientific, managerial and financial. This instrument entails the joint implementation of national programmes (or parts of these), and the commitment (scientific, financial and political) of Member States for the whole duration of the initiative. Article 185 initiatives have different characteristics concerning duration, funds, level of integration among partners and potential impacts that highlight governance gap and poor integration among Member States. Common issues of Article 185 regard financial and governmental rules; in particular, the heterogeneity of funding timetable and mechanisms in each country causes a gap in scientific integration and development of activities. Article 185 lays down a complex coordination scheme very expensive to manage, as confirmed by EMRP report (EMRP, 2012). In addition, the existing Article 185 does not set out a real financial partnership and shared governance with third countries other than EU Member States.

So far, approved initiatives based on Article 185 are five, four of which fall within FP7 (AAL on the improvement of quality of life, BONUS on science in the Baltic Sea region, EUROSTARS on research and development of SMEs, EURAMET on metrology, EDCTP on clinical trials). No Article 185 has been launched, so far, in the Mediterranean region, with the exception of EDCTP in which Third Countries do not support financially the initiative, but they can participate in an independent advisory body that recommends suggestions to the Dedicated Implementation Structure.

Although Article 185 is in its infancy because of the few initiatives approved, in our view it can be a good instrument to favor a **stable and legitimate EU-MPCs cooperation** thanks to the **long-term commitment** and financial integration required to partners for the whole duration of the initiative. To this end, the EU should envisage a stronger involvement of programme owners, policy makers, scientific and business communities and a more coordinated approach to research and innovation. It is also necessary to define rules that simplify the access to cooperation tools, favouring a **full integration of MPCs** at decisional, financial and scientific level. Such rules should be flexible enough to allow the countries involved to react and to adapt to new challenges or promising opportunities.

IV – Sustainability and governance for a renewed cooperation

Considering the strategic role of Mediterranean countries in EU external trade and the current economic and political context emerged after the “Arab Spring”, a stable and durable relationship should be established for an integrated development of the Mediterranean basin. The EU has to deal with new challenges, shifting from the usual fragmented cooperation to a full partnership with MPCs in research and innovation. As highlighted in the previous section a new approach to EU-MPCs cooperation policies based on co-ownership and co-decision principles is necessary and could be supported by *ad hoc* STI instruments ensuring long-term and stable cooperation. The key aspects of such cooperation are:

1. *Participatory approach* during the co-decision phase of cooperation in STI, on the basis of common priorities and challenges. These can be identified in synergies and complementarities among European MSs and MPCs’ research programmes. Sustainable and long-term cooperation can be guaranteed by a bottom-up approach and by the involvement of the cross-border chain of research and innovation.

2. *Financial commitment* of MPCs for the whole duration of initiatives, in order to guarantee a wide participation in the decision-making process and a more active involvement in joint implementation. The sharing of responsibility and commitment among Member States and MPCs allows better integration, the enhancement of capacity building, knowledge and innovation, and the achievement of common benefits and mutual interests.

3. *Flexible financial and administrative rules,* that take into account the asymmetry of governance and financial procedures of European MSs and MPCs, as well as the respective fields of research and innovation and different coordination tools. A flexible harmonization of financial and governmental procedures is strongly encouraged by all involved parties.

In order to be effective, the re-thinking of Euro-Mediterranean STI cooperation outlined above should be sided by the establishment of a new governance.

So far, the periodical "restyling" of the Barcelona Process did not apparently lead to tangible and stable results. For this reason, long-term solutions are needed to ensure that the Mediterranean region becomes an area of peace, political stability and shared prosperity. Such solutions should be able to face the following challenges:

1) Weak coordination between bilateral and multilateral level

At present, Euro-Med relations work both at the bilateral and multilateral level. Each level has its respective commitments, initiatives and specific projects. However, there is scarce coordination between the two regimes of cooperation. This generates a duplication of efforts and a dispersal of potential synergies.

2) "EU-directed" programmes and policies

Despite the intensions announced in several Euro-Med conferences and ministerial meetings, the cooperation initiatives, tools and policies in place are "EU-directed"[3] and not demand-driven. As outlined above, the at times "assistentialism" approach of the EU is counterproductive for real cooperation. An assessment of the needs is crucial for the conversion of the donor-beneficiary relationship into a cooperative one. In fact, responsibility and political commitment derive from mutual trust and sharing of objectives.

3) Institutional and administrative asymmetries

The institutional dynamics and administrative systems of the countries on the two shores of the Mediterranean are undoubtedly different. Thus, effective cooperation initiatives should take such differences into account. This means focussing on capacity building, on the exchange of best practices and on the legal harmonization between the EU and MPCs in key sectors, including research and higher education.

4) Top-down approach

Besides the "Eurocentrism" that characterized the history of Euro-Mediterranean relations, a top-down approach to the design of cooperation instruments and initiatives has negatively affected the results and, in the medium run, has contributed to both political instability and the following uprising of the civil society in many MPCs. The involvement of target beneficiaries of policies and programmes in the phase of strategy definition is crucial to ensure their success. This is particularly urgent for research, higher education and STI cooperation.

5) Divergent EU strategies

The 27 EU Member States are far from having a single approach and common objectives for their external relations. All EU policies are the result of an endless negotiation process and an extemporary balance of different interests. This is reflected in the fact that the EU internal strategy for growth and its related objectives seem to be in contrast with the goals of Euro-Med

cooperation[5]. Also, a partial shift of the EU from what was declared in terms of principles and what was put into practice has contributed to its failure to hit some Euro-Mediterranean cooperation targets (Kausch and Youngs, 2009).

These challenges cannot be faced without a concrete and shared political commitment, based on high-level policy dialogue. Such a commitment should be the milestone of a new framework for Euro-Mediterranean relations. In particular, the EU Members States and the MPCs should translate into practice the principles (declared on several occasions) based on mutual trust and will: co-ownership, co-management, co-working, co-financing. Co-financing is the principle that might drive the others, since it requires clear commitment prior to the launch of cooperation initiatives. In this regard, on the EU side the main effort consists in balancing the national interests of Member States and in developing a coherent set of policies both at the internal and external level. On the MPC side, the main responsibility is to play to the maximum extent the "partner" role.

At the same time, cooperation tools should be structured by taking into account requests, opinions and needs of the civil society. This could give more legitimacy to the actions developed through the Euro-Mediterranean cooperation, that will no more be perceived as "imposed" by EU bureaucrats or by MPC governments, but developed to meet the real interests of citizens. This objective can be achieved through the inclusion of specific (and mandatory) listening and feedback actions in all programmes launched in the framework of Euro-Mediterranean cooperation.

In addition, capacity building and a constant exchange of best practices and lessons learned is essential to overcome the institutional imbalances and to develop a harmonized administrative management of the sectors that are included in cooperation. Of course, considering the complexity and the heterogeneity of the territories involved, harmonization cannot be full but should focus mainly on financing and bureaucratic procedures.

Keeping this in mind, the pillars of the new governance for Euro-Mediterranean relations could be summarized as follows: co-financing, shared responsibility, coherence and synergy among initiatives, involvement of the civil society, flexible harmonization.

Still, this might not be enough. With a closer look, we can state that the objective is not governance itself, but the contribution to an **ethical and sustainable development** of the region, with particular attention to societal, environmental and economic dimensions (and their interlinkages) (Bogliotti and Spangerberg, 2005). As a result, a sustainable cooperation scheme should take into account these three dimensions and orient policy dialogue towards the need to provide viable solutions for today's problems without worsening tomorrow's perspectives.

V – Conclusions

Competitiveness and prosperity in the EU, particularly in the Southern European member states, depend on the socio-economic and political stability of the neighbouring countries. At the same time the socio-economic growth and political changes in MPCs impinge upon the EU, particularly upon Southern Europe's socio-economic and market perspectives.

This urges to develop a new vision of Euro-Mediterranean cooperation to support sustainable growth in the region. Cooperation in science and technology, more than in other sectors, is the way to create new opportunities for regional growth through North-South equal sharing and co-ownership of knowledge development and innovation prospect.

EU cooperation instruments like ERANET schemes and EU legal means, like for example Article 185, should become common actions to support EU-MPCs cooperation. As recognized by the EU in the Barcelona Conference of April 2012, an initiative based on Article 185 and specifically targeted to the Mediterranean region could be a big occasion to design a framework for stable and long-term cooperation. Despite many thematic, coordination and financial constraints of MPCs,

the EU should develop instruments to stimulate and attract (both financial and coordination) these countries in such initiatives: MPCs should play a role in designing the process from the early steps and occupy a driving position in implementation and financial support. As a matter of fact, a wider and substantial involvement of MPCs in co-financing and co-programming would help pave the way to their integration in the European Research Area and increase their research absorption capacity in view of a future association to the EU research programming. In this respect, it is worth noting that in the last years, within ERANETs, INCONETs and similar initiatives addressing Euro-Mediterranean cooperation, MPCs have met regularly at a high level (Ministries of Research) to develop a mutual understanding and vision on research governance. In this perspective, such a type of initiatives represents a solid basis to build a common approach and vision, which are necessary to enhance the adoption of common policies amongst MPCs towards the EU on a long term basis.

To achieve these objectives it is strongly recommended that the cooperation process should be based on a North-South participatory approach, including the civil society, in order to create a new governance of Euro-Mediterranean relations.

Finally, the prospect of developing financial synergies and stable cooperation between the EU and MPCs has to take into account common societal challenges to make a clear-cut contribution to the sustainable development of the region.

Notes

[1] The 16 non-EU countries of UfM are: Albania, Algeria, Bosnia and Herzegovina, Croatia, Egypt, Israel, Jordan, Lebanon, Mauritania, Monaco, Montenegro, Morocco, Palestinian Authority, Syria, Tunisia, Turkey.

[2] The critical mass is intended by the EC as a combined level of research effort, partner support, and resources, which is sufficient to tackle with success common research and societal challenge.

[3] The Eurocentrism of cooperation initiatives has been a constant trait of Euro-Med relations. Even the UfM, that is claimed to be based on co-decision, co-management and co-ownership, seems to have failed from the beginning, since related initiatives "mostly originated from EU side" (Aliboni and Ammor, 2009).

[4] As far as the Mediterranean region is concerned some authors maintain that "by its actions the EU has favoured regimes and practices that ultimately proved intolerable to a broad stratum of the Arab society" (Hollis, 2012).

[5] This is particularly clear in trade and economic relations. The logic of the free movement of goods, capital, labour and services which is at the basis of EU "shared prosperity" has not been applied to Euro-Med co-operation (Hollis, 2012).

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Third part

The Euro-Mediterranean Innovation Space

Paving the way towards the creation of a Euro-Mediterranean Innovation Space

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Abstract. This article presents the rationale for including the innovation activities as part of the Euro-Med dialogue policy. It relies on an analysis focussed on the need to include innovation in the international cooperation schemes. It shows that policy can be largely upgraded to include not only simple measures aimed to promote international collaborations but more integrated joint initiatives targeted to encourage shared agendas and cooperative schemes. Finally the article indicates some general objectives for opening a dialogue process among Euro-Med science, technology and innovation stakeholders. The article gives the example of the conclusions of the MIRA forum on energy as a way to build this dialogue platform.

Keywords. Innovation – International cooperation – Euro-Med cooperation – Innovation adoption.

Préparer la voie pour la création d'un espace euro-méditerranéen de l'innovation

Résumé. *Cet article présente les raisons justifiant l'intégration des activités d'innovation dans le cadre du dialogue euro-méditerranéen. Il s'appuie sur la nécessité d'inclure l'innovation dans les schémas de coopération internationale. Il montre que la politique peut être améliorée pour passer de la réponse à des mesures de promotion de la collaboration internationale vers des initiatives conjointes qui permettent de promouvoir la définition commune des objectifs et des formes de coopération. Finalement l'article indique des objectifs généraux pour favoriser le processus de dialogue euro-méditerranéen entre les parties prenantes dans la communauté scientifique et technologique. L'article donne l'exemple des conclusions du forum MIRA sur l'énergie en tant que moyen pour construire cette plate-forme de dialogue.*

Mots-clés. *Innovation – Coopération internationale – Coopération euro-méditerranéenne – Adoption de l'innovation.*

I – Introduction

The geo-political stability of the Mediterranean region is of fundamental importance for Europe, given the strategic position of the region. It is recognized that economic growth and prosperity is one of the key drivers which can secure the strategic political stability of the Mediterranean countries, and the promotion of innovation is crucial towards achieving this aim. In this regard, the development of an innovation capacity throughout the region becomes of vital importance to the Euro-Med region as a whole. In this paper we argue that there is a need for concrete actions to stimulate a shift in the rationale and contexts of STI collaboration between EU and the Mediterranean countries. The creation of a Euro-Mediterranean Space (EMIS) could provide a framework to facilitate the exchange. In explaining this rationale, this paper will first give a brief overview of the current Euro-Med STI cooperation and subsequently provide a literature review of the rationales for international ST cooperation. In the third section the rationales are dealt with in further detail for Euro-Med STI cooperation. In conclusion, this paper provides some insights on the way forward in this regard.

II – The Euro-Med science, technology and innovation cooperation

Since the Barcelona Declaration in 1995, substantial effort has been made to support partnership at political, economic, social and cultural levels between the member states of the European Union (EU) and the Mediterranean Partner Countries (MPCs). Following the Barcelona process, Euro-Mediterranean association agreements have been signed with the partner countries in the context of the European Neighbourhood Policy (ENP). These agreements provide, among others, a framework for scientific, technical and technological cooperation. In this spirit, many activities have been accomplished in the EU to structure a Mediterranean policy on science and technology. New policy instruments have been designed: the creation of the Monitoring Committee on ST policy (also known as MoCo or ST Barcelona Committee), the introduction of science and technology in the Association Agreements between the EU and MPCs, the consolidation of the International Cooperation Division (INCO) in Brussels, the funding of policy-oriented projects, at the request of the MoCo, in order to draw a state of the art on science, technology and innovation systems in the region (ASBIMED and ESTIME, as well as other projects on forecasting and innovation in MPCs like INNFORMED), and the creation of a network of National Contact Points for EU-MPC scientific collaboration in the partner countries (EUROMEDANET1&2).

Other EU-MEDA funded initiatives include ANIMA (Network of Euro-Mediterranean investment agencies), Invest in Med and Medibtikar (a project aiming at developing innovation in business firms and building innovation systems in MEDA countries). This clearly shows that the process has already started but it is rather fragmented. What is urgently needed is to provide a mechanism for a more structured debate and trans-national learning on RTD and innovation policy.

The political coverage of all the aforementioned Euro-Mediterranean collaboration actions in science, technology and innovation has been provided by the Barcelona process since 1995 and would move in the near future under the Union for the Mediterranean.

“The Mediterranean Innovation and Research Coordination Action” (MIRA) is an FP7-funded INCO-Net coordination platform targeting MPCs. The project aims at creating a dialogue platform to improve the RTD and Innovation cooperation which includes linking up and facilitating the interaction between the fragmented RTD and Innovation cooperation initiatives already supported by the Member States, the European Commission and other political bodies. In this regard, the MIRA consortium acted to appoint an EU-MPC task force to kick-start the process of creating a Euro-Mediterranean Innovation Space (EMIS).

III – Rationales for the international collaboration in science, technology and innovation

Cooperation in science, technology and innovation (STI) used to be considered as a national or regional phenomenon (Georghiou, 1998), but since the 1980s international cooperation in R&D has experienced a substantial growth across continents and especially among developed countries. This trend is more visible today with several Countries using different methods to collaborate internationally.

Boekholt *et al*. (2009) have come up with a number of determinants, which trigger the policy debate on STI internationalization; these include:

- the emergence of BRIC countries as economies as well as STI powers
- increased pressure to address global challenges
- globalisation of R&D in the private sector as multinationals become more and more global, and researchers increasingly mobile
- competition towards STI talents between countries and companies.

Carlson (2006), while highlighting the growing literature body addressing internationalization of corporate R&D, contends that so far too little attention has been paid to the internationalization of national innovation systems. However, he concludes that there is sufficient evidence to support the claim that national innovation systems are becoming more internationalized, while admitting the existence of certain "barriers to internationalization inherent in innovative activity in the form of spatial boundaries of knowledge spillovers as well as certain features such as national specificities of intellectual property rights".

International cooperation depends on a number of elements according to the nature of the actors involved, the characteristics of the scientific fields of activity, the level of funding and the nature of the collaboration process - bottom up (impetus of scientists) versus top down (driven by government and other policy makers). Georghiou (1998) suggests four types of international collaboration in R&D:

1. informal collaboration
2. large-scale science cooperation between nations
3. formalized cooperation agreements
4. global collaborative programmes.

In order to analyze qualitatively and quantitatively international cooperation between ERA countries and BRICs, Gnamus (2010) developed the following twofold assessment approach:

Model 1 - Index Degree of Networking (Fig. 1): this model builds upon policy instruments for international ST cooperation implemented in ERA countries. According to this model, ST cooperation becomes more strategic and has a greater networking effect as we move from knowledge exchange schemes, such as Exchange of ST Information, Mobility & Exchange of Scientists, to knowledge clustering schemes, such as Joint Infrastructure Investments and Innovation / Knowledge Clusters.

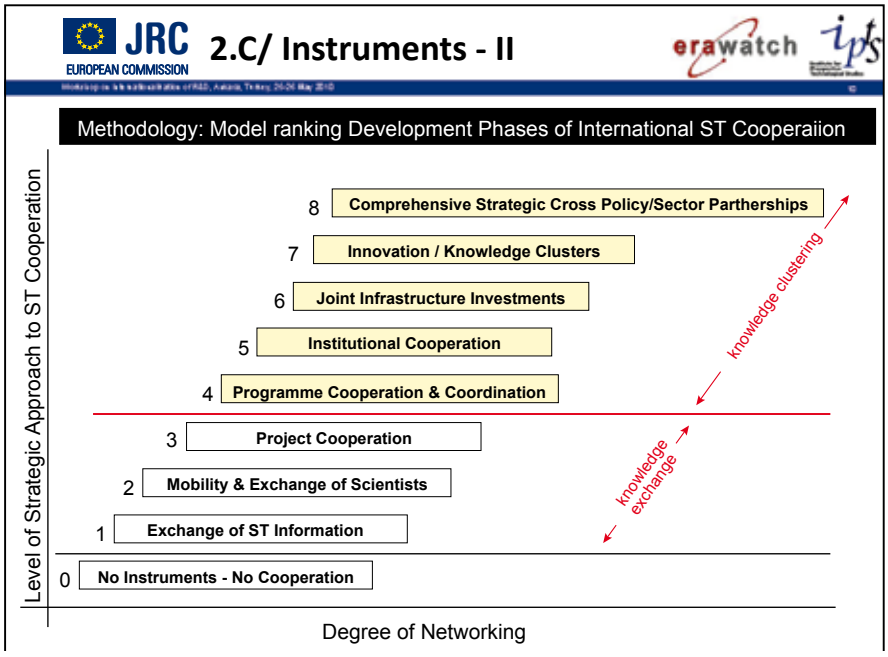

Figure 1. Model 1 ranking development phases of ST cooperation and networking.

Model 2 - Index Cooperation Status (Fig. 2): “a composite indicator summing up information on ERA countries” ST cooperation policy, institutional capacity and related policy measures, and practical implementation of ST cooperation policies, while describing the overall ST cooperation policy implementation framework for internationalization of ST with BRICs”.

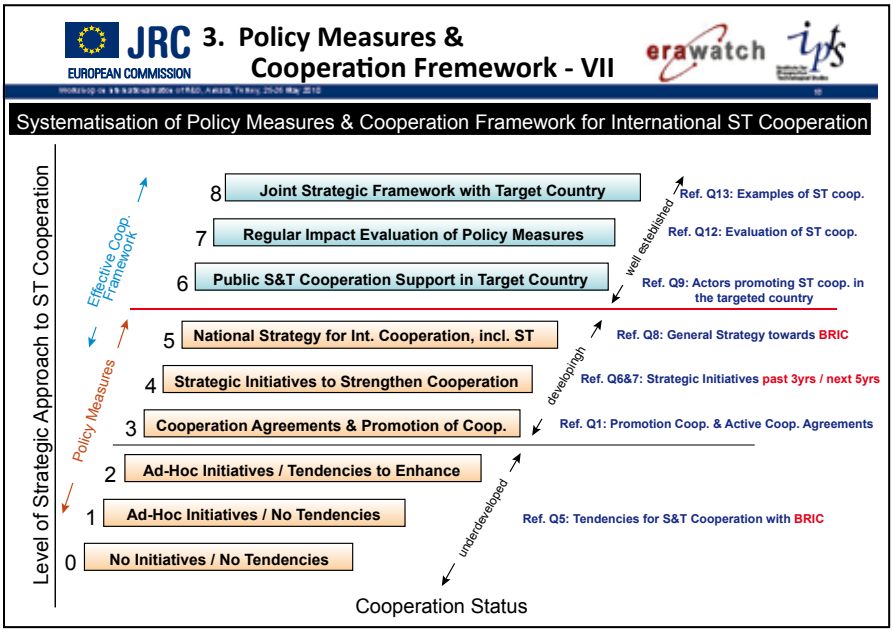

Figure 2. Model 2 ranking types of cooperation.

While analysing the drivers for international cooperation in R&D, Boekholt *et al.* (2009) distinguished between two sets of paradigms underpinning international collaboration in STI:

- The “Narrow STI Paradigm”: the drivers here take roots in the scientific community and are related to scientific ST objectives then translated in science and policy instruments establishing linkages between national and foreign resources and knowledge (both material and human). Among the objectives we might find access to complementary assets, scientific excellence, sharing costs and risks (Georghiou, 1998).
- The “Broad STI Paradigm”: it describes a situation where international STI cooperation is driven by objectives (political, economical, cultural, historical) that are external to science and technology, such as:
  - enhancing national economic competitiveness;
  - supporting developing countries to build their STI capabilities;
  - addressing global challenges (climate change, low carbon economy, migration, etc.);
  - building trust and promoting political dialogue between countries.

IV – Rationales for the Euro-Med STI cooperation

1. Innovation is a must

First of all, it is widely acknowledged among scholars that innovation has become one of the pillars in modern economies and is gaining a growing importance in today's increasingly global and knowledge-based economy. Competitiveness depends, to a far larger extent today than in the past, on the ability of businesses to meet fast-changing market needs through the application of new technologies. This offers new opportunities and poses new challenges for both the EU and MPCs. While the northern bank of the Mediterranean Sea seems to have the knowledge, skills and resources to respond to such a great challenge, the southern one is moving at a slower pace in responding to such a challenge, thus placing the region in a competitiveness disadvantage. MPCs need to be equipped with the appropriate tools to improve their innovation capacity for competing internationally. This needs to be done through the introduction of specific measures such as the enhancement of resources in the field of education, science, research and technological development, and the strengthening of institutions to ensure the right framework through which businesses can operate. In a nutshell, their innovation systems have to be enhanced, improved, and created, where necessary.

2. The worrying situation on the southern shore

With the exception of Israel and to some extent Turkey (considered as an emerging economy or "catch-up" country), the reality in the MPCs is rather bleak according to the findings of the ESTIME project (Evaluation of Scientific, Technology and Innovation capabilities in Mediterranean countries) (Arvanitis, 2007). The final report includes a list of areas where MPCs lag behind: poor innovation policies, investment in R&D ranging from 0.3% to 1%, poor R&D infrastructure, low R&D performance in terms of number of researchers, publications and patents, lack of coordination in policy making, difficult access to funding, poor innovation and entrepreneurship culture etc. The report highlights the differences between countries, particularly the recognition that MPCs have varying profiles of governance in managing their ST and innovation systems. This situation casts serious doubts on the future of the whole Euro-Mediterranean region as an area of sustainable development and shared prosperity (as envisaged in the Barcelona Declaration and wished for by the Union for the Mediterranean).

3. Why the EU-MPC cooperation on innovation?

Science, technology and innovation were not explicitly mentioned as an objective of the Barcelona Process which focussed on three large directions (i. e. political and security dialogue, economic and financial partnership, social, cultural and human partnership). Nonetheless, science was instrumentally taken into account by the EU with the creation of the Monitoring Committee on ST policy (also known as MoCo). The targets were political and economic: the creation of a zone of peace and stability based on shared fundamental values, particularly the respect of human rights and democracy, and the construction of a region of shared prosperity through the gradual establishment of a free trade area by 2010.

The MEDA programme was put in place as a financial instrument to achieve these goals. As regards science and technology, the main instruments for collaboration included the framework programmes (FPs) and, more specifically, the calls targeting the so-called third countries, including the Mediterranean regions within the successive FPs. The rationale behind science and technology collaboration belongs mainly to the broad paradigm driven by security and political dialogue between the two shores, in addition to the capacity building from the southern Mediterranean perspective. Although it is widely recognised among scholars that innovation is the driver of growth and prosperity and hence the key to achieving Barcelona process targets, science,

technology and innovation were not a priority at that time. By the end of the MEDA programme in 2006, the European Commission recognised the importance of regional programmes to promote innovation, and it launched a three-year pilot project for Euro-Med Innovation and Technology Programme (Medibtikar). The main aim of the programme was to ascertain the state of the art in MPCs; however it became clear that the project was too small in scope and budget to face the enormous challenge and the diversity of situations in Mediterranean countries. Bilateral association agreements (including ST agreements) were signed between most of the Mediterranean countries and the European Union[1]. But the turning point in the policy context at regional level was marked by the signing of the inter-ministerial agreement called Cairo Declaration between the EU and MPCs "Towards a Euro-Mediterranean Higher Education & Research Area" (June 2007)[2]. At the same time there was the announcement of the Union for the Mediterranean (UfM) which gathers 27 European Union member countries and all the Mediterranean countries. This provided further momentum to the Euro-Med partnership at political level. The UfM developed the following concrete "core initiatives":

1. Depollution of the Mediterranean ("Horizon 2020 Initiative");
2. Replacement energies (Mediterranean Solar Plan);
3. Sea highways and road highways;
4. Business development (including vocational training);
5. Education and research, Euro-Mediterranean university;
6. Civil protection (fight against climate change…);
7. Sustainable water management in the Mediterranean;
8. Agriculture and food security;
9. Sustainable cities and urban transport.

These political evolutions clearly show that there is the willingness to move towards an effective framework to assist MPCs to actively respond to the global common challenges (solar plan, de-pollution of the Mediterranean sea, etc.). An increased participation of MPC scientists in FP programmes can certainly contribute to the capacity building of their research skills to produce knowledge in the frontier of science. However, if MPCs are to meet the challenges and objectives outlined in the Cairo declaration or addressed by the UfM, there is the need to go further in developing complementary skills, competences, institutions and structures to enable the diffusion and use of knowledge in the socio-economic sphere (Hall, 2005).

As Georghiou (2001) said in proposing a new framework for European collaboration in science and technology, "the fact that innovation policies are often better delivered locally does not mean that they would not benefit from co-ordination at a higher level". Arvanitis *et al.* (2009) contends that instead of calling for a specific policy oriented towards innovation it would be more appropriate to launch a strategy to create a Euro-Mediterranean Innovation Space (EMIS) to support several of the broad objectives, such as the harmonization of standards, facilitating the emergence of a knowledge-based economy, developing technological and productive clusters, which will ultimately help develop the innovation capacity to meet these challenges.

This strategy of a Euro-Mediterranean Innovation Space (EMIS) could be part of the action of the EU involving an Innovation Policy for Europe. Such a structure should be closely linked to the Union for the Mediterranean and in line with its priorities shown above. Pasimeni *et al.* (2007) argued in favour of "the creation of a Euro-Mediterranean Innovation Space (and not a Mediterranean system of innovation) because international relations are still limited by frontiers and political criteria, but scientific relations, business links and technological cooperation and learning are less likely to be brindled by political constraints". EMIS would bring Euro-Med innovation stakeholders

in a common framework and act as a mutually beneficial partnership to develop a more intelligent and competitive Euro-Med space.

4. Building indigenous innovation capabilities in MPCs: relevant issues to consider

So far, policy discussions addressing technology transfer at international level, including our Euro-Med region, have had a strong tendency to focus on providing developing countries with access to existing technology on the basis of consuming technological hardware (equipment) rather than producing it[3]. This attitude fails to recognise the vital importance of building innovation capabilities (absorptive capacity) to promote both the diffusion of innovation within developing countries and sustainable economic development, based on the adoption, adaptation and development of environmentally sound technologies that fit the conditions faced by developing countries. This calls for a deeper analysis and understanding of:

- what should be the essence of a Euro-Med STI cooperation in the field of renewable energies that might allow knowledge and innovation clustering?
- what kind of knowledge flow would ease rapid and sustained uptake of innovations in renewable energies in the Euro-Med region?

To answer these questions it is important, particularly in the context of developing MPCs, to clearly define two concepts : technology and innovation.

"Technology" as defined by innovation scholars encompasses both material elements (physical equipment) with knowledge and processes. Knowledge can be explicit and codified knowledge (e.g. engineering and manufacturing process) as well as implicit and tacit knowledge (i.e. embodied knowledge acquired by doing, applied engineering, system integration skills). The centrality of tacit knowledge and experience of working with the technology is often overlooked. The development of innovation capabilities in MPCs is not only about importing new hardware or the creation of new production capabilities but includes also promoting the capacity to absorb the technology, to adapt it to local changing needs, to replicate it, enhance it and enable the countries to become innovators in their own right.

"Innovation" can be characterised using the OECD Oslo Manual (OECD, 2005) under the following typologies:

I. Innovations 'new to the world': where a firm is the first to introduce innovation for all markets & industries, domestic and international.

II. Innovations 'new to the market': where a firm is the first to introduce innovation in its particular market.

III. Innovations 'new to the firm': where a firm introduces a product, process or method new to that firm, or significantly improved by it, even if it has already been implemented by other firms.

"Type I" innovation (new to the world) is the main interest of policy discussions within Euro-Med STI cooperation level. This type of innovation is more likely to be associated with more radical innovations that are the results of deliberate R&D, and it requires the existence of a strong knowledge base. However, in the context of developing countries (such as MPCs), where rapid adoption and diffusion is a central concern, incremental and adaptive innovations that are often underpinned by "type II" (new to the market) and "type III" (new to the firm) are often more relevant and important.

Incremental innovations are seen as occurring more or less continuously, as economic agents strive to improve quality, design and performance. The emphasis is on learning by searching, using and doing and on the interaction between suppliers and users of technology (Lundvall,

1988; Freeman, 1992). Incremental innovation plays also a critical role in instances of assumed technology "leapfrogging" in developing countries, where countries have moved towards, and then surpassed, the international technological frontier. Ockwell *et al.* (2010) mention, for example, that the most successful latecomers into the wind energy market (e.g. Spain and China) took the first steps in developing their industry through joint partnerships technology transfer via licensing agreements and associated royalty fees with manufacturers in Germany and Denmark.

Gallagher (2006) cites the case of the Korean steel industry, which eventually emerged as international technology leader as a result of the adoption of internationally established technology followed by a continuing process of incremental improvements. Walz (2010) finds that the relationship between scientific publications, patenting activities and trade share in sustainability-related technologies is positive but not linear among emerging economies (Taiwan, Korea, Malaysia, Brazil, etc…). Zhao and Arvanitis (2010) also reported the technological capabilities of Chinese firms to be related with foreign clients, relayed by local industrial policies. The possibility to develop the industrial capabilities and export capacity is thus not only related to the kind of innovation but to a combination of enterprise's capabilities and public policies (Bironneau, 2012).

Other analyses in 2010 reported that it is tempting for policymakers to operate on the basis of a simple model of innovation and growth, where investment in science is seen not only as a necessary but also as a sufficient condition for innovation-based growth. It is striking that the most important European innovation policy measure to implement the Lisbon Agenda has been the Barcelona 2%+1% objective for, respectively, private and public R&D to GDP ratios. There are inherent risks in exaggerating the expectations regarding the direct impact of science on innovation and underestimating other sources of innovation such as experience-based learning within industry. Among policymakers this has resulted in disappointments and in what they consider as 'paradoxes': domestic strength in science not being reflected in innovation-based economic growth. To overcome these paradoxes, policymakers look for solutions that aim at a commercialisation of science, thus transforming universities into "patent producers" neglecting their fundamental role, while serving industry and society with well-trained and critically minded graduates.

V – The way forward

Within this context, if we are to hope for a substantial change in the foreseeable future of the technological and innovation profile of MPCs enabling them to contribute with European countries to address those common trans-national challenges, substance needs to be given to the Cairo Declaration and UfM declaration as well as to their objectives. Opening a process of dialogue among Euro-Med science, technology and innovation stakeholders (businesses, policy makers, researchers, programme managers, financers) through an EMIS discussion platform will be important for the identification, selection of relevant activities and collaboration opportunities to outline the best course of actions to meet EMIS objectives. Using the above mentioned Model 1 (degree of Networking) and Model 2 (cooperation Status), the EMIS discussion platform should play a key role in:

- upgrading the strategic level of cooperation from less complex knowledge exchange schemes towards knowledge clustering schemes (see fig. 1 above),
- moving the status of cooperation from the response to policy measures towards a joint framework of Euro-Med Cooperation in science, technology and innovation,
- improving the communication channels among MPCs,
- working towards the linking up of regional programming among MPCs,
- and, last but not least, contributing effectively to building science, technology and innovation

capabilities in MPCs.

VI – Conclusions

Indeed, the Mediterranean region has been in a political turmoil recently. The economic difficulties faced by the populations have partly caused this situation. This process, although fragile and lengthy, is more likely to lead to more freedom and better governance, values that are common with the northern neighbours of these countries. However, to promote significantly the odds of success of this political transition the process needs consolidation to bring about the economic success expected by the population. The EU is a vital entity which could play an important role to provide the required support for this purpose.

Supporting the innovation capacity of these countries through a commensurate framework, namely the Euro-Mediterranean Innovation Space, could provide the right conditions towards enhancing the STI capacity of the southern STI countries to become more competitive. The Arab spring that has brought about a wave of change in the region, with new people with fresh ideas at the helm of key countries such as Libya, Tunisia, and Egypt, may provide an opportunity to develop academic and industrial partnerships that will enable these countries to create wealth, provide jobs and ensure stability. EMIS is trying to contribute in this sense in the fields of water and energy.

Notes

[1] See a list of these agreements in the article by Arvanitis *et al*., in this volume.

[2] This section draws heavily on the OECD report by Ockwell *et al.* (2010), Enhancing developing country access to eco-innovation.

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Annex 1 - The EMIS Forum: the example of the Energy Forum

The energy forum is an example of an initiative to promote common understanding in a specific technological area. The whole Mediterranean region and the European Union (EU) will both face major energy and climate challenges in the coming decades. Energy demand is projected to rise significantly, while fossil fuel prices will most likely continue to follow an unstable and rising trend. To address these challenges, the EU countries and the other member countries of the Union for the Mediterranean need to intensify their efforts to develop adequate policies in the field of energy efficiency and energy savings, renewable energies and reduction of greenhouse gas emissions (Solar Plan, 2010).

The neighbouring Southern Mediterranean Partner Countries (MPCs) have vast solar power resources which could tackle Europe's most pressing issues and add at the same time complementary issues in the Mediterranean region, such as energy poverty, socioeconomic development and efficiency. In the Med region the growth of population and economy will lead to a rising demand. The energy demand may increase by 65% before 2025, as a result of the influence of population growth and rising demand associated with economic development.

Against this background, several ambitious initiatives bringing together stakeholders around the Mediterranean have been launched such as the Mediterranean Solar Plan and Desertec. The challenge now is to establish a policy that encourages the rapid uptake and use of technology to avoid the catastrophic social, economic and environmental impacts of the current non sustainable development model at the global scale.

A policy approach that aims to promote renewable energy in the Euro-Med region is likely to be successful if tailored to respond simultaneously to the interests of developed EU Countries as well as developing Southern Mediterranean Countries. The EU has an interest in speeding up the uptake of sustainable technologies to mitigate the global environmental problems. European firms are expected to gain from the new market opportunities in MPCs. This might apply particularly where MPC engagement at local level leads to adaptive innovations opening up new set of technologies, which are specifically applicable within countries with similar context. MPC incentives to promote renewable energies are twofold. Firstly, MPCs are expected to be among the most vulnerable to the environmental impacts. Secondly, and maybe most importantly in terms of economic development, the prospects of revenues coming from export of clean energy to EU and access to new technologies are key determinants of the future socioeconomic development level of MPCs. In regard to the latter, the access of MPCs to new sustainable technologies opens up the potential of technological change, broadening the industrial base with associated employment benefits, profits, and public income through taxes. Renewable energy is a key area where MPCs can access new technologies and build their indigenous innovation capabilities with the support of a targeted European Neighbourhood Policy.

The EMIS Forum on renewable energy was particularly focused on building an indigenous innovation capability in MPCs. The objective of the Forum was to target the key players for innovation, i.e. industry, academia and the public sector in the Mediterranean and European countries in order to build-up a dialogue between these participants, create a mutual understanding of innovation by identifying intermediate structures and initiatives dealing with innovation (IPR experts, Technological Parks' administrators, service providers, etc.), discover cooperation and funding opportunities. The Forum was intended to identify possible partners for setting consortia on research and innovation, which are topics of mutual interest covered by the available funding instruments. Finally, the Forum aimed at developing recommendations for policy makers to foster innovation in the field of Renewable Energy and Energy Efficiency.

Taking into consideration the previous activities of MIRA, the Forum was mainly focused on solar energy and energy efficiency in the Euro-Med region. During the thematic workshop in the field of energy research, the MIRA project identified the following research priorities:

- Photovoltaic
  - advancement of PV system components including cells, storage devices, inverters;
  - controllers for micro-grid applications;
  - integration of PV/CPV systems in industrial grid connected applications;
  - development of operation and maintenance training programs to support deployment of PV technology;
  - policy research, legislation development and awareness building for integration of PV technology application in energy management and resource planning.
- Concentrating Solar Power
  - local manufacturing of components;
  - advanced materials and surfaces;
  - improved weather forecasting models for direct normal irradiation;
  - new joint test facilities for CSP in the MENA region collocated to pilot power plants;
  - CSP Dissemination and Education Program “Educate the Educators”;
  - evaluation of Hybrid Concepts.
- Energy Efficiency
  - energy efficiency road map (prospects and challenges);
  - develop optimized energy efficient buildings for the region;
  - increasing efficiency and reliability of solar collectors through developing new materials, specific coating materials & cleaning techniques;
  - large energy-intensive industries: energy intensity improvements through energy efficiency.

The Research Driven Cluster Initiative - Challenges and opportunities for cluster approaches in the Mediterranean

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Abstract. There is a huge potential for transnational cluster initiatives in the Mediterranean Countries. In the frame of the networking project MIRA, the activities for the promotion and the development of a "Research Driven Cluster Initiative (RDCI) on Water and Waste Water Management in the Mediterranean" are considered as an appropriate approach to tackle the cross-border problems of integrated water management and water pollution in the Mediterranean macro-region. Taking into account the conditions and possibilities of the MIRA project, the efforts of the cluster development approach were focussed rather on the promotion of a cluster initiative and not so much on the establishment of clusters. This was done by introducing the relevance of a clustering approach, by analysing initial competencies and clusters, and by building a leadership group. This initiative is being carried out in the frame of the EMIS (Euro-Mediterranean Innovation Space) activities. Different events such as Innovation Forums and a Cluster Mission were organised which are described in the following text.

Keywords. Cluster – Innovation – Research – Water management – Waste water treatment.

Initiative de cluster poussée par la recherche – Défis et opportunités pour les approches cluster en Méditerranée

Résumé. *Le potentiel pour les initiatives cluster dans les pays méditerranéens est immense. Dans le cadre du projet de réseau MIRA, des activités pour la promotion et le développement d'une « Initiative de cluster poussée par la recherche sur la gestion des eaux et des eaux usées en Méditerranée » sont considérées comme une approche appropriée pour aborder les problèmes transfrontaliers de gestion intégrée des ressources en eau et de pollution des ressources en eau dans la macro-région méditerranéenne. En considérant les conditions et possibilités du projet MIRA, les efforts du développement de cluster étaient plutôt concentrés sur la promotion d'une initiative cluster, et non pas sur l'établissement des clusters. Cela se fait en introduisant la pertinence d'une approche de regroupement en cluster, en analysant les compétences initiales et les clusters, et en créant un groupe de direction. Cette initiative est réalisée dans le cadre des activités « EMIS » (Espace Euro-Méditerranéen de l'Innovation). On a organisé différents évènements comme des Forums de l'Innovation et une Mission de Cluster, décrits dans le texte suivant.*

Mots-clés. *Cluster – Innovation – Recherche – Gestion des eaux – Traitement des eaux usées.*

I – Background

International cluster cooperation offers opportunities to scale up research and technological potential, enhance competitiveness and support the regional development. These cooperation approaches often fail due to constraints on resources, capabilities, instruments and funding. In this respect we often see a mismatch between aspiration and capabilities.

On the other hand, about 2,000 clusters only in the European Union covering all sectors, as well as corresponding clusters, networks and technopoles in the southern Mediterranean countries form a huge potential for transnational clustering. Having said that, we are fully aware of the different nature and development stages of clusters, technopoles and other cluster-like networks

in the Euro-Mediterranean Innovation Space (EMIS). Nevertheless we see these differences not as a hindrance but as an incentive for a targeted cluster activity.

Empirical evaluations prove that clusters are able to develop competitiveness, enhance innovation and contribute to productivity and job creation. Thus clusters and cluster initiatives gained importance in economic activities as well as in innovation and research policies within the last 20 years, while the concept of Michael E. Porter outlined in "The Competitive Advantage of Nations" marked an important milestone in the debate (Porter, 1990). As an "eclectic" concept it picks up various aspects from economics, economic geography, political sciences and system theory. National as well as regional governments and the EU used the cluster approach to further develop their policies mainly in the fields of innovation, research and structural policy.

The EU's framework for state aid defines innovative clusters as follows: "Innovation clusters mean groupings of independent undertakings – innovative start-ups, small, medium and large undertakings as well as research organizations – operating in a particular sector and region and designed to stimulate innovative activity by promoting intensive interactions, sharing of facilities and exchange of knowledge and expertise and by contributing effectively to technology transfer, networking and information dissemination among the undertakings in the cluster"[1].

The European Cluster Memorandum defines clusters as regional concentrations of specialised companies and institutions linked through multiple linkages and spill-overs, which provide an environment conducive to innovation[2].

Notably France, the United Kingdom, Germany, the Netherlands and Sweden inaugurated cluster policies as an instrument to their portfolio of policies. The new EU-Member States integrated cluster policies and instruments right from the beginning in their policy portfolio from 2004 on. Recently, also Mediterranean Partner Countries like Egypt, Tunisia, Jordan and Morocco use elements of the cluster concept for some of their research and innovation policies, and support the management of cluster initiatives (for example the technopole approach in Tunisia[3]).

The territorial coverage of clusters crosses administrative regional or national boundaries (for example in the fields of environmental pollution or biotechnology). In this respect international cluster initiatives like Medicon Valley[4] (Sweden/Denmark) prove that these initiatives are able to operate across national boundaries. Having stated this, we argue that cluster and cluster initiatives operate successfully if they are demand/challenge-driven and restrict the political influence to building the framework conditions.

The promotion and development of the Research Driven Cluster Initiative on Water and Waste Water Management in the Mediterranean is an appropriate approach to tackle the transnational problems of integrated water management and water pollution in the Mediterranean macro-region. This Cluster Initiative shall be perceived as one instrument in a portfolio of various approaches for the convergence of strategies of water management and de-pollution of the Mediterranean.

II – Aim

One task of the MIRA (Mediterranean Innovation and Research Coordination Action) project is to promote and raise awareness about a Euro-Mediterranean Innovation Space (EMIS). In the frame of EMIS-activities, different events were organised which are described in the following chapters. In core activities, we try to promote a Research Driven Cluster Initiative (RDCI) in the Mediterranean area following the definition and functions of this instrument indicated in the European 7th Framework Program "Regions of Knowledge": the aim is the "fostering of trans-national, including cross-border and inter-regional co-operation (embracing mutual learning) between regional partners (research entities, enterprises, local and regional authorities) in creating and developing research-driven clusters in areas or topics of common interest, either

related to challenges from the globalisation of markets, technological change or the evolution of normative frames in the European context" (European Commission, 2007). In the particular case of the Mediterranean Countries, the presence of the regional and national authorities is of particular relevance due to their social and economic structure and to the need to transfer to the legislative bodies the recommendations emanating from the internal debate within the RDCI.

As a first attempt to test the feasibility of this instrument in the Mediterranean context, we chose a field where a common Mediterranean-wide political, social and economic concern exists, and there are enough intellectual resources and entrepreneurial activities. Two of such fields with common problems and actors on the transnational scale in the Mediterranean region are integrated water management and waste water management.

The main aim of the EMIS-initiative is not to create a cluster as an initial expected result, but to put together and combine expertise and talents across the Mediterranean region and bundle knowledge, which is only partly available or dispersed. Through our efforts a critical mass of knowledge shall be pooled.

III – Definition and Structure

We perceive the transnational Research Driven Cluster Initiative (RDCI) as an organised international effort to increase the growth and competitiveness of cluster or network structures within a macro-region (European Union – Southern Mediterranean Countries) involving the research community, clusters, industry and government/administration in adaptation to the Cluster Initiative Greenbook (Sölvell *et al*., 2003).

The Research Driven Cluster Initiative should be structured as an umbrella organization, which integrates the existing and developing clusters and cluster initiatives, as well as projects and networks. By this, RDCI will contribute to the better co-ordination of single national and regional clusters and cluster initiatives in the Mediterranean.

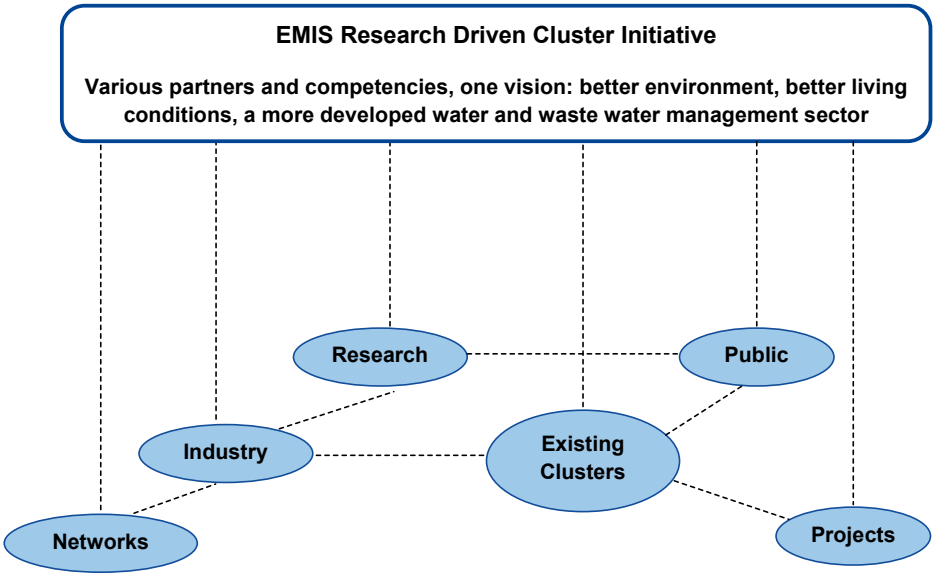

Figure 1. Possible Set-up of the Research Driven Cluster Initiative on Water and Waste Water Management in the Mediterranean.
Source and design by Roman Noetzel, 2012.

Due to the fact that we are applying a macro-regional cluster initiative approach, the cluster initiative should involve actors from existing clusters, industries, universities, technology transfer agencies and administrations across the Mediterranean region.

IV – First steps in the cluster development approach

The strategic steps foreseen in the frame of the MIRA Project (Mediterranean Innovation and Research Coordination Action) and necessary for the cluster development are described in Table 1.

Table 1. Strategic steps required for the cluster development approach.

Task	Activity related to the cluster development approach
Identification of innovation stakeholders	Initial competencies/cluster analysis
EMIS (Euro-Mediterranean Innovation Space) Forum 1 (Casablanca December 2011)	Introducing the relevance of a clustering approach
	Identification of clustering initiatives in the Mediterranean countries
	Discussion of aims and activities
Research Driven Cluster Initiative (I)	Building the leadership group/cluster development group; setting-up of sub-groups related to fields of activity
	Cluster Missions to deepen contacts with clusters/ networks – Cluster Partnership Agreements
	Active use of EU-Cluster Collaboration Platform (http://eco.inovex.de/)
Research Driven Cluster Initiative (II)	Consolidating the leadership group
	Consolidating the aim and structure
	Defining and prioritizing activities
	Involving further partners

The expected output of these steps was:

- raised awareness on the cluster concept and its advantages, and on the emerging Research Driven Cluster initiative on water and waste water management in the Mediterranean,
- identification of clustering initiatives in the Mediterranean countries and their relevance to a Mediterranean-wide clustering initiative,
- consolidation of the cluster development group, involvement of cluster partners,
- setting up of sub-groups related to fields of activity.

Due to the nature of the MIRA project as a means of coordinating research policies between regions in a time frame of four years, taking into account the limited resources available and knowing that cluster building processes take about 10-15 years, the efforts of the cluster development approach were focused not so much on the establishment of clusters, but rather on the promotion of a cluster initiative[5] by:

- introducing the relevance of a clustering approach,
- analysing initial competencies and clusters,
- building the leadership group.

With regard to the potential activities of the Research Driven Cluster Initiative (RDCI) on Water and Waste Water Management in the Mediterranean, the first EMIS Forum was dedicated to validating the aim and structure and identifying appropriate approaches.

1. First Forum on the Euro-Mediterranean Innovation Space

This initiative was launched by MIRA with the support of the key stakeholders interested in the EU-Mediterranean Innovation policy cooperation. In this sense, the institutional partners of MIRA, such as the General Directorates of Research of the Mediterranean Partner Countries and the Ministries of Industry of these countries, were involved. Notably the European Investment Bank, FEMIP (Facility for Euro-Mediterranean Investment and Partnership) and the ANIMA Network, together with the services of the European Commission's Directorates General "Research and Innovation" and "Enterprise" contributed to identify possible key topics and lectures and any other issues. Special contributions from the Waste Water Cluster and the Regions of Knowledge Cluster, and their participation in the event, were very useful.

The EMIS Forum was organised by the MIRA project in partnership with R&D Maroc in the frame of the Conference MED INNOVA 2011 («Salon de l'innovation, de la recherche et du partenariat technologique») and was held on 1-2 December, 2011 in Casablanca/Morocco. MED INNOVA 2011 got the support of three Moroccan ministries (Industry, Higher Education & Research, and Economic Affairs). It was held under the patronage of His Majesty King Mohamed VI. MED INNOVA 2011 comprised exposition stands, B-to-B partnership spaces along with a conference programme.

The EMIS Forum was organised as a dialogue platform focussing on the Euro-Mediterranean Innovation Space. It was mainly dedicated to laying the basis for activities to promote Research Driven Clusters (such as cluster missions) by:

- raising awareness about clustering, supporting actively the initiation of a research driven cluster initiative;
- articulating common Mediterranean Partner Countries' RDI needs and solutions, notably the promotion of Research Driven Clusters (RDC);
- linking initiatives, creating new alliances;
- providing a nucleus for new cooperation and projects in the framework of the EU-Framework Programme, the CIP-Programme, instruments such as ENPI and EIB-FEMIP, etc.);
- enhancing the innovation capacity of involved stakeholders through the Forum as an established innovation dialogue platform;
- establishing a common ground for further activities (in view of social capital); and
- providing recommendations for the European Commission and the Monitoring Committee.

Bringing together experts from the North and the South of the Mediterranean, this Forum was the first of its kind addressing issues such as: (1) De-contamination of the Mediterranean - industrial waste water, (2) Integrated Water Management and Waste Water - sustainable technologies, (3) Innovation in Water and Waste Water Management in the Mediterranean, and (4) Enhancement of research results and technology transfer.

Presentations on policy tools, funding opportunities and international, national and regional initiatives followed interactive sessions serving as catalysts for collaboration opportunities. The attendance and active participation of numerous project representatives provided a good opportunity for networking and achieving the first results.

2. Follow-up Cluster Mission

As a follow-up of the EMIS Forum on water technology and water management, a Cluster Mission of experts from the Mediterranean Partner Countries to Germany was initiated. The aim of this Cluster Mission was to support the initiation of transnational cluster and network co-operation in the field of water management, including waste water. The Mission brought researchers, representatives from different relevant industries as well as local authorities together to foster trans-national and bi-regional cooperation in the field of water technology and water management. The Mission gave the participants the opportunity to establish and deepen connections and to build up the basis for future cooperation. In this respect, the Cluster Mission meets the aim of the Research Driven Cluster Initiative (RDCI) and could serve as a pattern for future activities of this kind in various topics.

The overall objective of the Cluster Missions in general and of the Cluster Mission on water in particular, was:

- to identify interested clusters, networks, initiatives,
- to make an innovation analysis for the identification of common processes, protocols and needs for capacity building; and
- to initiate a “cluster matching event”.

It should bring together:

- cluster strengths and weaknesses,
- cluster offers and requests and
- ideas for collaboration at project level.

The following flow chart exemplifies the process in a simplified way:[6]

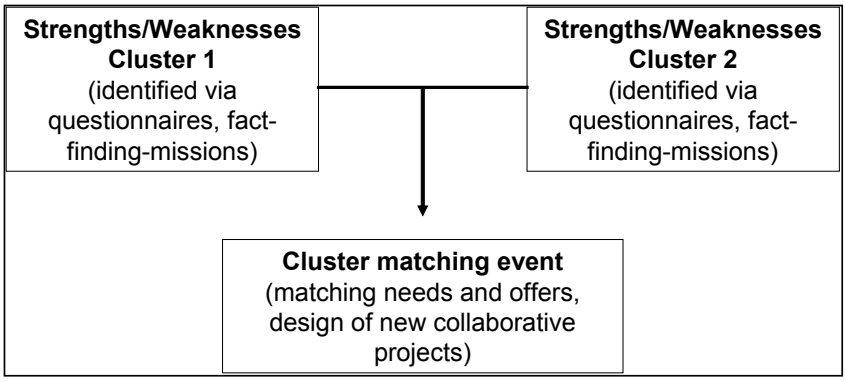

Figure 2. Methodology of the Cluster Mission.
Source and design by Roman Noetzel, 2012.

As a result, a pooling of resources was realised and a critical mass of RDI competencies was attained. The Cluster Mission could serve as a tool to initiate trans-national and bi-regional Research Driven Clusters between partners from Europe and Southern Mediterranean Countries.

In the particular case of the Southern Mediterranean Countries, the active participation of the regional and national authorities is of particular relevance to ensure good innovation system

governance. Moreover, translating the recommendations coming from the dialogue within the RDCI into legislative protocols, as well as supporting the change of technologies and the harmonization of legislations in both European and Southern Mediterranean contexts are of special importance.

Networking and knowledge exchange will be complemented by capacity building and training activities, as well as by demonstrations on the development and use of innovative water technologies in the following sectors:

- water use efficiency
- agricultural water productivity, and
- reuse of non-conventional water resources.

This is also in line with the outcomes of the Casablanca Water Group Meeting and regional research priorities identified in the MIRA Thematic Workshops for Environment and Agriculture/ Food/Biotechnology (KBBE).

The capacity building and training activities include a 3/4-day training for trainers organised on specific needs and gaps of the Southern Mediterranean Countries, identified in the cluster mission. The training will focus on water technology development, applications, results and prospects. The maximum number of trainees is 15 participants.

The overall objective of the training is the aggregation of trans-national clusters and network co-operation in the field of water management (including waste water reuse), as a follow up of the EMIS Forum in Casablanca.

The key learning outcomes are:

- informed trainees on innovative water and waste water technologies, and
- differentiation between conventional and alternative water management technologies and approaches, including water demand management, sewerage, waste water treatment.
- exchange of experiences in treated waste water and agricultural water management in the Mediterranean basin.

Having accomplished the training activities, a counselling based on specific demands in the Mediterranean Countries will be realised as a follow up. This could encompass smaller on-site coaching or even bilateral meetings.

V – Outlook

Innovation Forums and Cluster Missions were a preliminary approach to initiate transnational Research Driven Clusters with European and Southern Mediterranean countries. Establishing a functioning cluster can take up to 15 years, based on the experiences of a national cluster building process. Transnational clusters have additionally overcome the challenges faced by international cooperation, like different innovation systems and different cluster approaches.

Hence, the actions taken within the MIRA project can only be the first step and can in the best case lead to embryonic clusters. For the next steps it is important to keep the momentum of these approaches. The cluster building process could be supported by strengthening the cooperation between the potential members of clusters. This could be implemented through joint R&D projects, networking events and capacity building activities. It is essential that all existing platforms for RDI join their forces to raise awareness to transnational cluster building and support the establishment of the RDCI.

Having gained experience in the cluster approach in the water and waste water management sector, the implementation concept was further developed and adapted to the needs of the renewable energy sector (see the following chapter).

Notes

[1] See Community Framework for State Aid for Research and Development and Innovation (2006/C 323/01) of 30.12.2006.

[2] The High Level Advisory Group on Clusters: European Cluster Memorandum, p. 1.

[3] See http://www.getit-tunisia.com/parcs-technologiques.php

[4] See http://www.mediconvalley.com

[5] Stages of cluster development adapted from http://www.clusternavigators.com

[6] A similar approach was applied to the automotive and metal industry within the cluster part of the b2fair activities. For further information see http://www.b2fair.com/

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Valorisation of research results in the Mediterranean region

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Abstract. The efficient use of the existing research capabilities in the public sector to support the economic and social development in the Mediterranean Partner Countries (MPCs) is a key challenge. Valorisation of research, a fashionable topic, can strongly contribute provided that the research objectives and results are close to the strategic needs and prospects of firms. As the innovation policies in MPCs are increasingly dealing with valorisation, the article describes some of the measures and instruments created, namely technology transfer units, underlining the importance of analysing valorisation under a large focus which considers the conditions of public research and industry as well as the linkages between them.

Keywords. Valorisation – Technology transfer – Research - Cooperation – Intellectual property – Innovative enterprise.

Valorisation des résultats de la recherche en Méditerranée

Résumé. *L'utilisation efficace des capacités de recherche du secteur public afin de soutenir le développement économique et social dans les pays MED représente un défi de toute première importance. La valorisation de la recherche, un sujet à la mode, peut apporter une contribution significative étant donné que les objectifs et les résultats de la recherche sont proches des besoins stratégiques et des perspectives des entreprises. Vu que les politiques sur l'innovation dans les pays MED sont de plus en plus centrées sur les questions liées à la valorisation, cet article décrit un certain nombre de mesures et instruments qui ont été mis en place tels les bureaux de transfert de technologie, en soulignant l'importance qu'on doit accorder à l'analyse de la valorisation dans une optique plus large qui considère l'état de la recherche publique et de l'industrie et les liens qui existent entre les deux.*

Mots-clés. *Valorisation – Transfert de technologie – Recherche – Coopération – Propriété intellectuelle – Entreprise innovante.*

I – Introduction

For over a decade, the Mediterranean Partner Countries (MPCs) have developed complex research and innovation policies including initiatives for the valorisation of the results of research. The EMIS workgroup summarizes in this paper its vision on the current situation of those valorisation policies and efforts as well as on the institutional frame and research environment. These views are supported by the opinions of qualified experts from academia, industry and public institutions, gathered during a field work promoted by the EIB and performed in cooperation with ANIMA and several MIRA partners.

The creation of innovative dynamics in the region requires on one side the existence of a highly demanding industry and society and, on the other, research and academic institutions with the appropriate capabilities to provide suitable solutions. The public innovation and research policies play an important role in removing barriers and creating the conditions for those economic and research actors to interact and cooperate. Moreover, the creation of a Euro-Mediterranean Innovation Space (EMIS) should contribute to enhancing this innovative dynamics in MPCs through cooperation policies facilitating the actors of innovation in the region to exchange and strongly interact with EU firms and researchers.

The important differences that can be found between the EU and the MPC research, as shown by basic indicators, are coming out of the nature of economic structures, academic institutions and the articulation provided by research innovation policies. Although the figures for R&D expenditure in the region have increased during the last decade, with the exception of Tunisia, they are at levels distant from those of the EU, showing that public expenditures in research are not yet a priority. As for the private sector, its engagement in research and innovation remains at extremely low levels in most of the countries and this is also the case for cooperation with universities.

	Algeria	Egypt	Jordan	Lebanon	Morocco	Tunisia	EU-27
Total R&D Expenditure (GDP %)	0.40 (2010, est.)	0.21 (2009)	0.42 (2008)	0.30 (2006)	0.73 (2010)	1.10 (2009)	2.01 (2009)
Private R&D Expend. as Total % (est.)	<0.10	10	3	n.a.	22.7	14.1 (2005)	54.1

Source: UNESCO, 2011

Presently, some valid attempts to encourage companies to change can be appreciated with the opening, still quantitatively limited, of public research programmes to businesses, measures addressing incorporation of graduates and researchers into industry in Algeria, Egypt, Jordan, or the study of tax incentives to raise R&D private efforts in Algeria and Morocco. Nevertheless, the fact that most of the industry is made up of companies with limited skills and a very low technological intensity presents a significant challenge which once again outlines the importance of framing innovation policies with strong economic and educational policies.

The factors explaining the slow innovation and research development in MPCs, such as the dominant role of traditional industries, low development of research in universities or lack of resources for research and innovation have been shared by most of the countries in the area in recent times. Even when there are countries in the region, where the existence of natural resources could allow strong innovation policies, they did not reach a radically different situation. We have therefore to focus on policies dealing with structural issues when looking for the best suited approaches for innovation and economic development. A good example of those issues is provided by the weak interaction between the countries in the area and the numerous barriers– very often not explicit – to MPC cooperation that hinder efficient economic and innovation exchanges and strategies.

II – Technology needs for innovation

The absence of regular innovation surveys does not help have a sufficient and updated understanding of the technology needs of the MPC industry, therefore it relies on the figures for R&D business expenditure that show a low spontaneous demand of knowledge. Only a few large companies are reported to have in-house research capacities and the potential to lead cooperation projects or to request contract research, mainly like OCP (Office Chérifien des Phosphates) in Morocco, Sonade in Tunisia, Sonatrach or Cevital in Algeria. As for the international research collaboration, especially with European partners, it is still modest since the Mediterranean countries are rarely seen from abroad as technology partners.

The implementation of measures to promote the identification of technology needs and strategies in the industry as a key input to define research objectives in universities and research institutions and to become the basis for innovation and business development appears to be an urgent need in the MPCs. It is the creation of proximity links (not only geographical, but also organizational and cultural) between firms and providers of abilities and knowledge, as the universities and research institutions should be. This would allow the industry to advance not only in modernization of

plants and management systems, which is a basic need, but in the creation of new products and services for an upgraded competition in the national and international arena.

The creation of advanced industrial areas or technology platforms (cities of innovation, clusters, technology parks) already under development in many of the MPCs will help deal with the issue of industry needs for innovation and will also allow the creation of opportunities for new start-ups; however, the efficient use of existing resources in universities and research organizations will require a closer consideration of current regulations of the public research sector to make them suitable to leverage the firms technology potential.

III – Research resources and outcomes

Most of the MPC universities were created after the sixties with an exclusive initial focus on education. Only after the definition of the first public policies and investments in the nineties, they started to address research as their second function, generally without consideration of likely downstream applications. Presently, the public universities are to cope with the challenge of research upgrading in a situation of overload, inappropriate funding structure and ageing research facilities; this helps explain the weakness of scientific outcomes and the limited quality of the scientific training received by students. Besides, research fields and topics are quite often selected in the universities according to spontaneous approaches from researchers, far from national or market-oriented priorities, while the laboratory infrastructure and equipment are maintained lacking suitably skilled staff. This view is to be completed with the consideration of the public regulations and existing statutes in the universities closely focused towards education while mobilisation of researchers and instruments for cooperation with industry are quite generally not being considered. As for the most recent wave of private universities in MPCs, with a few exceptions, they lack the vocation and resources for technology R&D, as research is usually a second priority only at reach of their teachers-researchers when public facilities are available.

Adequacy of funding mechanisms, educational programmes adapted to the demands and needs of the labour market, as well as regulations to promote teachers competences and research form part of the government measures required to level the universities with the development needs of the MPCs. In the last times, though not everywhere, movements in the governance of universities occur towards implementing improvements in priorities definition, internal evaluation methods, monitoring of projects and areas of research in line with the democratization of management. Also, during the last decade the evolution of the legal frame of the universities is allowing initiatives to create or enhance links of universities with the industrial environment and to commercial exploitation of the research results.

The research or technology centres established in the eighties and nineties were frequently based on a linear view of the innovation process with insufficient attention to the creation of liaison mechanisms with the users and business community. This approach has been reoriented in recent times, involving private actors and companies, as is the case with the creation of new research centres in Egypt and Morocco (Mascir); they have a strong challenge ahead to show their efficiency in keeping close to the application. Meanwhile, research centres addressing national priorities in sectors like health or agriculture have been quite consistent with their objectives from start.

Other scientific infrastructures are timidly orienting their strategies to support academia and industry cooperation, as is the case of the CNRST laboratories in Rabat allowing easier access of universities and private users to their facilities. The growing need for resources to maintain research laboratories at a level of excellence recommends the development of common multilateral strategies involving centres from different countries, an issue already discussed during the Arab summit in 2010.

The availability of human resources for research in the region is a key element when the number of researchers per inhabitant in the region is below the most advanced countries. As exceptions, both Tunisia and Jordan have figures above many EU countries. The quality of the research teams in universities is deeply affected by the recruitment approaches, strongly conditioned by endogamous practices which give priority to graduates from the same institution and by the financial resources available for training and mobility assuring the return. In the last decades, a high number of university graduates from Egypt, Morocco and Algeria continue their studies abroad, mainly in the EU, where the most skilled obtain highly qualified jobs in business or research making difficult the search for comparative alternatives back home. Also ambitious policies to attract talent from abroad are being formulated with modest or no results for the moment.

When research started to be considered as one of the main functions of the universities, the number of publications became the main (often the only) criteria for quality evaluation. As a result, there was in the last decade a high growth in the number of publications in the region even when the differences between countries are important: Egypt has the highest number, while in relation to the population, Tunisia and Jordan outperform the world average of 147 publications per million inhabitants.

However, the research results show a very low orientation to industry needs if the patents are considered as indicator. The number of patents filed and registered confirm a lack of culture of intellectual property (IP) as compared to countries of similar size; being apparently the good news, some international patents are registered outside the region, mainly in the USPTO (US Patent and Trademark Office) and the European Patent Office (EPO).

	Algeria	Egypt	Jordan	Morocco	Tunisia
Patent applications, non residents (2007)	765	1452 (2009)	446 (2009)	856 (2010)	n.a.
Patent applications, residents (2007)	84	490 (2009)	60 (2009)	151 (2010)	n.a.
Average USPTO annual number of patents registered (2002-2006)	0.4	5.6	1.4	0.8	0.6

Sources: WIPO: World Intellectual Property Indicators.www.wipo.int/econ_stat; USPTO, http://www.uspto.gov

For most of the countries the number of patents is not yet considered as a measure of researchers' activity, thereby preventing them from a more focused approach looking for application and closer to the economy needs. The development of the culture of intellectual property, built on technical training and support to researchers as well as on increased dissemination and visibility of research results, should be enhanced to help create an efficient basis for technology transfer.

IV – Cooperation in research

Currently, public policies and programmes supporting university-industry cooperation, using public funds are timidly starting to appear in most of the MPCs. The promotion of applied research cooperation should be completed considering first the kind of projects to be developed, actually focused on well-defined and specific objectives of the firms which are to benefit from the research results.

Some of the main barriers to launch cooperation projects as a way to valorise knowledge come currently from the regulatory frame for career development existing in many institutions that creates difficulties for the motivation of researchers. Therefore, the definition of researcher's statutes facilitating the careers and mobility of researchers, together with the creation of incentives and strict codes of conduct will strongly help upgrade the research capabilities.

Moreover, promoting international research cooperation has an outstanding importance not only to contribute to the mastering of emerging technologies but also to facilitate the comparison with the state of the art.

International research cooperation in MPCs, which is supported by EU and bilateral programs offers opportunities for innovation and transfer of knowledge to firms in the region; however, these opportunities are still scarcely used: as an example, by the end of 2011, in the 168 FP7 projects involving MPC partners - mainly from Egypt, Morocco and Tunisia -, the participation of firms was only 10% of the total showing the need to address the sectors and firms with innovative potential as to increase their interest in innovation through cooperation. These results also underline the importance of reconsidering the existing rules of participation in international programmes such as the Framework Programme.

V – Valorisation of research in the MPCs

The "creation of economic and social value from knowledge and scientific capabilities" can be produced by a variety of channels: joint projects, patents license, business creation or training of specialists. The consideration of knowledge transfer as an actual role of the universities (the "third function", after education and research) was introduced in most of the MPCs only in the last decade, and still has a long way ahead to set up regulations on the role of the universities, the researchers' statute or the creation of professionalized capacities helping with industry liaison, RDT financing, IP management, contracts negotiation and business creation and development.

Those measures quite often include the creation of liaison or technology transfer offices (TTO) as well as other structures (clusters, technology parks, technical centres, incubators) able to provide the required expertise to both researchers and industry or final users.

Valorisation has to build as far as possible on research results that were produced looking forward to giving response to actual problems or innovation needs; otherwise the "marketability" of the academic knowledge will find barriers very difficult to overcome. The role of liaison with industries and final users as to help researchers to identify topics appears at the forefront of the TTO functions.

Most countries in the region have been defining valorisation policies during the last decade, which included the creation of units in universities and research centres together with other structures of support to industry cooperation and innovation. The implementation of those policies, following quite often models already developed in other countries since the late eighties, usually needs long periods of time to achieve a sustainable impact, as they are closely related to the whole process of knowledge production and innovation, and are also conditioned by regulatory and organizational factors in the academic environment. Here follows a short review of the valorisation policies and measures to implement support structures in the Mediterranean countries.

Since the nineties valorisation has joined the innovation policy schemes in **Algeria**, where specific measures have been proposed in research centres in order to create links to industry and to look for application of the existing capabilities. In 2008 a valorisation department was created to reinforce the policies of the Ministry of Education and Research - initially developed by the ANVREDET (Agence Nationale de Valorisation des Réultats de la Recherche et du Développement Technologique), an agency for dissemination of the results of research and an IP agency (INAPI).

The support to valorisation interfaces in universities appeared in the agenda after 2008 as they are requested to implement liaison offices promoting knowledge transfer to industry further than the supply of skilled graduates. Some universities set up valorisation units usually with the help of part-time researchers, who mainly addressed the negotiation of research contracts and IP issues,

as is the case of the Houari Boumediene University (USTHB). Other universities, such as those of Blida, Tlemcen, Constantine, Bejaia, Jijel, Oran and USTO are also in the process of developing their own units quite often conditioned for the availability of resources. This approach in public education is having a parallel effort in the business side where innovation and technology transfer centres (CITT) are planned, with the first one already at work in Tlemcen.

Regarding the existing public research and technology institutions, both the creation of valorisation units and the creation of technical subsidiaries are making easier for them to close the gap with final users and the industry since some of them such as CDTA (Centre de Développement des Technologies Avancées) or CDER (Centre de Développement des Energies Renouvelables) have annual experts in charge of valorisation, while others as the UDTS are currently formalizing valorisation units. The transfer of technologies developed in the research centres is being efficiently supported by specific subsidiaries – Saticom (a subsidiary of CDTA), ER2 (CDER) or PITT (UDTS) - created to adapt the technical solutions to the needs of the users or to new products covering all the stages of the innovation process.

Programmes for applied research collaboration funding in **Egypt** include more and more bringing together academia and industry in their objectives. That is the case of STDF - Science and Technology Development Fund, and RDI - Research, Development and Innovation Programme (financed by the EU), ITIDA Fellowship for IT and the IMC - Industrial Modernization Centre (which supports the stage of proof of concept). However, the specific issue of creation of technology transfer offices in universities and other structures to facilitate innovation such as incubators are slowly developing, mainly starting from the universities themselves. Thus, four universities (Helwan, Cairo, Asyut and the American University in Cairo) supported by the Tempus project (EU) created their TTO in 2010, while other universities followed: Kafrelsheikh, Ain Shams, Beni Suef and Egypt-Japan University of Science and Technology. These ones, in collaboration with the University of Alexandria, - which has a large TTO since 2009 - are working in the configuration of a national TT network (ENIT) with additional support from USAID. Technology transfer channels and institutions include also in Egypt the Invention and Innovation Development Agency (IIDA), helping to access the market and the Technology and Innovation Centres promoted by the Ministry of Industry.

The National Research Centre (NRC, the largest research institution in Egypt, with 14 thematic research areas) has been based, since its creation, on a different cooperation model with industry, in close relationship with industry associations and the Federation of Egyptian Industries as to facilitate the implementation of contract research projects. To this end, NRC created in 2002 a Business and Investors Office (BISO) which upgraded its capacity in IP and valorisation services to NRC researchers after 2011.

In **Jordan**, the application of a 1% tax on the benefits of the public companies is aimed to turn the business attention to innovation while helping increase the funding of research; additionally, incorporation of university experts into industry through the Faculty to Factory programme is efficiently contributing to the transfer of knowledge to industry. In more concrete terms, a wide network of technology transfer offices in academia and industry is being developed in the frame of the EU-financed SRTD programme with a wide geographic coverage.

This innovative initiative has supported the creation of eleven TTO since 2009 in both academic and industry environments (Jerash Private University, Jordan University of Science and Technology, Mut'ah University, University of Jordan Yarmouk University, NCARE; Al Urdonia Lil EBDA - JIC North, Amman Chamber of Industry, Jordan Enterprise Development Corporation, Jordan Industrial Estates Corporation and King Abdullah II Design and Development Bureau) through the National Programme for Technology Transfer. The creation of this national TTO network with common goals and cooperation mechanisms counts with the professional coordination from the Intellectual Property Commercialization Office (IPCO, a part of El Hassan Business Park).

Looking towards international cooperation in technology transfer, IPCO is currently exchanging experiences in the field with other institutions such as Lebanon's CNRS.

Since 2003 **Morocco** has created a number of valorisation units in the universities (fifteen) and research institutions (eleven) under an international cooperation program with France, aimed to provide the researchers with the necessary support to launch joint projects with industry and new innovative start-ups. Those units, developed in parallel with an incubators programme (RMIE), need further empowerment to cope with the challenges set by industry development in the country.

Meanwhile other instruments for industry-university cooperation have been launched in the last few years such as the public-private Mascir Foundation for research in priority fields (biotechnology, nanotechnology, microelectronics), industry clusters (microelectronics, digital industries, mechatronics, fishing industry) and Cities of Innovation (Fez, Rabat, Marrakech and Casablanca) under the Moroccan Innovation programme.

The National Plan for Research and Innovation and Valorisation Programme (VRR) in **Tunisia** has been active since the nineties aiming to increase university-industry cooperation and launching an ambitious programme of technoparks (seven have been created since then). From 2011 the PASRI programme has initiated with the cooperation of the EU and the WIPO the creation of 7 technology transfer offices (BuTT) to build upon experiences developed at the technoparks (e.g. Borj Cedria technopark hiring independent brokers to create and commercialise a technology portfolio) and Tunisian universities (Tunis - El Manar, 7th November, Carthage, Gabes, Gafsa, Jendouba, Sousse) which designed their liaison offices with industry under a Tempus project four years ago.

VI – Valorisation services

As it has been shown, valorisation activities in the Mediterranean countries started in the nineties, but only in the last decade universities and research institutions became aware of the convenience of building professionalised support interfaces, giving pace to the above-commented policies and initiatives. In order to attain a more detailed vision of the valorisation approaches and services, a questionnaire and interviews were addressed to 24 research institutions leading the ERA-WIDE rojects approved by the EC in 2010-11.

	Algeria	Egypt	Jordan	Morocco	Palestine	Syria	Tunisia	Total
Institutions surveyed	2	5	6	3	4	1	3	24

Almost half of the institutions declared to be managing valorisation of research results from presidency-related departments (only one of them had a specific unit) while other departments such as those of external relations, marketing, dissemination, or central laboratories were charged with industry liaison tasks. This proximity to the institution heads suggests that valorisation issues are still having a low degree of development and autonomy.

In line with it, hiring specialized professionals is not common, and the researchers themselves are at the forefront of the day-to-day liaison and valorisation work. The technology transfer units or responsible people usually support the researchers with horizontal services: information, training, workshops organization, while those services that involve greater specialization, such as IP management, search of research projects financing or support to spin-offs quite often remain with no suitable support.

Summarizing, it can be said that valorisation is usually allocated as a complementary function to units in charge of other responsibilities in the academic or research institutions, and since professionals in IP management, technology watch and specialized fields are rare. Those

functions are to be usually performed either by the researchers themselves or other management people lacking the required qualification, who quite often require external support (patent agents, consultants, etc.).

These findings are coherent with the general opinions on valorisation and technology transfer also gathered in the survey showing that in research institutions: (1) research-business links are usually created through personal contacts; (2) transfer of patented knowledge is unusual as a means of co-operation with industry; (3) technology transfer units and services still play a marginal role in the creation of links with industry (Fig. 1).

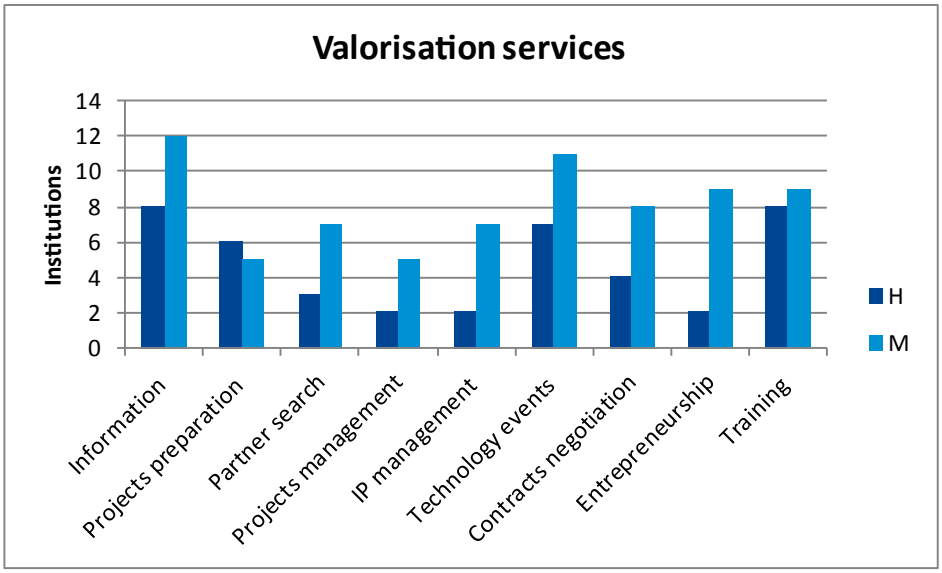

Figure 1. Results of the survey on valorisation and technology transfer in research institutions
H= High intensity; M = medium intensity
Source: MIRA (2011)

VII – Networking of valorisation interfaces

By its own nature the flow of knowledge has no borders and sets a challenge to facilitators in the creation of efficient channels for technology transfer both in their countries and internationally.

From the firstly created Technology Transfer Offices in Morocco to the most recent initiatives in Jordan, Egypt, Algeria or Tunisia, building capabilities, performing joint activities and sharing expertise through interlinking them appear clearly in the forefront of the valorisation policies. The experiences of European networks, both national (e.g., Italy's Nerval, France's Curie, Spain's RedOtri) or international (e.g. Proton, EEN) show some of the benefits that can be drawn from networking cooperation. In this line, five public universities in Egypt agreed to create a nation-wide network (ENIT) to debate on sustainability models and to exchange experts. The response of the universities professors and researchers has been very receptive to a model which, even when caring about the experiences from other countries, is to be drawn according to national issues and challenges.

Another initiative is the network of the Jordan Higher Council of Science and Technology (HCST) and Jordan Enterprise Development Cooperation (JEDCO) aimed to supply eleven university and business TTOs with a professional coordination that has to cope with the specific cultures of the involved organizations and to look for the best ways of respecting the institutional independence while getting more and more involved in sharing tech transfer activities.

The creation of linkages among technology transfer units and national networks in the Mediterranean area will help open new perspectives not only to valorisation but more important to research cooperation, as shows the experience of the 1995-created Enterprise Europe Network (EEN), in which members from Morocco, Tunisia or Egypt are currently taking part.

VIII – Final Comments

Valorisation of research results is facing similar challenges in most of the Mediterranean Partner Countries. A main one is the strengthening of links between researchers and firms allowing to orient and improve the quality of applied research performed in universities and research centres. Those links can also play a key role in the creation of favourable conditions for innovation in industry and to promote the allocation of private resources to research which in return will help to overcome weaknesses of the industry and to improve its competitiveness.

On the industry side, the changes in the strategies of the firms are more and more conditioned by the competition in open markets to invest in product development and to innovate. The identification of the technology needs linked to the objectives of the firms appears therefore as a critical issue for industry that is followed by the measures to guarantee the accessibility to technology, through capacities in the country or through international alliances. It is here where the public research sector should focus its attention to become a strategic agent.

Additionally MPCs show the need of a powerful policy of innovation to implement strong measures aimed to upgrade and modernise industry in terms of skills, equipment, information and quality management, to increase the number of firms able to compete in local and external markets. Knowledge and technology available in universities and research institutions are to contribute to this endeavour, providing skilled graduates and the capabilities to deal with the technical problems and innovation challenges. On the research side, the public institutions are to deal with the issues related to the quality and motivation of researchers for cooperation with industry. This means that the public standards and regulations of the careers have to consider the possibilities of a stronger commitment of researchers active in applied research, with higher possibilities of getting involved in the exploitation of the results through joint projects with industry, patents licensing or creation of innovative start-ups.

Public regulations and institutions are also to deal with the introduction of intellectual property culture and with IP rights management (ownership, share of revenues, patent licenses) and with provisions for the mobility of researchers, a hard challenge when the internationalisation of research opens the labour market for researchers.

Innovation and research policies in MPC are currently deploying a wide arsenal of instruments – technology transfer interfaces, clusters, incubators, technoparks, technology platforms, etc. – which are to be tuned to the possibilities and requirements of the country's economy, after a sound consideration of the country's priorities in the different research and industry areas. The existing programmes are very often not addressing the research-industry cooperation needs in a fully satisfactory way, usually affected by governance barriers between the departments in charge.

In the international arena, certainly the use of the existing EU, bilateral and multilateral programmes offer wide opportunities of cooperation for MPC, helping keep close linkages and acquaintance of international markets, state-of-the-art and frontier technologies. Besides, what is actually missing is a deeper cooperation effort to create liaisons between the Mediterranean Partner Countries themselves, facilitating the creation of common platforms through technical and managerial exchanges with the critical mass in international forums and networks as to play a mutual benefit role in technology and research exchanges.

Valorisation and knowledge transfer from the public sector to industry will need a close consideration in the frame of the innovation policies, and will require specific measures for creation of support units or interfaces with the professional capacities to help researchers and firms cooperate in creating strong liaisons, raising R&D funds, managing intellectual property, negotiating technology contracts or helping to create and develop innovative enterprises.

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Technology transfer experiences in the Mediterranean

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Abstract. One of the important outputs of the MIRA project has been the creation of the Euro-Mediterranean Innovation Space (EMIS). This concept has allowed to initiate a number of activities among interested stakeholders in the Mediterranean who meet and discuss the framework conditions necessary to create such a Space. A case in point is represented by the TT activities organised to this effect. MIRA organised an exploratory forum in this regard in Brussels, Belgium (February 2010); other forums were organised in Casablanca, Morocco (December 2011), in Tunis, Tunisia (June 2012) and in Larnaca, Cyprus (October 2012). The Brussels event identified four key issues namely: Identification and mapping of the key barriers and the success factors; Knowledge Transfer policies and strategies; Innovation strategies and entrepreneurship in a Euro-Mediterranean context; Building knowledge and technology transfer capacities. A number of recommendations were drawn up based on the personal experiences of the participants coming from both sides of the Mediterranean. One important issue which emerged is the need to have clear achievable aims at two levels, both national and regional; more importantly, these aims must be designed in a way that they are complementary to each other.

Keywords. Innovation – Technology transfer – Research networks – Mediterranean region.

Les experiences de transfert de technologie en Méditerranée

Résumé. *L'un des résultats importants du projet MIRA a été la création de l'Espace euro-méditerranéen de l'innovation (MIRA). Compte tenu de ce concept, les acteurs intéressés dans la région méditerranéenne se sont engagés dans de nombreuses activités pour définer le cadre des conditions nécessaires pour la création d' un tel espace. Citons, à titre d'exemple, les activités TT (transfert de technologie) organisées à cet effet. MIRA a organisé un forum exploratoire à Bruxelles, en Belgique (Février 2010) ; d'autres forums ont été organisés à Casablanca, Maroc (Décembre 2011), à Tunis, Tunisie (Juin 2012) et à Larnaca, Chypre (Octobre 2012). La réunion de Bruxelles a permis d'identifier quatre questions essentielles à savoir : l'identification et la cartographie des principaux obstacles et les facteurs de succès, les politiques et les stratégies de transfert des connaissances, des stratégies d'innovation et l'entreprenariat dans un contexte euro-méditerranéen, le développement des connaissances et des capacités de transfert des technologies. Un certain nombre de recommandations ont été élaborées sur la base des expériences des participants provenant des deux côtés de la Méditerranée. Une question importante qui a été mise en évidence est la nécessité d'avoir des objectifs clairs, réalisables à deux niveaux, national et régional, et, surtout,complémentaires.*

Mots-clés. *Innovation – Transfert de technologie – Réseau de recherche – Région méditerranéenne.*

I – Introduction

MIRA has played a critical role in promoting the transfer of technology and helping train scientific and technical staff by increasing participation in joint research projects. MIRA has launched a pilot action which focused on developing an overview of the national technology transfer structures, policies and strategies in Euro-Mediterranean countries. A number of activities were organised under the MIRA patronage to discuss Euro-Mediterranean Technology Transfer (TT) to identify the barriers hampering technology transfer and innovation which are shared among EU and Mediterranean countries. These events also helped identifying training needs in relation to TT tools and methods as well as identifying the range of expertise available in the partner countries.

A number of interesting results emerged from an event organised in Brussels in February 2010. This event was attended by a number of experts from both sides of the Mediterranean and space was given to elaborate the discussion on the issues outlined above and to provide a number of recommendations which will eventually feed into the overall result of the TT effort of MIRA on the following points:

- Key Issue 1: Identification and mapping of the key barriers and the success factors of TT
- Key Issue 2: Knowledge transfer policies and strategies
- Key Issue 3: Innovation strategies and entrepreneurship in a Euro-Mediterranean context
- Key Issue 4: Building knowledge and technology transfer capacities.

For any attempt to identify the needs for an increased Transfer of Technology and valorisation of results, one needs to comprehensively look at the region, to identify the main barriers and success factors of TT (Key Issue 1) to be able to truly give a full picture of the situation. The barriers for Technology transfer in the Mediterranean include: lack of communication and trust; lack of skills in TT; lack of management skills; wrong academic incentives; risk aversion and lack of early-stage financing; lack of a legal framework; lack of information on the market needs; and companies unwilling to participate (financing, secretive information). These barriers call for solutions to be found; the following is being proposed:

a) Key Recommendations (Key Issue 1)

- Develop *a clear vision* with clear objectives and aims which are achievable
- improve measures and conditions to ensure *Capacity-building* in the field on both sides of the knowledge transfer
- increase *TT incentives* and support through specific programmes/projects with clear and targeted aims
- establish *communication channels* which allow for the free circulation of information, particularly on success stories.

It is perceived that there is a lack of clear policy orientation and of resources to effectively deal with knowledge transfer policies and strategies (Key Issue 2); therefore, there is an unbalanced excellence throughout the Mediterranean. Furthermore there is also lack of information on the market needs, lack of early stage financing as well as the absence of a risk-taking culture which is paramount for the success of TT activities to move ahead. The recommendations to overcome these problems have been narrowed down to two essential and complementary actions, namely:

b) Recommendations (Key Issue 2)

- *Diffusion of knowledge*: Bridge knowledge of different types of intermediaries at different levels along the value chain clearly spelling out the range of actors involved and address bottlenecks between the knowledge generation and application
- *innovation and regulatory policies* need to be designed and adapted to fit the framework conditions. Setting core objectives and priorities is a key issue to be addressed.

One of the identified challenges towards increased innovation and entrepreneurship in the Mediterranean (Key Issue 3) is the financial risk associated with the setting up of companies particularly in the Southern Mediterranean. This is coupled with the lack of financial support particularly in the risky start-up phase and difficulties in securing sufficient funds from Investment Banks, business angels and other funding sources. Furthermore, one needs to recognise the problems associated with the entrepreneurial culture in the region. This is very peculiar and thus needs to be threaded carefully to allow space for more creative thinking.

c) Key Recommendations (Key Issue 3)

More international donors: International donors (among which the EC) should help to set up specific support schemes and appropriate instruments to share/minimise risks and help developing further the entrepreneurial culture in the Mediterranean.

- *Development of robust interfaces between Industry and Research*: This stimulates the knowledge flow from research to industry. Innovation parks and research and innovation clusters play an important role.

Similarly to other regions, one of the solutions toward addressing the technology transfer and the valorisation of knowledge is the need for specific capacity building (Key Issue 4) measures in the field. It is recognised that there is lack of data on the experience acquired across Euro-Mediterranean countries and the lack of an inventory of the lessons learned. This is seen as a draw-back since many new industries may not know what capacities do really exist in the region.

d) Key Recommendations (Key Issue 4)

- *Benchmarking* of different TT experiences in the EU-Med using a conceptual structure covering different aspects involved in Technology Transfer. This should include:
- knowledge availability, professional qualifications, IPR issues, existence of interface institutions, mapping of the technology needs and demands as well as regulation and legal issues.
- capitalise on Smart Bridging for knowledge transfer in the Mediterranean taking advantage of the available instruments, such as the existence of expatriates' networks.

No doubt that all of such measures should not be expected to be tackled solely at the national level by individual countries. History has shown (particularly within the European Union) that cross-border cooperation can be an essential factor to overcome common problems and concerns such as the issue of addressing Technology Transfer and the Valorisation of results. For this purpose the EMIS group with the help of carefully chosen experts from the region for both the academia and industry side have discussed and come up with two possible scenarios of having two separate (yet complementary) road maps one at national and the other at regional level.

II – Road map at national level

The importance of having a road map at the national level is to clearly address the national priorities which could be well different to its neighbours. Therefore it is not sufficient to have a regional road map for a country to simply follow that; it is advisable for each country to have (in addition) its own national road map to address key issues and priorities which could be limited to its experience. The main items proposed in this case would be:

- set up long-term vision with clear aims and objectives.
- allow for provisions to ensure brain circulation between researchers regionally, nationally and internationally – measures should include provisions to ease visa restrictions for incoming researchers. Furthermore existing industry should be closely interlinked with research centres and laboratories by providing increased networking opportunities to ensure that clustering may be a continuous process.
- set-up more universities and specialised training institutions to allow a more multi-disciplinary generation which can easily adapt to the changing competitive market to increase the experience at policy level of the institutions.
- omit national funds specifically to address the TT gaps which exist. An example is to provide specific incentives to SMEs doing research with universities and research-driven clusters.
- create new SMEs by promoting in a more effective way university spin-offs and assist such SMEs to develop into high-tech SMEs within 5 years.

III – Road map at regional level

Tackling technology transfer at the regional level may have significant results if complemented with national actions. Regional cooperation opens up new space for Technology Transfer trans-nationally and may be instrumental for achieving specific expertise which is not available within the national territories. Regional cooperation is an instrument for all countries regardless of the size as it allows for a real brain circulation and networking beyond the national borders. It has been highlighted that Regional road maps may be key to achieving regional objectives that should not be seen as the sole solution for the national objectives – the opening up of regional cooperation in the field could give access to a wider diaspora of qualified people, increased interfaces among institutions and new partnerships. The actions proposed are the following:

- setting-up of specialised programmes specifically targeted to the region. In the case of the EC it would be useful to have a specific ERA-NET on Technology Transfer in the EuroMed region;
- set-up partnerships across borders and create clusters which may have the capacity to be linked to the EU and/or global scale;
- have Public and Private technology brokers and use techno-parks as a tool for the developed clusters;
- provide specific incentives for SMEs engaging in trans-national Technology Transfer activities;
- provide funding for effective training of experts and networking amongst key players in Technology Transfer within both sides of the Euro-Med Region.

IV – Role of the EMIS

EMIS (Euro-Med Innovation Space) is currently pursuing efforts to identify the potential for the future development of Technology Transfer. It has organised a number of events under the MIRA patronage and is expected to continue building on the substantial work already carried out so far. The ideas have been many and so have the actions. However, to summarise, EMIS priorities will be on the following identified suggestions:

- creation of a web-based dialogue platform
- use the platform to facilitate interaction with existing programmes on innovation in the Mediterranean Area
- organise 'thematic fora' where researchers, companies and public administration share their views on the issues related to the implementation of the UfM projects objectives and search the possibilities to establish national and, mainly, international 'Research-Driven clusters' as a tool to support technology transfer, the creation of consortia to apply for research funding, and developing training activities amongst others.

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Promoting innovation in the Mediterranean.
Profiles and expectations of business incubators, technology parks and technology transfer offices

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Abstract. Developing innovation economies is even more important during a crisis and this is why virtually every country in the world is striving to remain competitive. Their aim is to generate added value and create sustainable jobs. The development priorities for all countries, and in particular for the MED countries include developing promising new industrial activities in various areas of excellence, encouraging entrepreneurship and pushing forward future economic leaders, attracting foreign investment in high-end business areas and ensuring that technology parks and innovation showcases play a role in knowledge exchanges. Yet in response to these challenges, several countries in the Mediterranean region are falling behind at different levels. They find it difficult to acquire sufficient critical mass for investments and installations. They also lack global visibility and perform poorly when commercialising research results and public-private partnerships are difficult to establish. The study entitled Promoting Innovation in the Mediterranean is the result of field work, a survey of existing programmes and various workshops conducted alongside the "players of change in the Mediterranean". It takes stock of current innovative ecosystems that are being developed in the Southern Mediterranean region. Three types of innovation support structures are targeted: technology parks, business incubators and technology transfer offices. The 7 MED countries concerned include: Algeria, Egypt, Jordan, Lebanon, Morocco, Palestine and Tunisia. The study is not simply an analysis of macro-economic issue; it identifies the key elements required to drive new innovation dynamics across the Mediterranean. They include the promotion of best practises, the need to identify and involve industry leaders as well as networking between communities and innovation clusters at regional level.

Keywords. Innovation – Technology transfer – Entrepreneurship – Mediterranean region – Cluster sampling.

Promotion de l'innovation en Méditerranée - Profils et attentes des incubateurs, technopôles et centres de valorisation

Résumé. *Le développement des économies de l'innovation est, plus que jamais en période de crise, une course à la compétitivité engagée par quasiment tous les pays, dans le but de créer de la valeur ajoutée et de générer des emplois à long terme. L'essor d'activités industrielles d'avenir dans des domaines d'excellence, le pari sur l'entrepreneuriat et la création de futurs champions économiques, l'attraction d'investissements étrangers sur des activités haut de gamme, l'insertion dans les flux mondiaux d'échanges de connaissance par la promotion de technopôles et de vitrines d'innovation sont autant de priorités de développement pour tous, et pour les pays MED notamment. Pourtant, face à ces enjeux, un décrochage des pays du bassin méditerranéen se dessine à plusieurs niveaux : problèmes de masse critique des investissements et équipements, manque de visibilité internationale, faibles performances de la valorisation de la recherche et difficulté à mettre en place des partenariats public-privé. L'étude Promotion de l'innovation en Méditerranée s'appuie sur un travail de terrain, un recensement des programmes existants, des ateliers avec les « acteurs méditerranéens du changement » pour proposer un état des lieux des écosystèmes de l'innovation qui se développent au sud de la Méditerranée. Trois types de structures d'appui à l'innovation sont ciblés : technopôles, incubateurs et centres de valorisation. 7 pays MED sont concernés : Algérie, Egypte, Jordanie, Liban, Maroc, Palestine et Tunisie. Au-delà des analyses macro-économiques, l'ambition de cette étude est de proposer des éléments clés pour l'émergence de nouvelles dynamiques de développement de l'innovation en Méditerranée : mise en valeur des bonnes pratiques, identification et implication d'acteurs moteurs et mise en réseau de communautés et pôles d'innovation à l'échelle régionale.*

Mots-clés. *Innovation – Transfert de technologie – Entrepreneuriat – Région Méditerranéenne – Échantillonnage en grappes.*

I – State of play: stakeholders and innovation policies in the Mediterranean

The majority of all research and development activity (R&D) in the Mediterranean region is carried out by public universities and research centres (over 90%, compared to 54% on average in the European Union). Amounts invested in R&D are low compared to international averages: between 0.2% and 0.7% of GDP in the MED countries (Tunisia is an exception with approximately 1%), compared to almost 2% in Europe (UNESCO, 2010).

There is a **significant lack in funding for research and facilities across the Mediterranean. Innovation systems are inefficient** in terms of overall strategic vision, research excellence and international visibility. Problems are encountered when commercialising publications and patents and managing the innovation environment. In addition, the MED countries are all suffering from the brain drain phenomenon. However, it is worth noting that there are large differences between certain countries. Performances in countries such as Tunisia and Jordan are very similar or even better than those registered in some countries of southern Europe (France and Italy for example), whereas Algeria is lagging behind in virtually all areas.

Generally speaking, the private sector still shows **relatively low commitment to innovation, but is also undergoing fundamental change**. A new generation of entrepreneurs and innovative SMEs is coming up, the venture capital industry is developing and there is a broader involvement of the major groups, along with the introduction of increasing numbers of innovation support programmes at national and international levels.

Table 1. Profile of innovation actors in the Mediterranean.

Type of players	Profile	Innovation focus	Expectations	Interface/ international
Traditional micro-enterprises/ SMEs	Informal structures Family-based management	Low-tech services Food industry	Innovation management Product offering	Chambers of Commerce Federations Local clusters
Start-ups/ new SMEs	High innovation International teams	Mid-tech services High tech	Coaching Seed funding Access to local and global markets	Innovative clusters Business plan competitions Business incubators, technology parks
Major local and international groups	Leaders in innovation Little interaction with local networks	Infrastructures Energy Banks ICT	Talent sourcing Product promotion R&D partnerships	Professional federations Innovative clusters Government and/or promotion agencies
Public universities and R&D centres	Poor research funding Lack of visibility in areas of excellence Brain drain	High Tech Environment Food industry Health ICT	Marketing Improved governance Co-funding and public-private partnerships	International support programmes Technology transfer offices
Financial bodies	Strong development of venture capital over the last 10 years Slow emergence of business angels	Consumer goods Infrastructures Services High Tech	Project sourcing Lower due diligence costs Coaching networks	Business angel networks Regional venture capital funds

Source: ANIMA

II – Profile of innovation support structures: technology parks, business incubators and technology transfer offices

The study focuses on three types of structures and highlights various issues regarding innovation promotion in the Mediterranean:

- **technology parks** are at the heart of all policies adopted by Mediterranean countries to attract investment and address the question of synergies between public and private players;
- **business incubators** deal with questions regarding the financing of innovation projects and the involvement of large companies in innovation ecosystems;
- **technology transfer offices** raise the problem of governance and the need for public sector research to adapt to market needs.

The study lists **41 technology park projects** that have either been completed or announced in the 7 MED countries targeted. Almost **three quarters of them were created after 2005;** they are mainly located in Tunisia (12) and Morocco (9). Often located outside the city centre, they are held back by weak local ecosystems and by a lack of critical mass (lack of companies and research centres). The majority of these technology parks house companies in the **ICT sector (36%)**, but the food sector is also well represented (18%).

90 incubators are listed in the study and half of them are located in Morocco and Tunisia. They are divided into three categories: traditional university incubators with little activity, small business centres concentrating mainly on providing administrative services and innovation accelerators offering short-term assistance and close ties with financial networks. The majority of these incubators (53%) serve a wide range of business sectors. More than a third of them **(37%) focus on the ICT sector**.

Over 50 technology transfer offices in the MED countries are listed in the study. They were also created very recently (80% of them after 2008) and generally speaking, they have neither the structure nor the teams required to provide full time service. They are located mainly in Egypt (14) and in Algeria (13). The centres often provide services for in-house teams (student researchers) and are rarely business or globally oriented. Only a quarter of TTOs target specific sectors such as agronomy, biotechnologies or health.

III – Innovation dynamics and partnerships in the Mediterranean: what are the difficulties and opportunities?

In the current context where innovation is increasingly based on open, international networking built around innovation ecosystems, the **lack of proximity and trust between public and private sector stakeholders**, **rigid administrative frameworks**, **poorly trained innovation managers** and **governance problems** all represent major hurdles that prevent MED countries from pushing forward dynamic innovation policies.

Yet **new dynamics are already at work** with, for example, the recent development of a **culture of entrepreneurship** across the Mediterranean as well as the creation of **South-South partnerships** involving key players in innovation. The MED countries can rely on attractive sources of **leverage** to boost their innovation systems, for example using **public procurement** or by inviting **talented expatriates in the diaspora** to contribute to the development of their home countries.

Strengths	Weaknesses
▪ Innovative high-growth sectors (ITC, tourism and services, food industry and health) ▪ Skilled workers in the diaspora communities of Europe, the USA and the Gulf countries ▪ Success stories and role models	▪ Poorly developed innovative culture ▪ Lack of trust and proximity between private and public stakeholders ▪ Poor understanding and visibility regarding international issues ▪ Rigid regulatory framework ▪ Lack of seed funding
Threats	**Opportunities**
▪ Falling behind the rest of the world in terms of global knowledge and investment flows ▪ Under-investment and dispersion of available resources ▪ Crisis situation and reduced direct foreign investment	▪ Entrepreneurial spirit ▪ Leverage of public procurement ▪ New key players are keen to get involved (major groups and business angels) ▪ New innovation policies ▪ South-South partnerships?

Figure 1. Swot Analysis on innovation dynamics and partnerships in the Mediterranean.
Source: ANIMA

IV – Twelve proposals for action at regional level

There are several elements in favour of Euro-Mediterranean action being taken. These include sharing resources that are currently insufficient in both the north and south of the Mediterranean region. There are also potential synergy opportunities in problem areas or common fields of expertise such as mobility, water management or urban development and there is a pool of skilled workers willing to develop innovative projects in collaboration with Europe and the Mediterranean.

The following proposals address actual problems and seek possible synergies with existing policies and programmes. They involve various players in innovation and are introduced in four steps (**see table 2**):

In the short term, a regional action plan (priorities, players, activation means and leverage); **proposals 1 and 2.**

In the medium term, identification of instruments that may be shared to obtain the critical mass required and synergies between those involved in innovation in the Mediterranean; **proposals 3, 4 and 5.**

In the longer term, coordination of national schemes to ensure continuity of service for innovators in the Euro-Mediterranean region; **proposals 6, 7, 8 and 9.**

Conducted in parallel, governance support for innovation is proposed at different levels to guarantee long-term involvement of key players in innovation policy; **proposals 10, 11 and 12.**

Table 2. Proposals for action.

Proposals	What?	How?
An online platform for collaboration and promotion (MedIn 2.0)	List of stakeholders Database of 100 key technologies Value chains and priority areas for innovation in the Mediterranean Promotional tools (videos, success stories)	By building on the exchange sessions and mapping those conducted by the IT1 group; by decentralising platform management; by coordinating national programmes for innovation, RDFP and regional competitions
4 regional sector-specific task forces	Green Economy Food industry ICT Sustainable tourism and services	With task forces involving 5 stakeholder types and based on regional objectives and action plans
Training programmes	4 priority areas: financing, promotion and technology transfer, communication and intellectual property management	By using case studies and bringing together mentors, innovation stakeholders and market players. By coordinating existing training systems developed in each country
Monitoring service	Alerts and news about opportunities in specific business sectors, innovations and technologies as well as cooperation opportunities.	By developing partnerships with specialised media, platforms monitoring institutional bodies, public research laboratories or major groups
Promotion and prospecting campaigns	“Mediterranean Pavilions” at international fairs, with stands and promotional workshops	Using available expertise in the diaspora (ambassador communities) and by attracting private sponsors for ongoing long term partnerships
International business development	“Mediterranean agencies” in target regions, featuring network leaders, co-working spaces and low-cost market research services	By targeting specific regions: European capital cities, the Gulf countries and the USA
Mentoring and managerial support	Groups offering sector-specific mentoring at regional level	By offering a regional dimension to existing programmes. By bringing together major groups
Seed funding	A framework offering seed funding for Mediterranean projects: project sourcing, co-financing support, joint investments via regional funds	Nomination of a committee of experts, an approval committee and marketing team

Proposals	What?	How?
Innovation project prototyping	A network of Euro-Mediterranean prototyping and proof of concept platforms (living labs).	By encouraging major groups to sponsor these platforms. By networking with European living labs
Develop a strong entrepreneurial culture within innovative clusters	Early stage financing and support tools to help new projects emerge (interest free loans and mentoring) and assistance for the best innovation projects.	With the organization of business plan competitions and by encouraging emulation with financial incentives. By measuring the impact of financing and raising interest towards results among the staff of the innovation support structures
Coordination of measures to attract investment with industrial and innovation policy	Creation of a strategic network of policy committees in charge of business support as well as the creation of a one-stop shop for innovation at operational level	By using the National Contact Points that are part of the 7th R&D Framework Programme By organising an annual conference on the theme of innovation governance
At transnational level: improving the mobility of innovators	Mediterranean Innovation Mobility grants for the 100 most innovative projects in the southern Mediterranean	Based on the Erasmus for Young Entrepreneurs programme or the Euraxess initiative by the European Commission

Source: ANIMA

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