# 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.

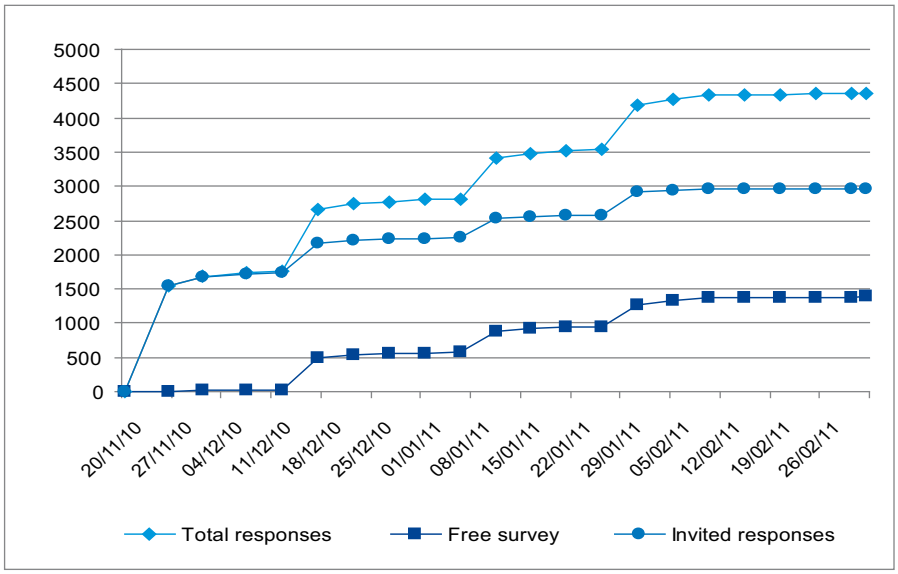


**Figure 1. Responses to the survey.**

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.

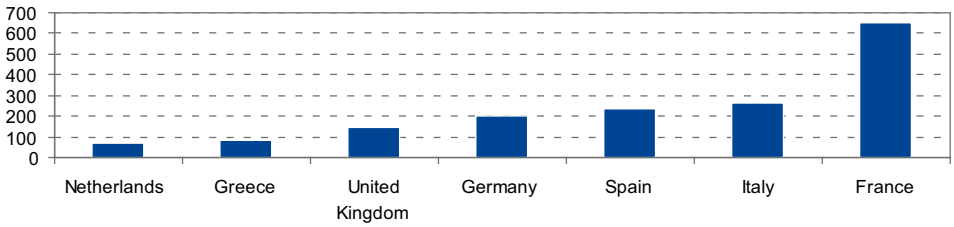


**Figure 2. The main European countries where the responding scientists work (more than 60 responses).**

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.

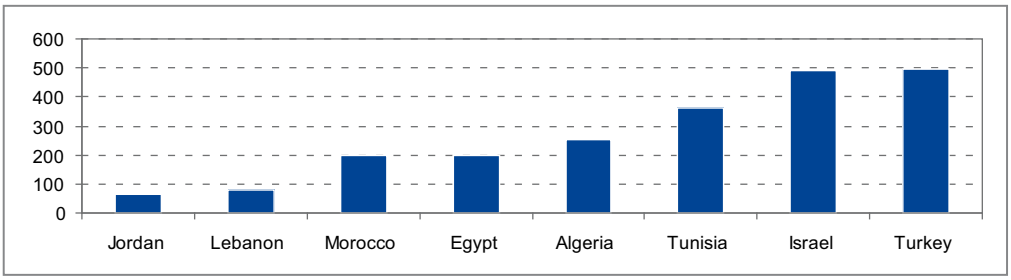


**Figure 3. The main MPCs where the responding scientists work (more than 60 responses)**.

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% |

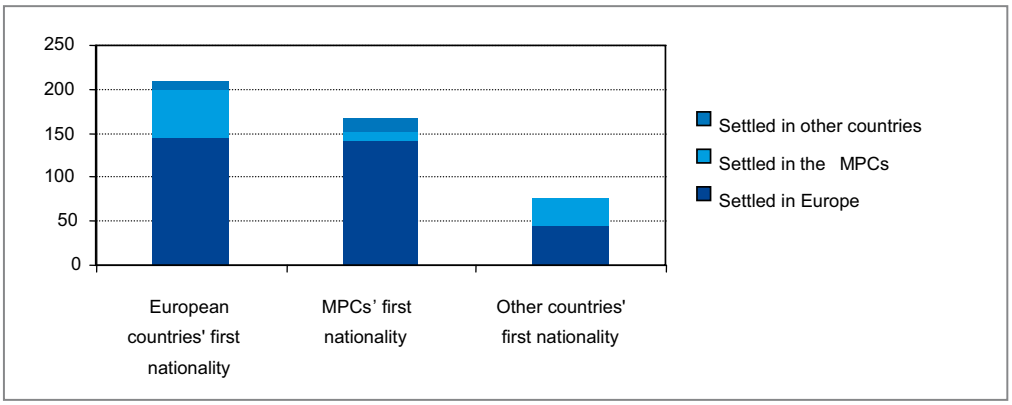


**Figure 4. Residence of respondents having a first nationality different from the country where they are settled.**

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).

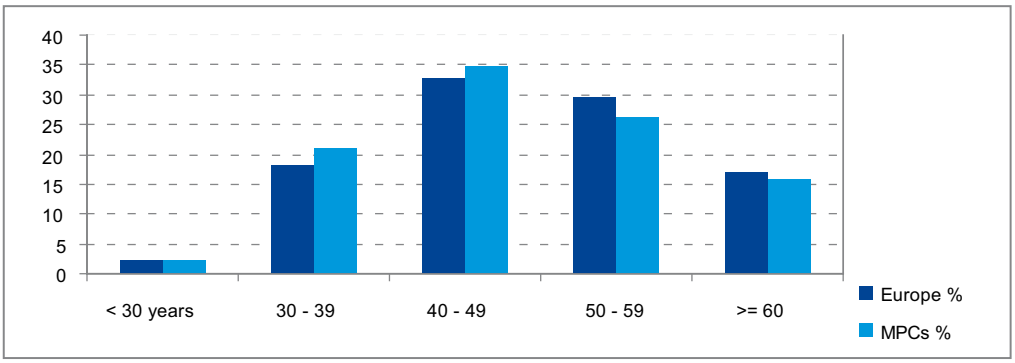


**Figure 5. Age of respondents.**

### *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.

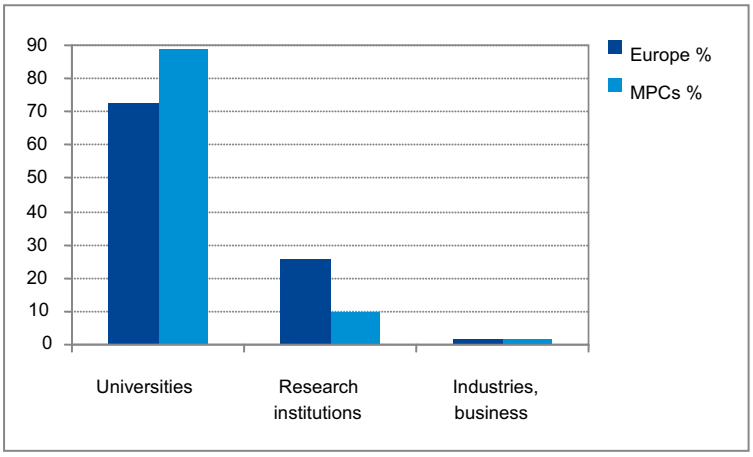


**Figure 6. Types of institutions where respondents work.**

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).

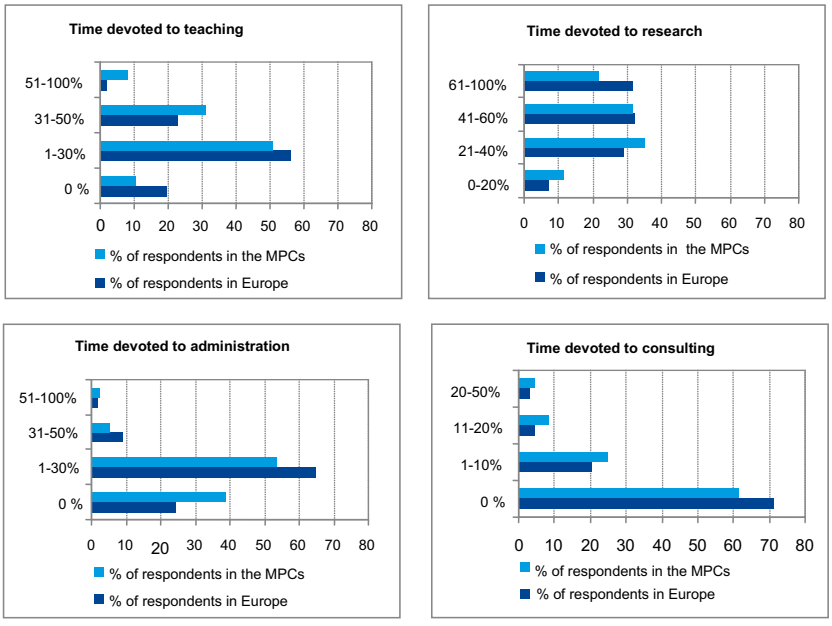


**Figure 7. Percentage of time devoted to research, teaching, administration and consulting.**

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).

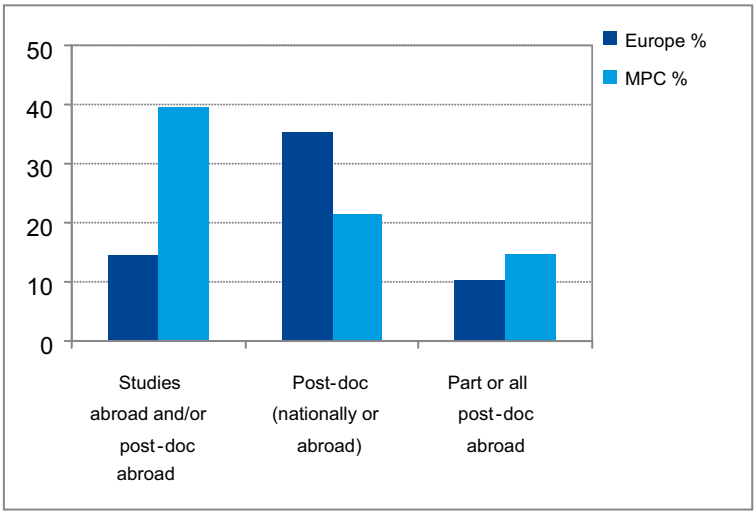


**Figure 8. Percentage of respondents having studied abroad or having achieved a post-doc (nationally or abroad).**

## 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).

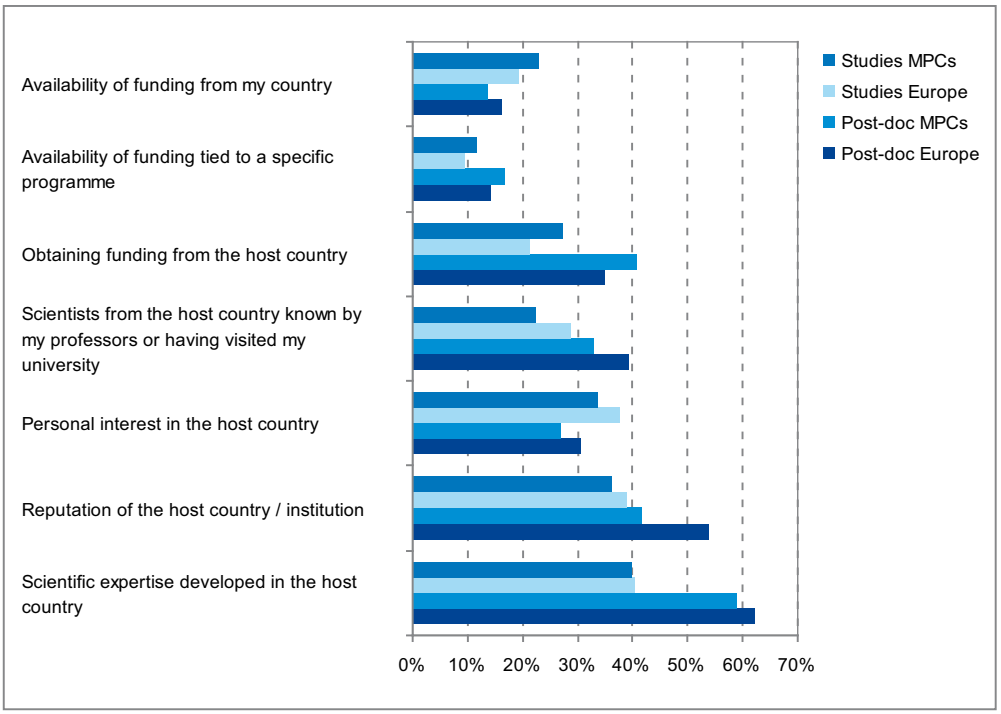


**Figure 9. Main reasons for doing studies and post-doc abroad (reasons gathering more than 15% of responses on the whole sample).**

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).

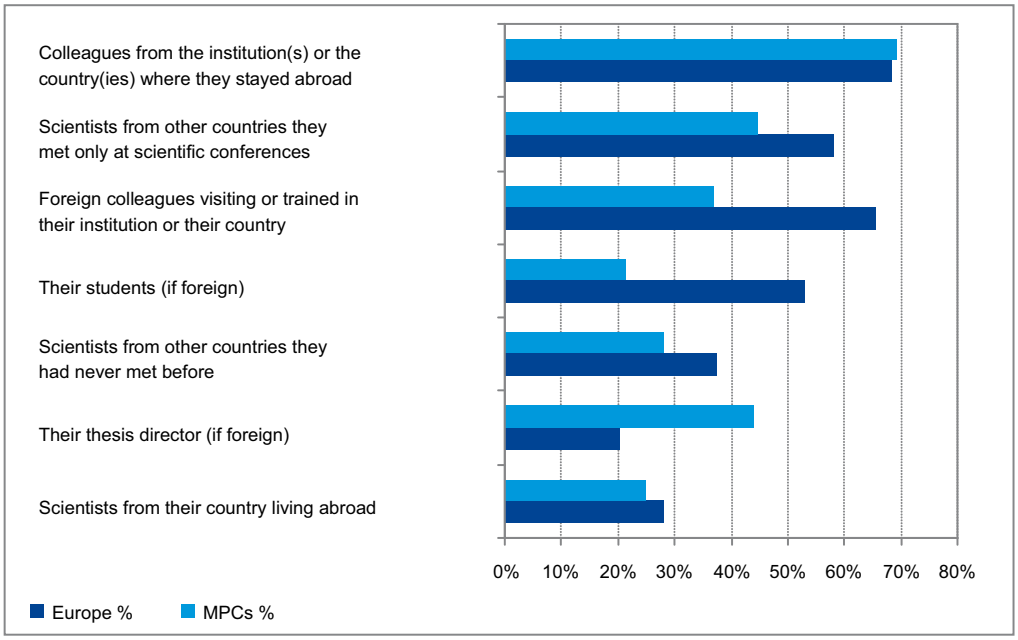


**Figure 10. Preferred foreign partners to collaborate with.**

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.

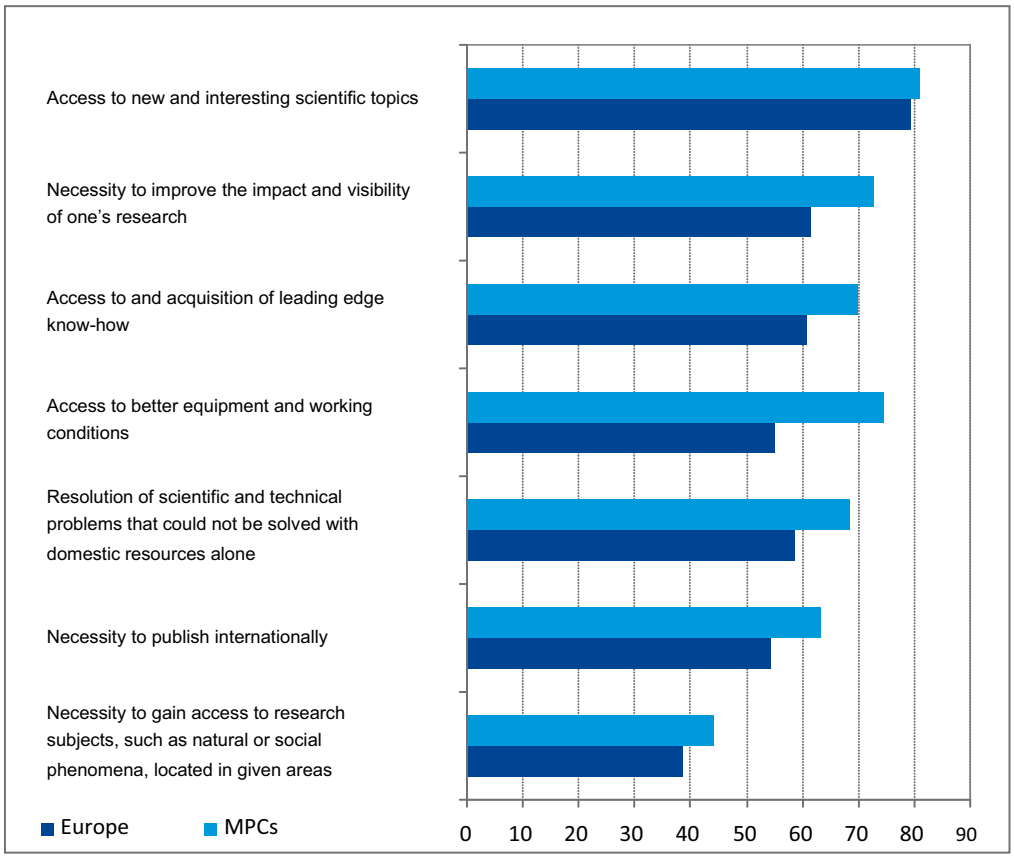


**Figure 11. "Important" and "Major" drivers of collaboration (in %).**

## 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).

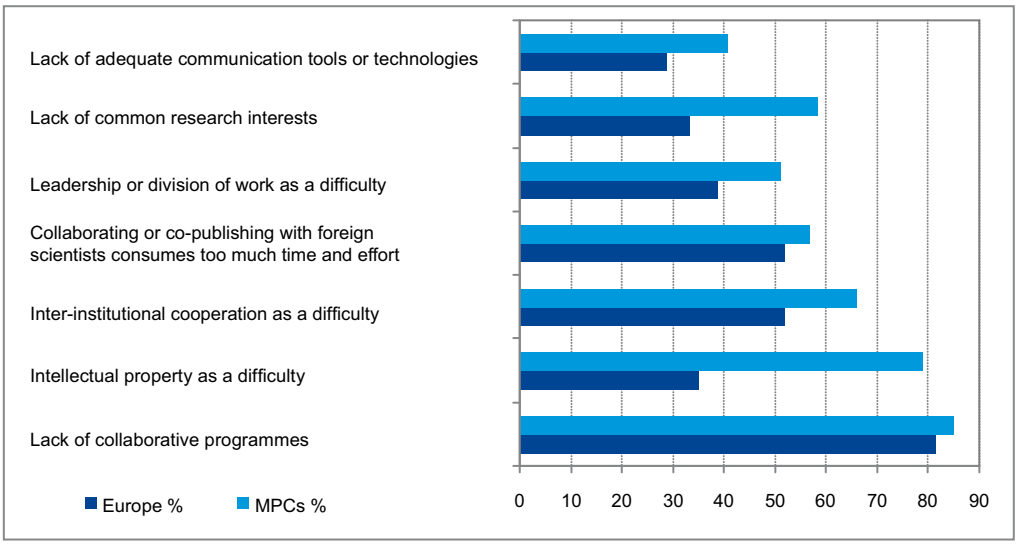


**Figure 12. "Moderately important", "important" and "major" difficulties in collaborating or co-publishing with foreign scientists (in %).**

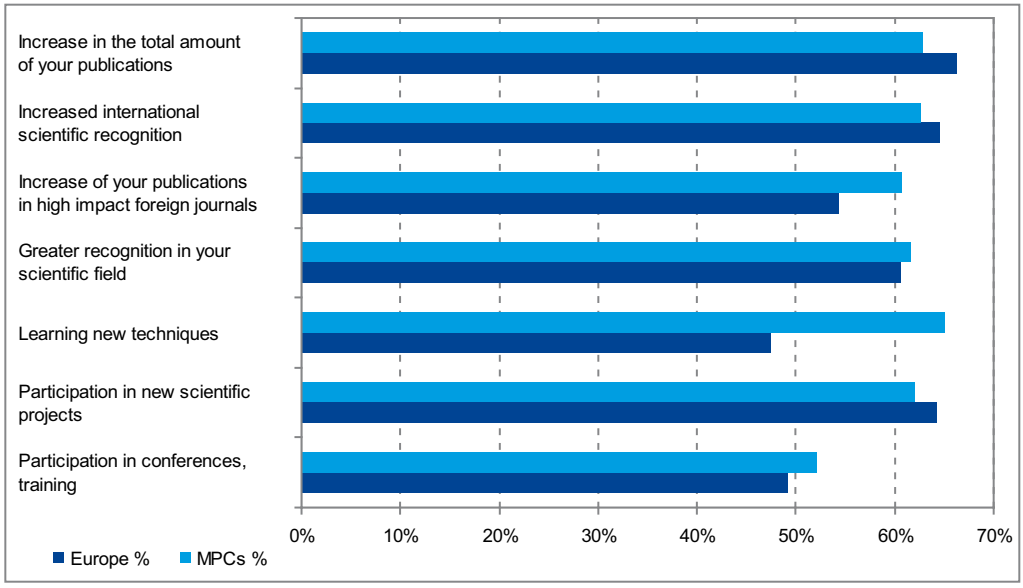


**Figure 13. "Important" and "major" outcomes of collaboration gathering an average of at least 50% of responses.**

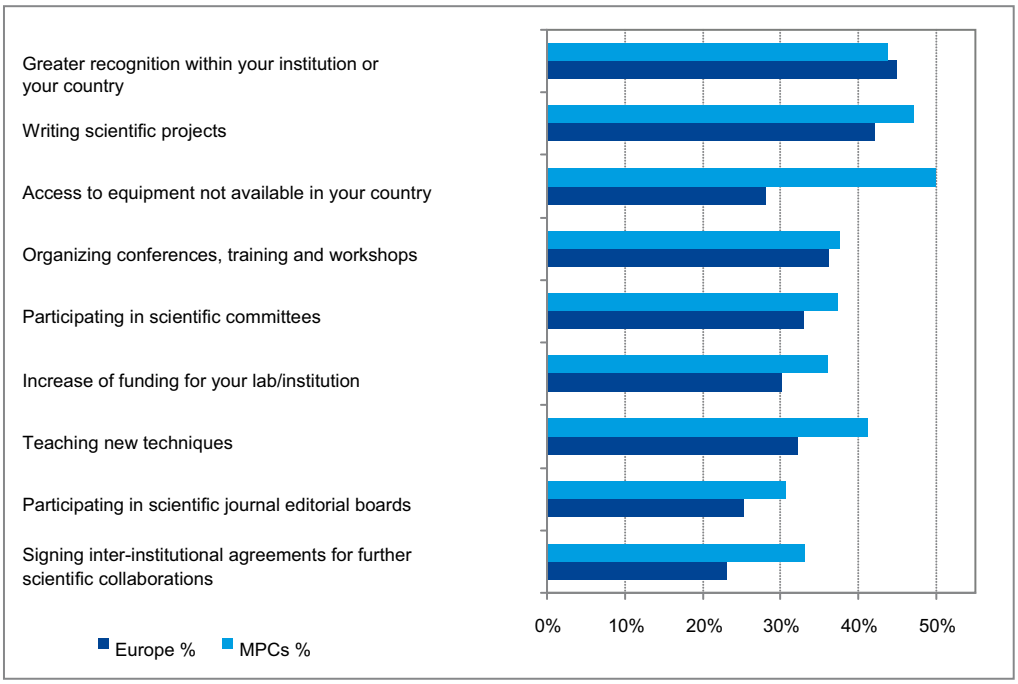


**Figure 14. "Important" and "major" outcomes of collaboration gathering an average of less than 50% of responses.**

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%).

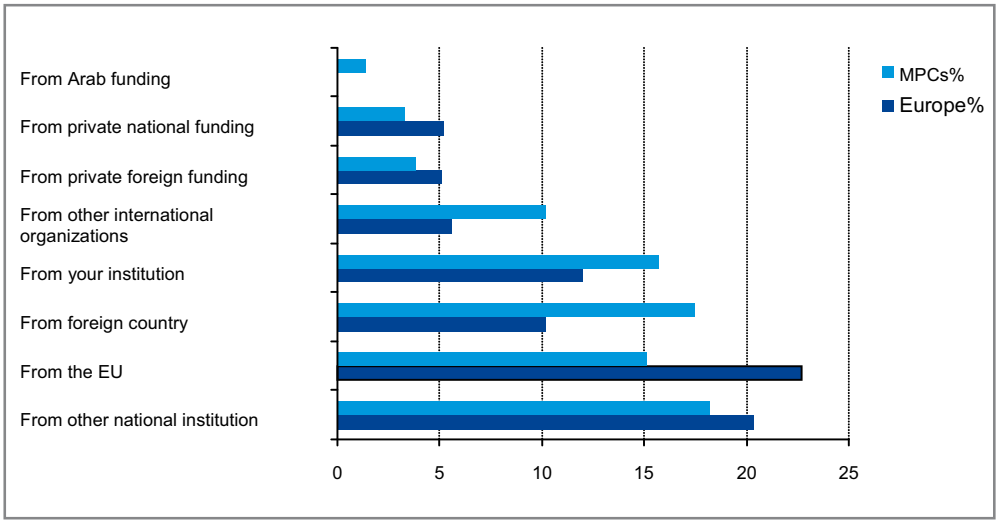


**Figure 15. Origin of increased funding for labs/institutions.**

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.

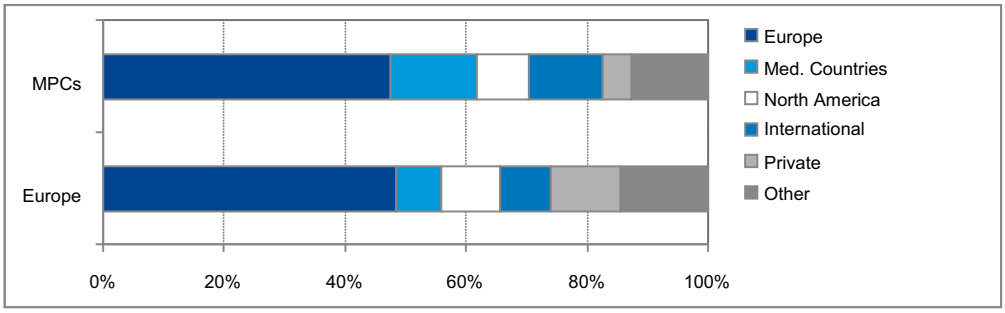


**Figure 16. Geographical distribution of funding agencies.**

## 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).

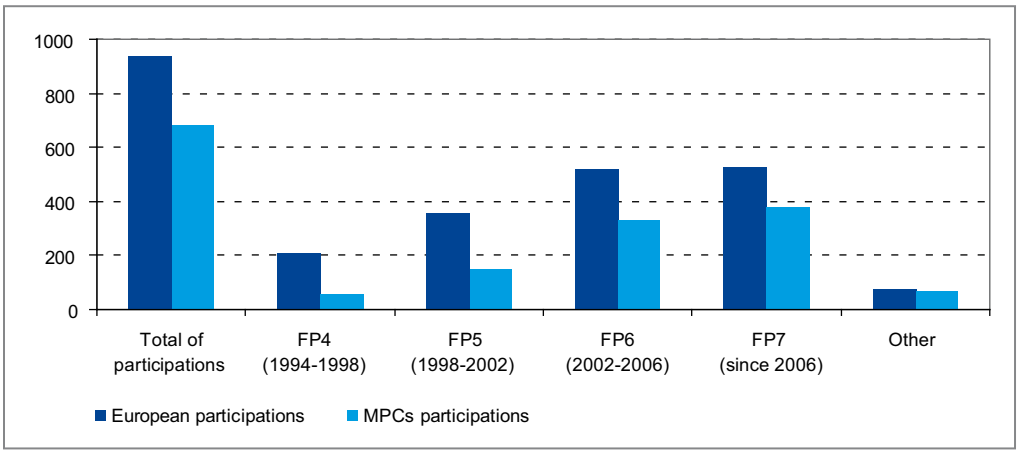


**Figure 17. Participation in different European Frame Programmes.**

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.

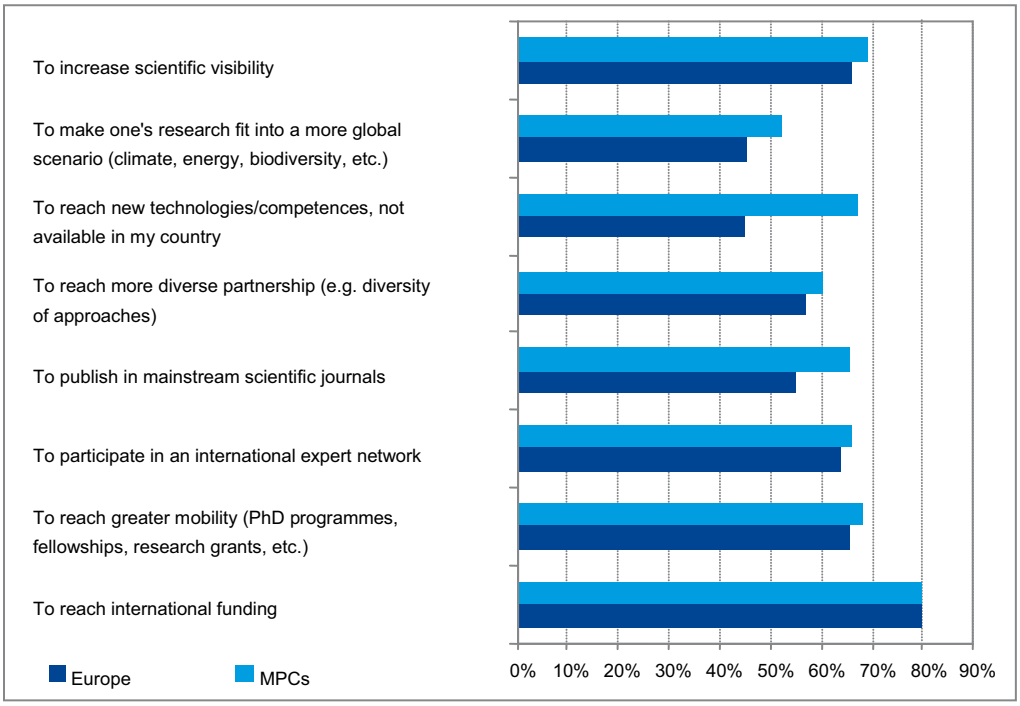


**Figure 18. "Important" and "essential" motivations to participate in international calls for proposals.**

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.

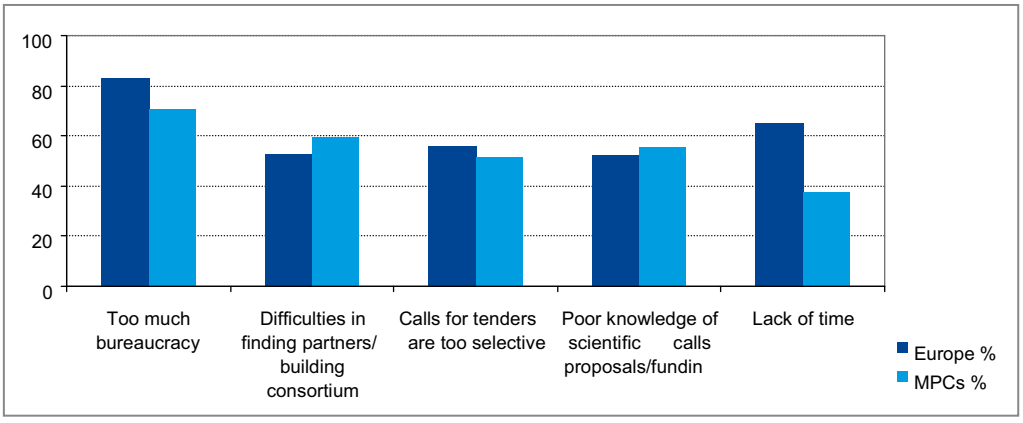


**Figure 19a. Five main "restrictive", "very restrictive" and "crippling" limitations to participate in international calls for proposals.**

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.

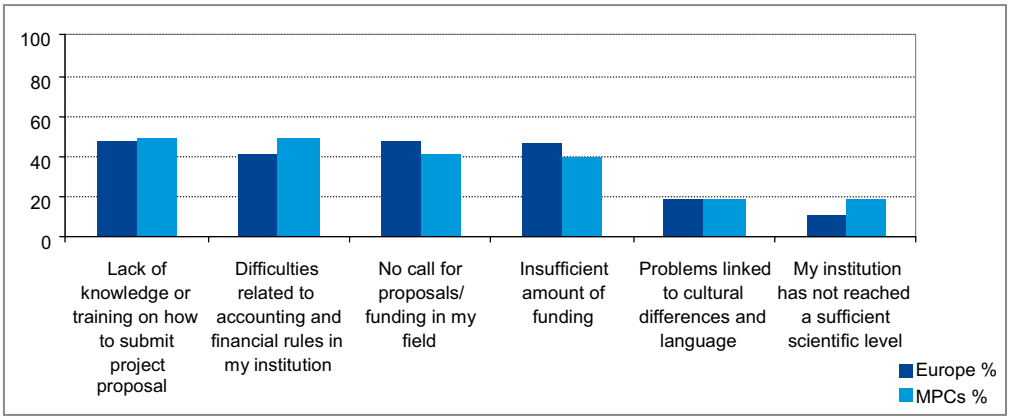


**Figure 19b. The next “restrictive”, “very restrictive” and “crippling” limitations to participate in international calls for proposals.**

### *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.

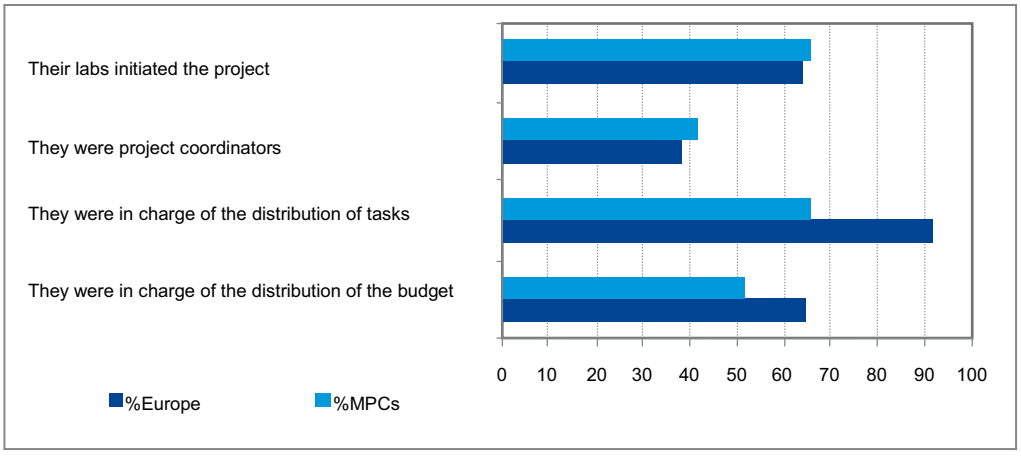


**Figure 20. Respondents’ leading roles in the last project they participated in (alone or with partners).**

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).

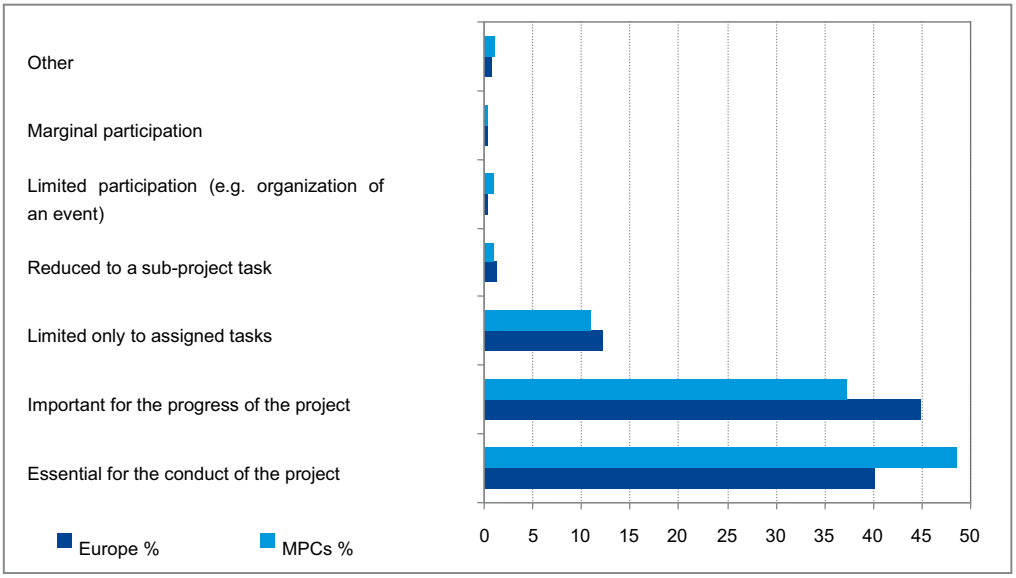


**Figure 21. How do the respondents rate their contribution to the last project.**

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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