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1. Introduction

1.1 Background

The "**Med**iterranean **S**cience, **P**olicy, **R**esearch & **IN**novation **G**ateway" (MEDSPRING) project is a 4 years bi-regional cooperation platform financed by the European Commission (DG Research and Innovation) under the 7th Framework Programme. The project aims at reinforcing the Euro-Mediterranean Cooperation on Research and Innovation in relation to the Barcelona priority areas: water, food, energy, health, transport and marine environment and, in particular, in the field of the three relevant societal challenges of the Mediterranean region: Resource efficiency (particularly Water), High Quality Affordable Food and Energy (particularly renewable energies).

One objective of Medspring is to foster brokerage and venturing for increasing cooperation between EU and MPCs in research, technology and innovation. Brokerage and venturing for innovation aims at bridging the gap between research and innovation through the creation of private-public and research-enterprise partnerships. It also aims at bridging local and regional actors, helping them to join forces and enhance clustering for innovation. The analysis of current clustering activities in the region was carried out to support the brokerage for innovation. The analysis should identify promising cooperation partners among clusters and local technology initiatives in the MPCs. Special attention was given to international linkages. Clusters may spread across administrative borders, on regional as well as on national level. Examples for successful cross-border collaboration can be found in the Baltic Sea Region (e.g. Medicon Valley between Denmark and Sweden).[1]

1.2 Methodology

This report maps and analyses the science and technology (S&T) cluster initiatives in eight Mediterranean Countries, six of the Mediterranean Partner Countries (MPC) (Algeria, Egypt, Jordan, Lebanon, Morocco and Tunisia) as well as Israel and Turkey.[2] Cluster initiatives in the sense of this report are "organised efforts to increase growth and competitiveness of clusters in a region, involving cluster firms, government and the research community".[3] Clusters are characterized by their geographical scope, the involvement of multiple stakeholders (firms, universities, public research institutions and other organisations) and issues of cooperation between the stakeholders on fields such as training, technological development, product design, marketing, export and distribution. For clusters, multiple modes of governance exist, ranging from formal agreements with stable contractual relationships to rather informal networks.[4]

Societal challenges are put in the centre of attention because tackling these challenges requires cross-border collaboration, and clusters can serve this purpose very well. Cluster can lead to accelerated rates of development diffusion of new technologies in the fields of energy, food security or resource efficiency and therefore contribute to solutions for global challenges.[5]

The cluster analysis is based on two different sources: The first source is a database of 88 clusters and local technology initiatives in all MPCs derived by Medspring partner ANIMA Investment Network

[1] Noetzel, R./ Kunze, U./ Ditgens, B. (2013): The Research Driven Cluster Initiative -Challenges and opportunities for cluster approaches in the Mediterranean, in: Moving forward in the Euro-Mediterranean Research and Innovation Partnership- The experience of the MIRA project; Options mediterranés No. 71, p. 229-230.
[2] For Palestine, no data on clusters were available in the ANIMA database.
[3] Sölvell, Ö. / Lindqvist, G./ Ketels, C. (2003): The Cluster Initiative Greenbook, p. 9.
[4] OECD (2014): www.innovationpolicyplatform.org/content/cluster-policies?topic-filters=12067.
[5] OECD (2012): OECD Science, Technology and Industry Outlook 2012, p. 73.

enriched with more data for the analysis. All clusters listed in the database were asked to fill in a questionnaire on the scale and scope of their activities, with special regard to their international activities. To facilitate brokerage activities within Medspring, a section was included in the questionnaire where cluster manager could post possible offers or requests for technology.[6]

Questionnaires could be completed online using DLR's PT-Survey software. The response ratio to the survey was rather low; only 13 questionnaires were received with full answers. From some MPCs no responses were received at all. Responses were obtained from clusters in Lebanon (one cluster), Morocco (four clusters), Tunisia (five clusters), Turkey (two clusters) and Israel.

The analysis will first present finding from the broader database. The second part will focus on responses to the questionnaire, especially aspects of international cooperation and future orientations. Remarks on clusters as promising partners for innovation activities in the MPC will conclude this report.

2. State-of-the-art of current clusters

The general database used for the analysis lists 72 active clusters in six of the seven MPCs, plus Israel and Turkey. In addition 14 clusters are currently under development (see fig. 2 below). Regarding the number of clusters listed for the MPCs, two groups of countries seem visible: The highest number of clusters for the MPCs is listed for Morocco, with Tunisia following very close. Jordan, Lebanon, Algeria and Egypt form the second group, with a number of three to five clusters listed for each country.

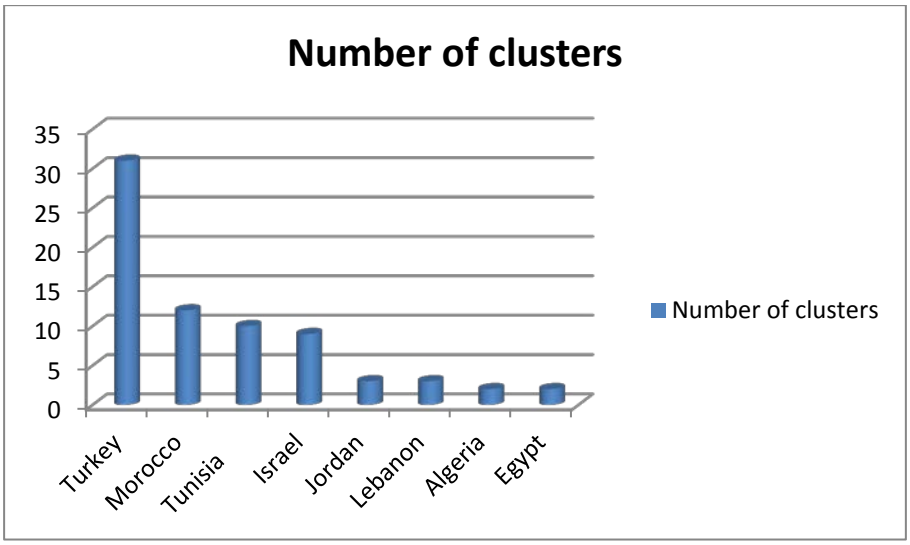

Figure 1: Number of current clusters in the Mediterranean countries

Some clusters already exist since the 1990s, especially in Turkey, Tunisia and Egypt (see figure 3 below). Since the year 2000 the development of clusters accelerated rapidly in all MPCs, with high growth rates in Morocco and Tunisia. Compared to the other MPCs, the development of clusters started rather late in Algeria. Algeria and Egypt report the lowest number of clusters in the dataset, but with differences in the maturity of the clusters, since the development of clusters started some years earlier in Egypt than in Algeria.

[6] The full questionnaire is presented in the annex.

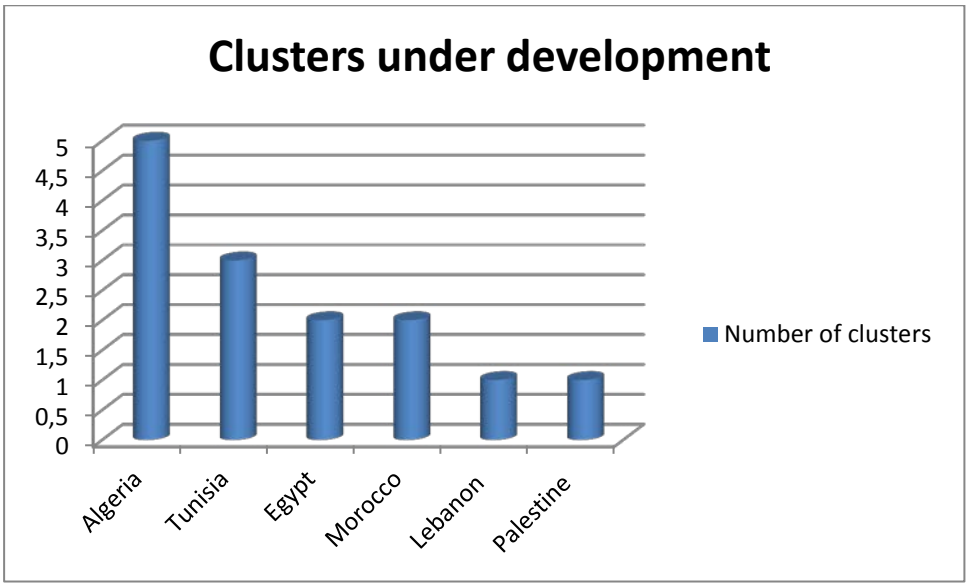

Figure 2: Clusters under development

Apart from the existing clusters, further clusters are under development in the MPCs and are not yet fully operational at the time of writing. Especially Algeria makes large efforts in cluster development with 5 new clusters coming up in the near future. Many institutions from various EU countries support cluster development in MPCs. The French AFD (Agence Francaise de Developpement) for example provides technical assistance on the implementation of a private Sector development cluster programme in Palestine. AFD is active in Tunisia as well, and Germany's GIZ supports the development of a cluster policy in some sectors in Algeria. The European Investment Bank supported some clusters in the Maghreb (specifically in Tunisia).

In Lebanon cluster activities developed following a bottom-up approach with little public involvement but with great international exposure and private initiative. One of the most dynamic clusters with strong international linkages among the MPCs is Berytech, a Lebanese Cluster, 100% private and formed around a private University in Beirut, "Université Saint Joseph".[7] Berytech managed to attract European funds to help develop the Beirut Creative Cluster (the only cluster in the MPCs dedicated to cultural and creative industries.

The EU-Egyptian Innovation Fund operated by the Research, Development and Innovation Programme (RDI) currently published a call for proposals to help form clusters in Egypt in the following sectors: Renewable Energy, Food, Aquatic Resources, Sustainable Tourism, Education and Life-long Learning, Research and Innovation Management.[8]

[7] http://www.berytech.org/.
[8] http://www.rdi.eg.net/InnovationFund/OpenCallForProposals/Pages/default.aspx.

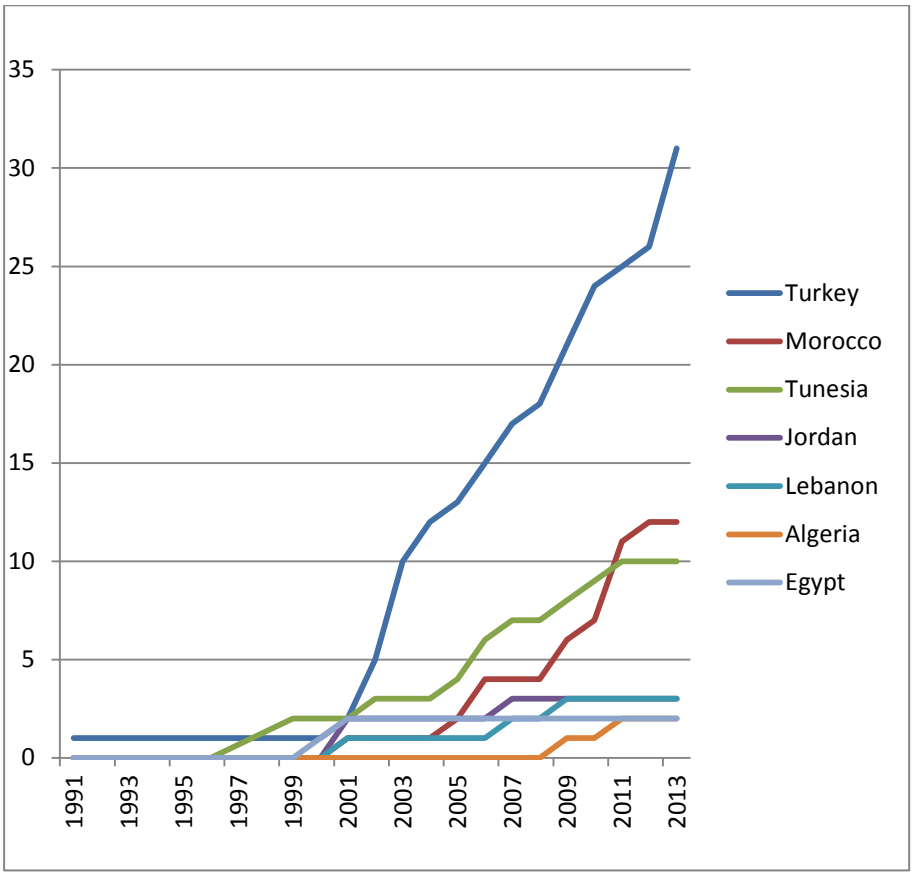

Figure 3: Evolution of clusters in the Mediterranean region (1990 – 2013)

2.1 Thematic fields

The clusters cover a broad variety of topics and technology fields. Most clusters are in the field of ICT, with general electronics & microelectronics and energy & environment following close. The fields targeted by the Mediterranean clusters and local technology initiatives adress the societal challenges targeted by Medspring: Resource efficiency (with clusters in fields like energy/ environment and marine resources), High Quality Affordable Food (clusters in agribusiness) and energy (with clusters in energy/ environment and renewable energies). Areas with a weaker representation are for example Automotive, Textiles and Biotechnology. Fields not covered by the listed clusters are logistics, mining/ resource exploitation and nanontechnology.

The relative strong position of clusters from ICT and energy reflects both local strenghts, but also societal needs for clean and affordable energy.

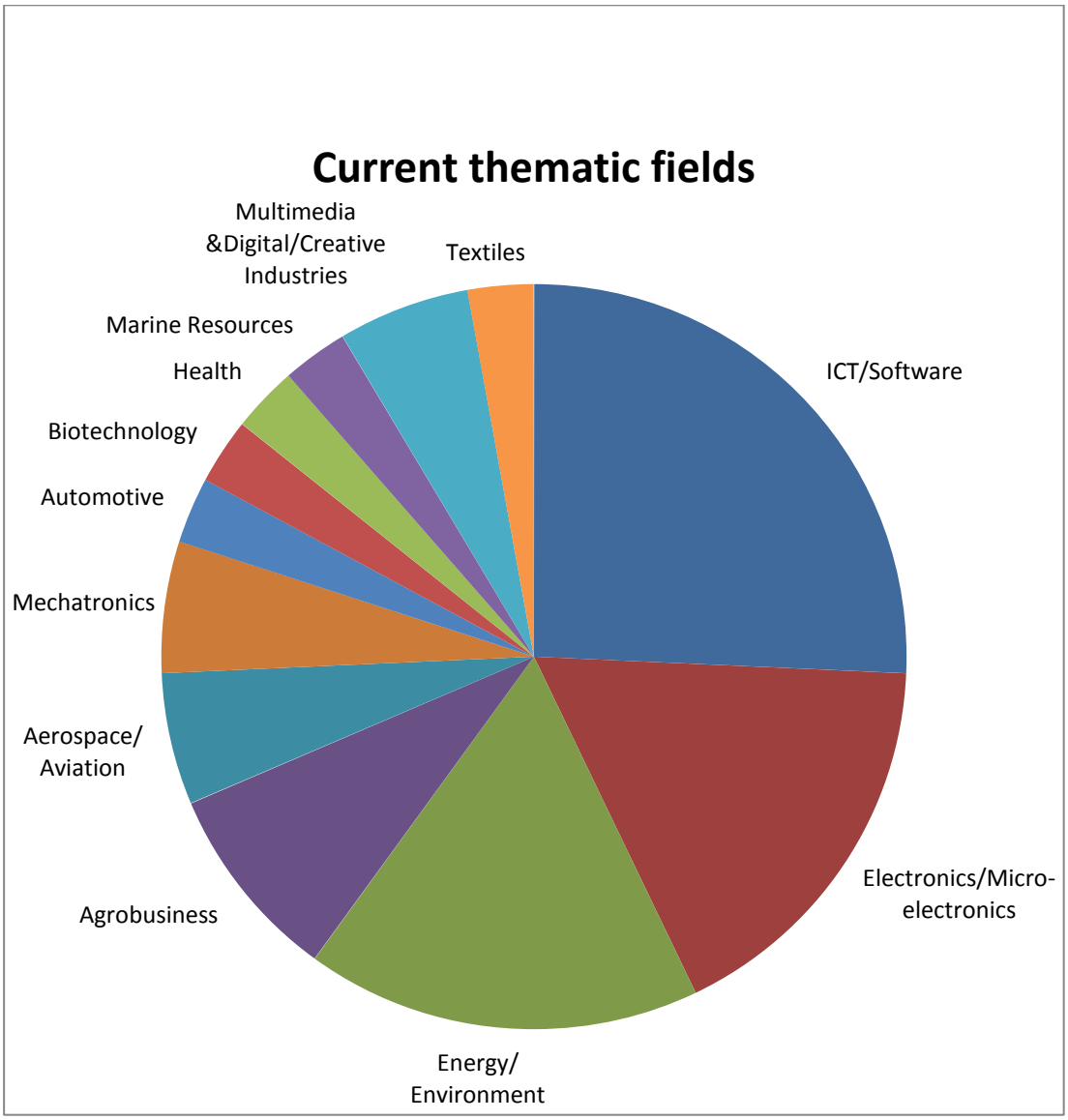

Figure 4: Current thematic orientation of the clusters

2.2 Membership

Membership numbers and structures differ a lot among the regarded clusters. For the thirteen responding clusters, membership numbers vary from seven members up to 222 in one cluster. Looking at the membership structures, many clusters have a large share of small and medium sized companies among their members. Seven of the thirteen clusters have membership of 50% or more SMEs. This is especially the case for clusters with 50 or more total members, which might indicate that the attractiveness of cluster membership grows with the cluster size. If large companies are included, all but two clusters have a dominant share of members from the business sphere among their members. Of the two clusters where universities and research institutions dominate, one is rather small (seven members in total, 1 SME and one large company member), while the other cluster has 90 members, comprising of 25 SMEs anf five large companies.

Some clusters are more driven by their academic member institutions, while others consider business members as the driving forces of cluster development. One cluster counts a national ministry as the

most relevant stakeholder. Four cluster consider specific companies as the main stakeholders, in one case startups were explicitly mentioned. In the other case, one or two university institutes or research institutions are the driving forces of cluster activities.

2.3 Financing of cluster activities

Cluster activities are financed from various sources. Most common is a mixed mode of funding, combining public support and private funding, obtained e.g. via membership fees. Only one cluster is fully public financed, while three clusters do not report any public support. Five are to the most part dependent on public funding, while for one cluster private funds dominate. Three cluster chose the option ”other”, which should also been as indicating mixed modes of financing.

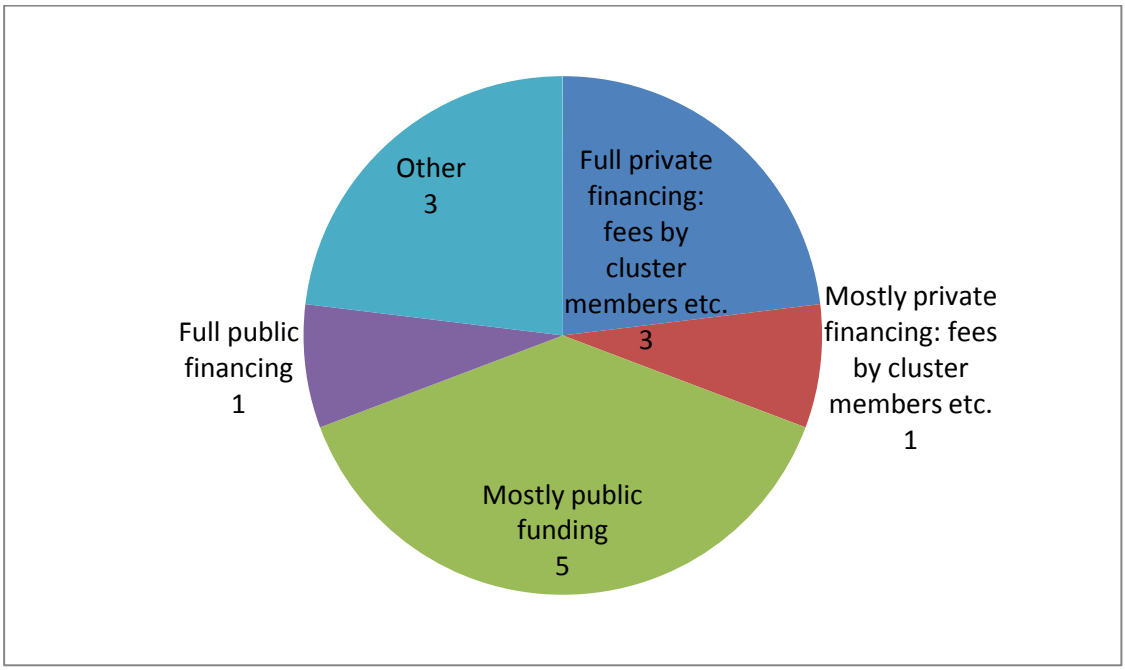

Figure 5: Modes of financing for clusters

2.4 Services provided

Clusters were surveyed about the scope of their activities.[9] The most common activities are events and workshops (mentioned by twelve clusters) and partnering activities (mentioned by eleven clusters). Of lesser importance are public relations and marketing activities as well as the facilitation of infrastructure for cluster members. The monitoring of technological developments also does not matter much, but the information on current market trends is reported as an activity by eleven clusters. The focus on activities that have an internal impact on the networks, like working groups, partnering activities and the initiation of R&D activities against the lesser importance that is given to more externally oriented activities like public relations and internationalisation reflects that the MPC clusters are comparatively young. Strengthening internal ties is more important at their stage of development than building new connections to partners outside of the cluster.

[9] This and the following section relate to the responses to the survey, not the whole database of clusters provided by ANIMA.

Figure 6: Services provided by the various clusters

3. International Linkages

Eight clusters from the MPCs particularly mention support for internationalisation among their scope of services. The support for internationalisation is heterogeneous. Some clusters participate in international exchange networks, mentoring programmes or joint projects with cluster and organisations from abroad. One clusters focusses more on support for internationalisation of their member companies or research institutions. For companies, visiting trade fairs and participating in matchmaking events to find new partners and get market access plays a vital role, while for researcher support is more geared towards possible participation in EU-funded research consortia. Another strand of actitivites comprises partnering with business incubators.

3.1 Internationalisation of clusters

Seven of the 13 responding clusters have a dedicated strategy outlining their internationalisation objectives, instruments and activities. Seven cluster also report existing international linkages, but some cluster with internationalisation strategies do not have established international linkages, while some clusters with international linkages do not report having an internationalisation strategy shows that some linkages just grow without strategic approaches.

The existing linkages refer to exchange on best practices, matchmaking and mutual visits and delegations, but also participating together in calls for proposals and joint training measures.

3.2 Participation in EU Programmes

Of the 13 clusters, eight mention that they have already participated in EU programmes. The one most cited is FP7. One cluster also participated in training measures relarted to the Euroepan Cluster Excellence programme, funded by PRO INNO Europe under the Competitiveness and Innovation Programme (CIP).[10]

3.3 Current Partner Countries

Clusters report existing international linkages with a number of partner countries. Most prominent are European partners from the northern shore of the Mediterranean, namely France, Italy and Spain. But linkages also exist with other European countries like the UK, Switzerland and Belgium. Outside Europe, MPC clusters are connected with partners in the USA, Columbia and the United Arab Emirates and Middle Eastern countries in general. Only one cluster reports existing linkages with partners in other MPCs.

[10] www.cluster-excellence.eu.

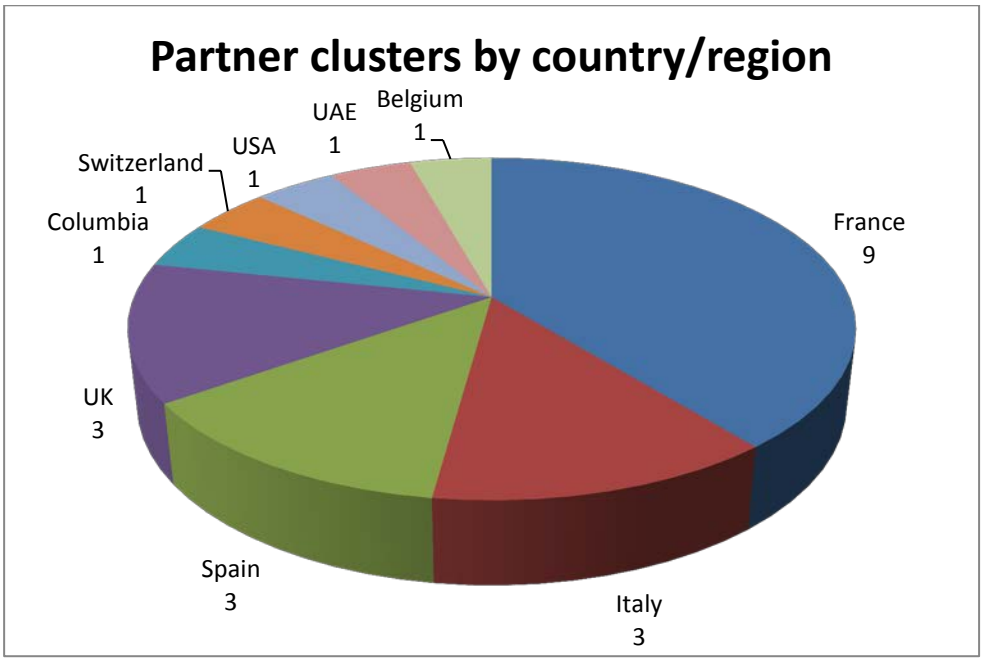

Figure 7: International Cooperation by country/region

4. Future Orientation

Clusters were asked to give an indication of the avenues they want to take on in their future cooperation - both in terms of technology fields and topics as well as regarding international cooperation.

4.1 Future thematic Orientation

The future thematic orientations reflect more or less the existing orientations, indicating that clusters want to further build on existing strengths for cooperation.

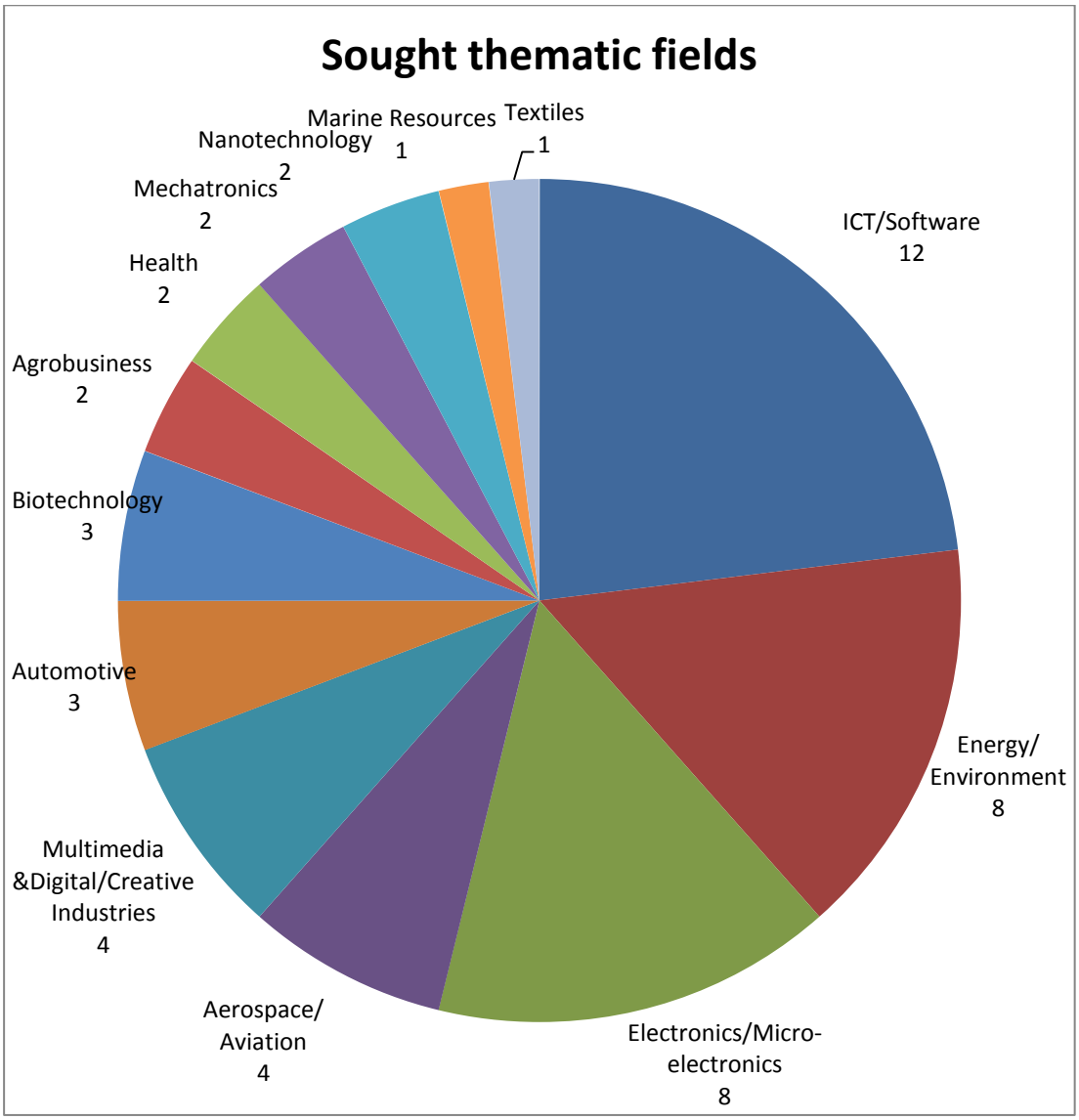

Figure 8: Sought future thematic orientation of the clusters

The sought fields of cooperation lie mostly in the fields of ICT, energy and electronics. Since agrobusiness was also mentioned by some respondents, the fields most interesting for Medspring are adressed. MOBILISE, the BILAT project targeting cooperation between Morocco and the EU, has asked European clusters for their fields of preference in cooperation with Morocco. The three most mentioned fields were agriculture, renewable energies and ICT/ manufacturing. This shows that technologies sought by European as well as MPC clusters are going in the same direction.[11]

[11] MOBILISE (2013): Catalogue of European clusters, p. 2.

4.2 Sought Partner Countries

The countries which cluster consider the most desirable partner countries for future cooperation do not differ much from the ones where linkages are already established, with France, Italy, Switzerland, the USA and Spain being mentioned as attractive future partner. Germany and Europe in general are added to this list. New to the list is the wish of many clusters to establish new links with partners in Africa, Central Asia and the Mediterranean Region. This newly sought cooperation partners might reflect the changing R&D landscape, with new countries emerging as important actors.

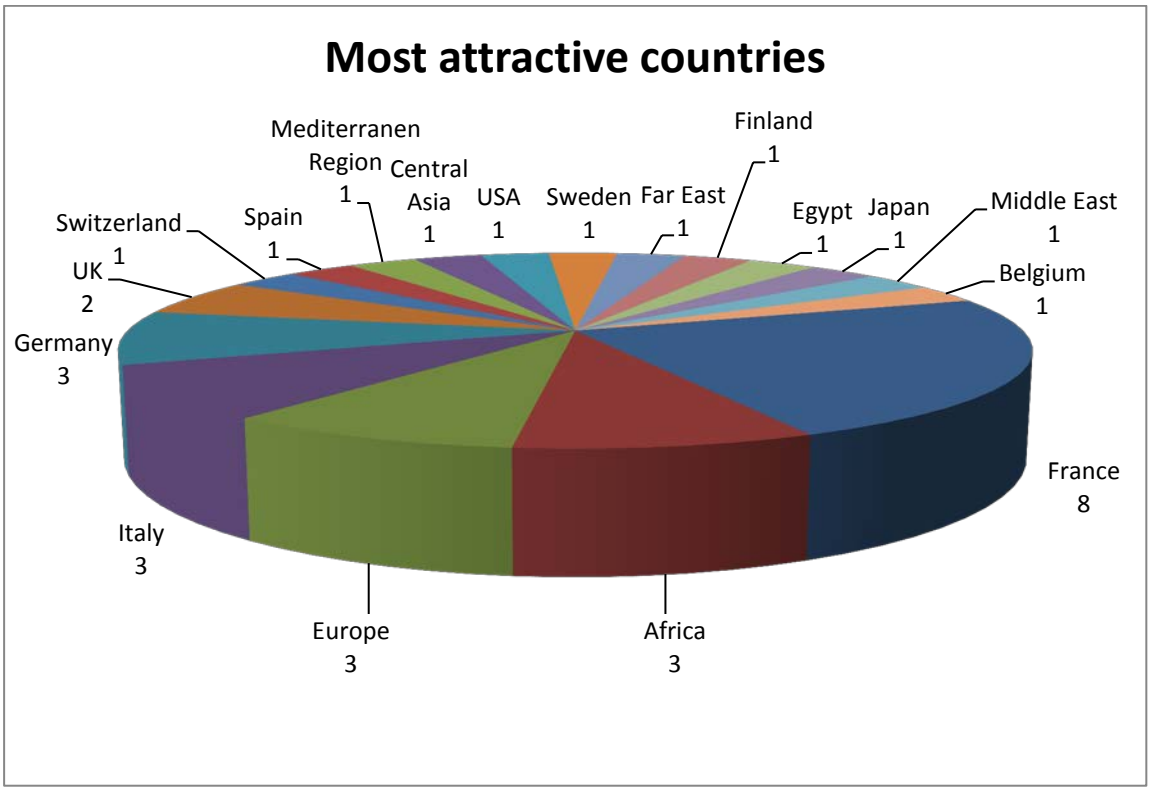

Figure 9: Desired international cooperation by country/region

4.3 Sought cooperation activities

The clusters were requested to identify and prioritize future activities for cross-border cooperation. The following activities were mentioned by various clusters:

- to promote innovation
- joint R&D projects
- Exchange of information/Know-how
- Technology transfer
- Networking activities

These activities basically correspond to existing linkages described under section 3.1 and therefore indicate a consistent orientation in terms of the cluster's aims and tools.

5. Conclusions and recommendations

The concept of cluster policy is still relatively new to some of the MPCs, but is spreading fast, as is illustrated by the accelerated development of cluster initiatives in recent years. The short analysis carried out for this report shows that the potential for successful cluster initiatives is present in all MPCs. The different MPCs show a large heterogeneity in their cluster landscapes, depending on the maturity of the concept as well as general economic conditions. Turkey, Morocco and Tunisia are represented by the largest number of clusters in the sample, followed by the other MPCs and Israel. Some MPCs, e.g. Egypt, Jordan, Tunisia and Morocco, apply parts of the cluster concept in their research and innovation policies.[12] Morocco for example launched an ambitious cluster policy based on the French model of "poles de compétitivité" in 2010; collaborative R&D projects are funded and financial support for governance structures of cluster is provided.[13]

Only one out of the thirteen responding clusters relies solely on public funding; the fact that the others finance their activities to a more or less large extent by membership fees and other non-public funds shows that companies and institutions are aware of the added-value of a cluster membership and are willing to pay for it. [14] Strengthening cluster initiatives can be beneficial for innovation and economic development in two ways: First of all, participation of a company in a cluster increases the possibility of this company becoming more innovative. Secondly, companies in a cluster are more open for R&D collaboration than other companies.[15] This collaboration generates a collective pool of knowledge, resulting in increased speed of technology transfer, broadened access to new knowledge in general. On firm level, this increases productivity and competiveness. In this way, clusters can be beneficial for economic development and job creation.[16]

The responding clusters express a high interest in international cooperation. Eight of the thirteen clusters support their members in their internationalization activities, and seven clusters also mention having a dedicated strategy for internationalization. Eight clusters have already participated in EU-funded programs, most notably FP7 and Pro Inno. Linkages exist mostly with European partners, especially to France, Italy and Spain. These countries, together with Germany, Switzerland and the UK, are also among the ones where future cooperation is most sought for. Only rarely are the MPC clusters connected with cluster initiatives in other MPCs.

Depending on the degree of maturity of the MPC clusters, it might still be necessary to develop and strengthen their own strengths and build up relationships among cluster members. Building international linkages might be a step forward to make use of their innovation potential. Fostering cross-border cooperation between clusters in the MPCs seems to be a good way in this regard and could complement the existing and desired linkages with partners outside the region. Active and successfully operating cluster are attractive cooperation partners, especially with regard to societal

[12] Noetzel, R./ Kunze, U./ Ditgens, B. (2013): The Research Driven Cluster Initiative -Challenges and opportunities for cluster approaches in the Mediterranean, in: Moving forward in the Euro-Mediterranean Research and Innovation Partnership- The experience of the MIRA project; Options mediterranés No. 71, p. 230.
[13] Minutes to the Euromed Workshop on innovation policy instruments: Support for Euro-Mediterranean industrial cooperation regarding Dimension 6 of the Euro-Mediterranean Charter for Enterprise : Innovative Firm; Milan, October 24-26 2011.
[14] In some MPCs, cluster initiatives receive funding from foreign donors in the form of development assistance. This is for example the case in Tunisia, where some local cluster initiatives are supported by Germany's Gesellschaft für Internationale Zusammenarbeit (GIZ).
[15] Thomas A. Christensen/ Thomas Lämmer-Gamp/ Gerd Meier zu Köcker (2012): Let's make a perfect cluster policy and cluster programme, Copenhagen/ Berlin; p. 12.
[16] OECD (2013): Innovation-driven growth in regions: The role of smart specialisation; p. 21.

challenges affecting countries worldwide such as energy, food security and scarcity of resources, which are targeted by Medspring. Single companies alone cannot bear the investment necessary in R&D for these efforts. Clusters can play a large role since they bring together partners from the whole innovation chain, ranging from fundamental research to the market. Therefore a major challenge for the future is to foster cooperation between actors that would be competitors otherwise in order to gain the critical mass needed for addressing these social challenges.[17] Lack of trust between cooperation can suppress the full use of the innovation potential.[18]

Against the findings of the survey the following recommendations can be formulated:[19]

1. Further investigation is necessary regarding the technological potential of clusters in the MENA region, their structural set-up and their positioning within the respective National Innovation System. In this respect workshops with stakeholders in the MENA region could be implemented.

2. Excellence of cluster managements should be supported by measures for capacity building and training – for example in view of gaining strategic intelligence through roadmapping exercises – should be identified through cluster missions and trainings.

3. Networking and matchmaking of clusters from the MENA region with EU clusters should be designed and implemented. Especially Turkey, Morocco, and Tunisia have made good progress in the past decade in terms of cluster policies, and thus they have good potential for cooperation with clusters in the EU. International cooperation by clusters could foster the international linkages of companies in the MPCs, especially with regard to SMEs. Existing collaborations should be intensified in order to better benefit from gained knowledge and experience. From the policy side, emphasis should be put on good practices from effective initiatives in the design and implementation of cluster policies.

4. Networking and exchange with similar initiatives and actions in the region, for example the BILAT projects with Morocco, Algeria and Jordan and the new BILAT projects with Tunisia and Egypt or the Euro-Med Charter for SMEs (DG ENTR) should be initiated. This will raise awareness and strengthen the visibility of EU initiatives in the Mediterranean region.

5. Within the MPCs, inter-ministerial coordination could be enhanced to adopt a holistic approach to innovation policy including, which should combined cluster policies with policies aimed at skills, access to finance and marketing as well as regional policies.

[17] EUREKA (2013). EUREKA Cluster Report 2012, p. 14.
[18] Lysann Müller/ Nadine May/ Gerd Meier zu Köcker/ Zied Kbaier/ Mohamed Kefi (2013): Indicator based analysis of National Innovation Systems: Tunisia - Summarising report on the determinants of the Tunisian innovation system with special focus on the sectors “water” and “energy”; Report commissioned by the International Bureau of the BMBF for the German Federal Ministry of Education and Research, p. 26.
[19] These recommendations partly refer to discussions during the Euromed Workshop on innovation policy instruments in Milan, October 24-26 2011.

ANNEX

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2. Questionnaire for Cluster Managers

1. Core Data of the cluster

- Name _____

- Country
  - Algeria
  - Egypt
  - Israel
  - Jordan
  - Lebanon
  - Morocco
  - Palestine
  - Tunisia
  - Turkey
  - Other:_____

- Territory/ geographical area covered (e.g. city, provinces) _____

- Thematic or industrial focus/ main sector
  Checkboxes (multiple answers possible)

  - Aerospace/ Aviation
  - Agrobusiness
  - Automotive
  - Biotechnology
  - Creative Industries
  - Electronics
  - Electronics
  - Energy/ Environment
  - Health
  - ICT
  - Logistics
  - Marine Resources
  - Mechatronics (mechanical and electrical engineering industries)
  - Microelectronics
  - Mining industry/ resource exploration
  - Multimedia &Digital
  - Multiple Sectors
  - Nanotechnology
  - Renewable energy
  - Software
  - Textiles
  - Other: Please specify _____

- Number of members ___

- No. of SMEs ____
- No. of larger enterprises
- No. of higher education institutions ____
- No. of public research institutes _____

- Most relevant stakeholders (universities, companies,…) _____

- Financing of cluster activities
  Checkboxes:

  - Full public financing
  - Mostly public funding
  - Mostly private financing: fees by cluster members etc.
  - Full private financing: fees by cluster members etc.

2. Cluster activities

- What kind of services do you offer for your cluster members?
  Checkboxes:

  - Events, workshops, conferences
  - Working groups
  - Facilitation of infrastructure for members
  - Dissemination of information on markets and trends
  - Monitoring of recent technological developments
  - Support for Start-ups (Consulting, mentoring)
  - Public relation activities
  - Concepts and activities for partnering between universities, research institutions and companies within and outside of the cluster
  - Initiating R&D projects (with and without funding)
  - Supporting members in their internationalisation activities
    - If yes: Please specify the internationalisation activities.
  - Other: please specify ___

3. International linkages

Does your cluster have an internationalisation strategy?

- Yes
- No

- Do you already have existing international linkages to other clusters?
  - Yes
  - no
    - If yes: please specify (type of activity, partners) ___
- Do you have ongoing cooperation activities with international clusters or other partners?
  - Yes
  - No

  - If yes: Please name country/ region and kind of cooperation:
    - Exchange of information
    - Mutual visits/ delegations
    - Joint R&D activities
    - Other: Please specify
- Do you participate in European or international cluster networks (e.g. programmes financed by the EU)?
  - Yes
  - No
    - If yes: please specify
- What are the most attractive countries or regions for international activities of your cluster and the cluster members? Please give reasons!
  1. Reasons:

  2. Reasons:

  3. Reasons:

4. Technology offers and requests

In the frame of Med Spring, brokerage events to foster cooperation between innovative partners in the Mediterranean region are planned for the first half of 2014. The events will bring together partners from academia and business and also potential investors. In case partners from your cluster want to participate in the events, we would like to ask you to state offers or requests for technologies or services, where your cluster members are either looking for potential cooperation partners or for investors for their technologies and services.

Type:

Checkbox

- Offer
- Request
- Offer/ request

- Title: Please describe your cooperation wish in one sentence:
  _____

- Field of technology:
  - Aerospace/ Aviation
  - Agrobusiness
  - Automotive
  - Biotechnology
  - Creative Industries
  - Electronics
  - Electronics
  - Energy/ Environment
  - Health
  - ICT

- Logistics
- Marine Resources
- Mechatronics (mechanical and electrical engineering industries)
- Microelectronics
- Mining industry/ resource exploration
- Multimedia &Digital
- Multiple Sectors
- Nanotechnology
- Renewable energy
- Software
- Textiles
- Other: Please specify _____

- Short description of co-operation project or technology
  - Type of activity _____
  - Type of partner _____

- Co-operation sought Offered/ Requested
  - R&D
  - Technical co-operation
  - Investment/Financing
  - Production agreement
  - Joint Venture Agreement
  - Commercial Agreement