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Abstract

This deliverable could be ideally divided into 3 parts:

In the first, it provides an extensive theoretical framework on the main theories related to the innovation environment by analyzing the Regional Innovation System, the open innovation concept and the quadruple and quintuple helix model, the cluster and meta-cluster theories etc. In the second part, it exploits the work carried on in the previous deliverables (d1.1 and d 1.3) by analyzing more in deep the activities and modus operandi of European innovation agencies and by identifying some success cases and the characteristic elements encompass in those success cases.

Finally, starting from the analysis of the modus operandi and from the experience of the InnoMedia partners, a wider model of innovation agency is proposed.

The work is concluded with some suggestions on possible acceleration programmes to be developed by the innovation agencies in order to stimulate the reinforcement of a SMEs ecosystem.

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Content

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1 The regional innovation system and the innovation agencies

1.1 Introduction

Regional Innovation System (RIS) could be defined as "*…a network of institutions in public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies*"[1], and where "*…actors produce pervasive and systemic effects that encourage firms within the region to develop specific forms of capital that are derived from social relations, norms, values and interaction within the community in order to reinforce regional innovative capability and competitiveness*[2]".

The development of an innovation system depends on different components /organizations/institutions. To have a perfect mechanism it is crucial that all the parts of the system are working in synergy:

- ***policymakers*** - those set the framework conditions on which innovation is able to develop;
- ***innovation supporters*** - those support research and development activities;
- ***innovation producers*** - those build and sell.

Moreover, it is necessary that all the above actors cooperate, communicate each other, create innovative ideas, exchange and transfer knowledge, and support dissemination and market diffusion of new products and services.

Within the category of **policymakers**, it is probably to find **Government** at all level (local, regional, national and international, including **public authorities**. As far as **innovation supporters** are concerned, we find in this category **technology parks, incubators and accelerators, HEI and research institutions** as well. Finally, **SMEs and Industries are innovation producers**, with the inimitable ability to diffuse products in the market.

1 OECD, 1997
2 Gertler, 2003.

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According to the previous description, the actors involved in the RIS are in charge to generate *an action-packed initiative for an innovation-friendly environment*[3]. To contribute to this, in 2000 the European summit in Lisbon, has defined "the support for innovation" as the cornerstone for promoting the economic growth of the member states. On the track of the Lisbon's strategy in March 2010, the EU's Europe 2020 strategy for smart, sustainable and inclusive growth was launched by the European Commission and it was approved by the Heads of States and Governments of EU countries in June 2010. There is a strong link between the concept of innovation and the role of the entrepreneur, with its structures firms, as trade unions, family farms, cooperatives, firms, industries, and Innovation system (university vocational training centers, Centers of Research and Development)[4]. A tool able to motivate innovation transfer from the knowledge creator to the knowledge adopters is given by the science parks, incubators, and innovation agencies. From the rich analysis, it emerges that science and technology parks can be considered as an ideal tool to create interaction between academic and economic reality. In this sense, **innovation policies** create suitable conditions *to support the capabilities of public authorities, innovation agencies and industry of working in synergies.* Evolution of this approach, take into consideration other two important aspects: civil society and environmental system. Nowadays, it is unimaginable talking about innovation policies without considering the involvement of civil society - where the policies have an impact – and the environmental ecosystem - where university, public authorities, and industries are embedded. For this reason, the "Helixes Approach" could be one optional model to encourage the above-mentioned actors to cooperate in view of developing policies and of contributing to the transformation of knowledge into new products and services, innovative and attractive for the market.

3 European Commission, *L'unione dell'innovazione*; Lussemburgo, 2013.
4 Agrawal A., Cockburn I., 2002; Autant Bernard C., 2001; Blomstrom M., Sjoholom F., 1998, AA.VV.

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1.2. Innovation vision of RIS: Quintuple Helix approach as scheme - model

For several years, the evolution and the integration between research institutions - university, public authorities and enterprises had been studied by numerous scholars. "The university and public research had to take on a progressive reduction of public funding because central and local governments were pressed by a number of social and economic questions that require selecting the resources available for research...The Triple Helix approach was the solution to closing these apparently separated word. The Triple Helix aim was fostered an innovative environment where all of them would have had cooperate together"[5]. The evolution of this model has been becoming the four helixes and then five. According to Carayannis and Campbell[6] the following attributes and components define the fourth helix in the Quadruple Helix: 'media-based and culture-based public,' 'civil society,' and 'arts, artistic research, and arts-based innovation'. By this, the fourth helix in the Quadruple Helix model represents the perspective of the 'dimension of democracy' or the 'context of democracy' for knowledge, knowledge production, and innovation[7]. Consequently, the degree of dissemination and sharing of knowledge developed and acquired by the Quintuple Helix can range from the use restricted to the widespread. Nowadays, new regionally based strategy building processes emerge. Governance, industry, university, social and natural environment are stimulating regional innovation and strengthening the smart regional system[8]. In final analysis, Quintuple Helix, combines knowledge, know-how, and the natural-environment-system together into one holistic framework[9]. The Quintuple helix would be an optimum model to apply in Regional Innovation System.

5 L. Leysdorff., the Triple Helix of university-industry-government-relations, February, 2012.
6 Carayannis and Campbell (2014). Developed democracies versus emerging autocracies: arts, democracy, and innovation in Quadruple Helix innovation systems. Journal of Innovation and Entrepreneurship 2014
7 ibid.
8 Carayannis and Campbell, DFJ(2010). Triple Helix, Quadruple Helix and Quintuple Helix and how do knowledge, innovation and the environment relate to each other? A proposed framework for a trans-disciplinary analysis of sustainable development and social ecology. International Journal of Social Ecology and Sustainable Development, 1(1), 41–6924 25
9 Carayannis, Thorsten and Campbell (2012). The Quintuple Helix innovation model: global warming as a challenge and driver for innovation. Journal of Innovation and Entrepreneurship, 1(1), 1–12.

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1.3. Regional Innovation System (RIS): the reference framework for Innovation

Regional Innovation Systems (RIS) approach has had considerable attention from innovation scholars, and policymakers. Since 1997, the OECD[10] has recognized innovation and technological development as result of complex set of relationships between enterprises, universities, research institutions and public authorities. According to several studies, it is significant promoting cooperation among these innovative actors that have good reasons to interact and create concrete occasion of networking and consolidate permanent relations. A well-functioning of collaboration among wider business community, governance structures and environmental system influences the country's economy in a positive way. Regional scale and regional resources can stimulate innovation capability and competitiveness of firms. Therefore, it is claimed that firms with specific competencies and learning process can lead to regional competitive advantages, if they are based on localized capabilities such as specialized resources, skills and share common social and cultural values. Innovation is stimulated and influenced by many actors and factors, both internal and external to the firm. In this sense, ***regional innovation systems*** (RIS) developing specific targeted policy measures dedicated to improve capabilities and performance in local firms and their business environment[11]. The main role for innovation policy, which aims to increase the capacity of a region and the capabilities of its SMEs to innovate, is to foster interactive learning within the firms and within the regions. The RIS approach has essentially informed policy and has been widely used as a framework for the design and implementation of regional innovation strategies in many areas of the world. Its appeal relies on the provision of a strong basis for customized, broad-based innovation system policies[12].

The RIS policies are sensitive to the specific preconditions, capabilities, and challenges of specific territory or region. Usually, the innovation makers investigate on RIS with the object of identifying system failures or deficiencies. The shortcomings of the analysis are useful to

10 OECD, 1997
11 Asheim, B. and M. Gertler., (2004) *Understanding regional innovation systems* in Jan Fagerberg, David Mowery and Richard Nelson Handbook of Innovation, Oxford: Oxford University Press.
12 Asheim B., Grillitsch M., Tripp M., (2015) *Regional Innovation Systems: Past - Presence - Future* in Papers in Innovation Studies Paper no. 2015/36, Regional Circle Lud University

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understand the problem of the areas, the gaps, barriers to the cooperation among the enterprises, universities, research institutions and public authorities. This help to provide the foundation for formulating innovation policies, that is a cornerstone of the new smart specialization approach advocated by the European Commission.

In total alignment with this approach, the innovation agencies could pick up the challenge of better understanding the state of the art for the RIS - by *taking some cases studies for example* - and analyzing the implication for regional innovation policy. It would be interesting to assess, for instance:

- how actors constellations are formed or where are they formed;
- how these actors' constellations create new knowledge, new guideline;
- how these guidelines are working within a strategic vision in the context for solving societal challenges.

These and other questions should be treated to make new strategic policies and programmes for SMEs. Regarding this point, in order to set up innovation policies, it is necessary keeping in mind that each type of firms has different support needs and different geographical scopes for their production networks and for their links with the innovation support system. Firms operating on an international scale will simply find access to R&D on the national or even international level. A closer look at the character of the innovation needs and competitive challenges at the company level, combined with the geographical scope of the clusters in the region, provides arguments about what regional authorities should offer themselves, and what could be done in cooperation with other regions or be left to the market or some higher authority or other actors involved. In addition, cross-border regional cooperation could be a good option for those regions where firms are closely interlinked with suppliers or customers just outside the country's borders.

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Finally, According to Cook and Memedovic - in the study edited by UNIDO[13] - significant dimensions of a regionalized innovation system are:

1) the processes and policies supporting education and knowledge transfer;
2) the arrangements for the governance of innovation;
3) the level of investment, especially in R&D;
4) the type of firms and their degree of linkage and communication, in terms of networking, subcontracting; presence or absence of supply chains and degree of co-makership between customers and suppliers.

1.4. Cluster area and role of innovation agencies

The interactions and cooperation among actors of the Quadruple and Quintuple Helix environment and involved in RIS lay the foundation for creating a new *clusters conception.* Clusters are: "*geographic concentrations of interconnected companies, specialized suppliers, service providers, and associated institutions in a particular field that are present in a nation or region*" (M. Delgado, M.E. Porter, S. Stern). According to Porter, clusters increasing the productivity when can compete with other companies. In addition, the development and upgrading of clusters is part of the government's agenda, companies, and other institutions like ***Innovation agencies.*** Cluster development initiatives and the role of the RIS are important in different fields: reducing the costs of doing business, building on earlier efforts in macroeconomic stabilization, privatization, market opening, and contributing to the creation of innovation policies. In this sense, the best practice - that experts have already studied - is the case of the Silicon Valley in the United States. In this context, a regional governance exists, and it is a key source of policies creations[14].

2. A step back: from the desk to the field

13 Ibidem
14 Cook P., Memedovic O., (2003) Strategies for Regional Innovation System: learning transfer and applications, Edited by United Nations Industrial Development (UNIDO) – economy, environment., employment - Vienna.

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The deliverable D.1.1 Innovation policies/programmes review and benchmarking has analyzed several innovation programmes implemented by the EC and by local and regional development agencies. As pointed out in the deliverable, a factor shared by all the programs in question is the presence of an industrial system formed by over 96% by SMEs, which generally do not have an autonomous capacity of innovation or even less of technological innovation resulting from industrial research.

Therefore, all programs considered pursue the common objective not only to stimulate but also and above all to support innovation processes in SMEs, starting from the assumption that SMEs need specific expertise and human and financial resources from outside. As a result, the implementation of all the concerned programs is entrusted to a regional innovation agency or to a similar organization duly recognized by the regional government, which in turn interacts with SMEs either directly or by mobilizing appropriate external resources.

Some interesting elements that characterized those innovation support programmes have been:

- the creation of competence centers specialized in different industrial sectors
- the continuous pro-activity approach to bridging research and industry
- the several alternatives to address technology-intensive knowledge exploitation
- the straight contact with clients and extensive support provided throughout the entire programme flow with dedicated resources
- the implementation of a funding mechanism for SME

A further feature that explains the successful implementation of certain programs consists in:

- involvement in the program of the regional innovation stakeholders.

The engagement of the innovation stakeholders is a key factor in the success of an innovation support program, in particular when carried out during the planning phase by the

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regional authority. In fact, the regional authority makes use of contributions from business associations, chambers of commerce, science and technology organizations and, of course, SME innovation agencies, in order to plan measures that can affect any type of SMEs of any industrial sector and to promote and support any form of innovation (product, process, organizational, technological innovation).

We have also identified 2 different methods to support SME innovation:

- the first consists of programming calls by the regional authority directly addressed to SMEs in order to financially stimulate and facilitate the design and implementation of innovation projects by the company. In this case, the innovation agency is mostly called upon to play a supporting role for the company that is primarily promotional and informative about the terms of the call for applications, while the company has the burden of the innovation project design and implementation, inclusive of possible activation of specialized partnerships;
- the second consists in planning the creation of highly specialized consultancy structures/intermediate vehicle at the service of enterprises and in financing them to support SMEs entirely in any issue about the design and implementation of innovation projects. In this case, the innovation agency is called upon to play a proactive role till arriving to create centers of competence, also equipped with technical resources, that are able to manage innovation directly and to bring innovation to market with a minimum burden on the company.

The main outcomes of this work are synthesized in the following table:

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	SISTER	Innovation Network	SMED	Start-up Entrepreneurs	FIWARE Accelerate
Main scope	***Reserch valorization***	***Liaise with industry***	***Support SME***	***Support SME***	***Support SME and ecosystem set up***
Services	scouting of promising research outcomes	setting up a network of competence centres	to support enterprises in developing innovative product ideas	consulting services	technical coaching
	assessment of their industrial application potential	technology-intensive knowledge transfer	to enable ideas to lead enterprises towards the development of new profitable products	machinery	commercial and business coaching
	exploitation of research outcomes	technology audit	to increase the ability of SMEs to develop innovative business.	office equipment	funds for development and investment (saftware, machinery, promotional activities)
	market analysis	feasibility studies			networking and internationalization occasion and funds
	protection of IPR	multi-sector studies			access to venture capitalist and business angels
	technology-intensive knowledge transfer from research organizations to SMEs and/or spin-offs.	validation of business ideas			
		market analysis			
		design and management of R&TD and industrial innovation projects			
Soft competence	Valorization experts	Brokers	contact point		technical and commercial coach
Success factors	*proactive approach pursued by the Liaison office*	*creation of an Innovation Network composed of Competence Centers for different industrial production sectors*	*involving in the programme the representatives of the main regional innovation players*	*tailor-made approach provided for different kinds of start-up entrepreneurs*	*unique coordinated funding mechanism for SME development*
	scouting differents alternatives of technology exploitation	*straight contact with clients achieved through visits and interviews*	*information and promotion plan carried out by a dedicated Contact Point*		*Dedicated team of coachs per company*
		extensive support provided throughout the entire innovation development and implementation process	*"stepwise working method": first evaluation of basic idea into a preliminary project proposal second more detailed investigation on the project idea with the cliend by the contact point*		*supporting centralized office*
		maintenance of business relationships between clients and Competence Centers			

Table 1: benchmarking analysis of different successful innovation programmes

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2.1 Business support service organization and regional agency operational methodology

In order to get a more in deep and update picture of the innovation agencies behavior, in the period September – October 2017, the InnoMedia consortium has run a brief survey on business support service organization and regional agency operational methodology. Via an online tool, 7 questions have been addressed to the regional innovation agency in order to investigate on their *modus operandi* and to their capacity to reach their "clients" need.

The survey was conducted using an online tool, SurveyMonkey. It was completed by 18 Innovation Agencies from different countries in Europe with well-differentiated technological, economic and social contexts. The survey was promoted via the Innomedia website and direct contacts of the Innomedia partners and by the EURADA central office in Brussels, which emailed the questionnaire to the EURADA' network.

Below the responses to the questionnaire together with a summary analysis results are presented.

Question 1: In your Center, what are, among these actions, the one/ones you usually implement (please indicate just three)

- ☐ Scouting on know-how in Research Centers
- ☐ Programmed set-up
- ☐ Information to SMEs
- ☐ Promotion of calls at national level
- ☐ Promotion of calls at international level
- ☐ Evaluation of innovation ideas
- ☐ Identification of investors
- ☐ Support offered to innovative projects developed by start-ups
- ☐ Others (please, specify)

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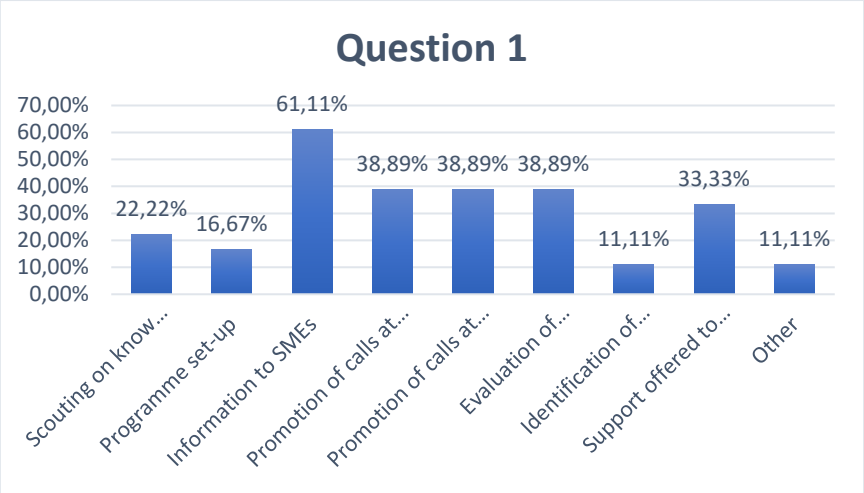

Figure 1: Actions implemented in the centers

Based on the answers obtained to this question, it can be observed that the main activity implemented by these Agencies is the support and information to the SMEs (61.1%) followed in equal measure by the promotion of the national and international calls and the evaluation of innovative ideas (38.89%). The answers obtained in the *other* item can be included in these two large groups. These results reflect a need for collaboration and support in the development of SMEs' innovation capacity and the design and implementation of innovative projects by companies.

Question 2: Number of SMEs contacted per year

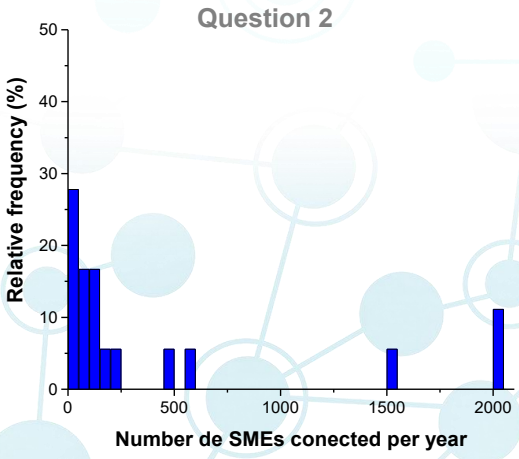

Figure 2: Number of SMES contacted per year

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Although a wide range of values is observed in the responses, two large distributions can be identified. On the one hand, the majority distribution of SMEs contacted per year is between 0 to 250 SMEs and on the other hand, a smaller volume distribution in which there is a higher value of SMEs contacted (between 1500 and 2000 companies). These two distributions can be explained due to the social and economic differences and the degree of industrial development of the different European regions to which the innovation centers have access. From these results, it can also be inferred that most of the access to the innovation centers corresponds to a volume of 50 to 150 companies per year.

Question 3: Number of successful projects on innovation initiatives in the last three years (Please, indicate name of the project and year)

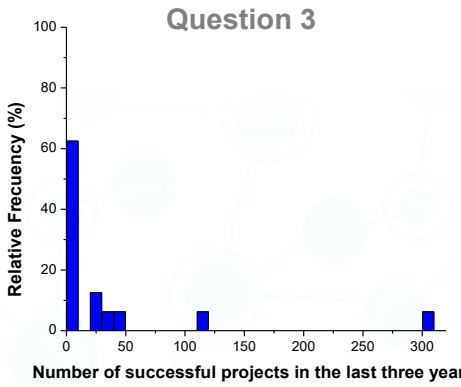

Figure 3: Number of successful projects

Despite contact with a large number of SMEs per year, the number of successful projects on innovation initiatives is quite low, most (more than 60% of the answers) do not exceed 10 successful projects in three years. And in some cases, the answer was: "no successful project in innovation".

However, in this question projects of different sizes can be compared, with very different times and financing, as well as the degree of success of the project, which makes the response subjective and difficult to make a clear comparison.

Question 4: How do you usually take contact with the SMEs?

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The main strategy of contact with the SMEs was direct and personal contact with the company (45.5% of the answers), followed by the telephone call (18%); the communication by email and other social platforms as such as Skype, Facebook and Twiter, and the dissemination of information in workshops and seminars both share the same percentage of respondents (14%) and finally communication via web and mail (9 and 5 %).

Question 5: Please, indicate two among these as success factors:

- ☐ Engaging enterprises which presented an innovative idea
- ☐ Having innovation ideas turned into projects granted for funding
- ☐ Innovative products developed and marketed
- ☐ Programme preparation
- ☐ Programme implementation
- ☐ Funding request to invest in project implementation

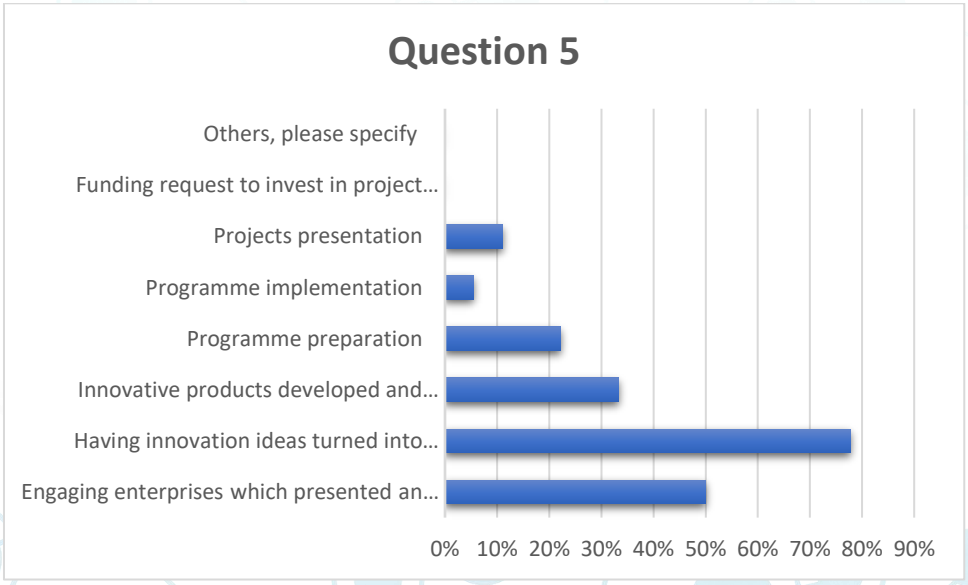

Figure 4: The recognized success factors

It was identified as the main factor of success to have ideas of innovation turned into projects for granted with a return percentage close to 80%, followed by the fact that the companies involved that presented an innovative idea (50%) and the development and

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commercialization of innovative products (33%). This show a **stronger approach "grants oriented" more than "innovation support oriented" by the agencies**.

Question 6: Have you established a Regional Competence office?

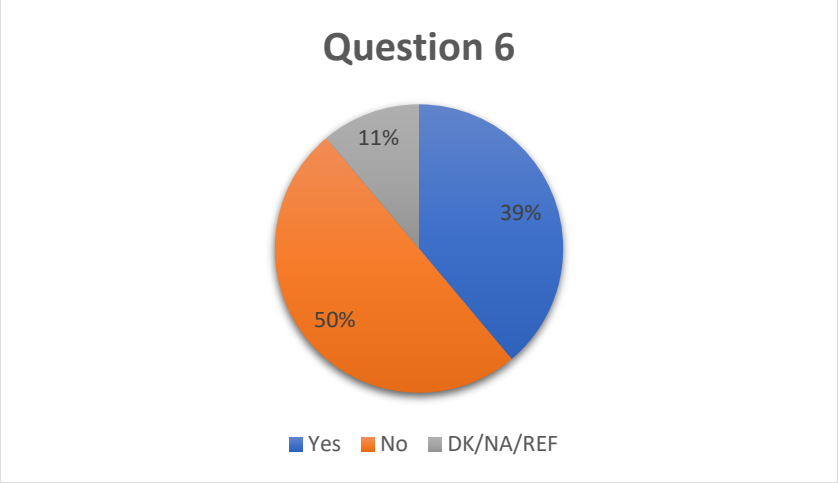

Figure 5: Presence of competence center

Question 7: What kind of approach you follow to establish the relationship with SME in the territory?

In general, respondents answered that relations with SMEs are established through direct personal contact and participation in workshops, symposiums, and networks. The promotion of their activities and the encouragement of SMEs to join organizations to participate in joint projects are effective tools for forging long-lasting relationships with companies.

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3. From a cluster to a metacluster approach

The need of a "Multiple, interdisciplinary and unstructured sources of knowledge and know-how as the key elements behind the process of entrepreneurial discovery" [15] has to be considered as one of the main success factors. The existence of an environment which allows industry players and government stakeholders to benefit from idea contributions from all possible sources has been recognized as a fundamental element for innovation development. In section 1.4 is described the added value to stimulate a RIS system following a cluster approach. In fact, the practice has recognized that:

- **Companies** in strong cluster environment are **more innovative** than other companies
- **Research organization** in cluster environment are **more active** in innovation with higher research standards/results
- **Regions with strong cluster** attract more **venture capital** that areas without strong cluster
- **Strong cluste**r creates a higher level of **entrepreneurship**
- Cluster are magnets for **skilled labor**
- Cluster results in higher wage levels as well as added value growth

According to Michel Porter *"Clusters are geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions in particular fields that compete but also cooperate" Michael E. Porter (1998).*

While cluster initiatives*: "are organized efforts to increase the growth and competitiveness of clusters within a region, involving cluster firms, government and/or the research community".*

The clusters fulfill the "geography" designed by the triple helix model, where enterprises, universities and public organization cooperate.

15 Using the Quadruple Helix Approach to Accelerate the Transfer of Research and Innovation Results to Regional Growth

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Starting from the above statements, seem that the regional innovation agencies should focalize their efforts on setting up or enforce the cluster development.

However, as shared by Innova BIC with the InnoMedia partners, it seems that the cluster approach is not enough today. Organizations are living in an interconnected and overspecialized world, where the needs of the final users have to be fulfilled following a personalized approach. Thus, a single cluster or clusters specialized on a single area and not interconnected among them are not enough.

A further step is proposed by the concept of the Meta-Cluster. It can be defined as a trans-regional network of clusters, which focuses on the same or complementary specific technological field or sector. A meta-cluster consists of at least three clusters in three different regions (from *The Alps4EU* project).

A meta-cluster offers the opportunity:

- to combine innovation capabilities of different regions to develop new products and services, which are customized to the requirements of the different markets;
- to exchange research ideas, capacity/labs, and testing areas among different regions and sectors;
- to encourage and support modern innovation processes in SMEs across different regions, markets and sectors;
- to optimize the transition from basic R&D to innovative products and services, in the context of cross-collaboration: Modern innovation processes are more and more meta-national;
- for innovative companies to use the different innovation capabilities of different regions;
- to the innovators to customize products and services to the specific demands of the different markets. (often innovations fail not because technologies bugs; but because there is more misunderstanding of the customer needs).

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The meta-cluster philosophy is somehow similar in some of its parts to the same approach followed by the multinational companies that are used to implement their research & developments labs in several geographical areas in order to get the best by the different groups and cultures.

The EU projects ETRERA_2020 and FP4BATIW and MAGRENOW in 2016 have recognized the importance of meta-clusters as the engine for the enterprises' development in an international context. In that case, the model proposed was to link in a "virtual organization" organizations settled in different EU and Mediterranean partner countries and specialized in the different thematic field. This experience brought to the nexus meta cluster concept, where different organizations work together around an interconnected theme: the NEXUS between water, energy, and food.

According to the model theorized by those projects the cooperation among institutions should bring to the setting up of a favourable environment where the organizations are able to share resources following a co-ownership and co-design approach. In fact, the organizations/cluster geographically distributed in several territories should be able to exchange resources and to allow a movement between countries of know-how, people, and practices. The meta-cluster is organized by the cluster manager that has the role to be *primus inter pares* and to stimulate the cooperation between the actors of the virtual organization and the development of the cluster members.

The meta cluster concept can be also applied somehow to regional development agencies where the agencies have the role to support the development of the organization of their territory. Moreover *since* ***the concentration of assets has a leading role in fostering innovation*** *and soft assets such as science/technology-based knowledge and creative knowledge grow through interaction, ...critical mass in knowledge can also be achieved outside of the physical dimension through the fostering of the virtual organization thus development agencies organized according to the metacluster concept.*

Furthermore, considering that the *less innovating regions suffer from a lack of cooperation among the triple helix actors, the limited capacity for economic investments for innovation*

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may be partially overcome by focusing on ***regional specialisation*** *(in line with the Smart Specialisation Strategy and sustained through EU structural funds) and on* ***the boosting of the innovative potential of civil society*** *by adopting, with limited cost, a new perspective favouring bottom-up initiatives and social inclusion.*[16] Again, following the metacluster approach less innovative region and thus innovation agencies could be focalized around their Research and Innovation Strategy for Smart Specialisation.

However, today, the development agencies are not in a meta-cluster orientation and they do not really aim to cooperate with them for the development of all the actors of the virtual organization.

16 EU Committee of the Region: Using the Quadruple Helix Approach to Accelerate the Transfer of Research and Innovation Results to Regional Growth, S. Cavallini, R. Soldi, J. Friedl, M. Volpe

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4. The methodological approach towards innovation

In line with what described above, the deliverable “D.1.3 Methodology of SMEs innovation and technology programmes as a new approach to foster research-driven SMEs” has described how to achieve successful cooperation of SMEs and to build a bridge between companies, R&D organizations and authorities, and how it is essential to involve relevant stakeholder groups. This will permit cross-border and interdisciplinary knowledge exchange combined with local innovation and technology transfer for specific needs of SMEs groups. Following a cross-sectoral and interdisciplinary approach, the results of the stakeholder collaboration will be an improvement of innovative products and services for SMEs and the civil society in the frame of smart specialization strategies.

The deliverable has described several different strategies based on the development of:

- ✓ a technology transfer center;
- ✓ an accelerator model:
- ✓ a personalized" advise and support system for SME looking at the companies under a heuristic approach.

The possibility to merge the different strategies around to a unique model has been tested and discussed during the roundtable “Innovation policies programmes Towards a fine-tuned model of regional innovation ecosystem” organized by Innomedia on the 19th October in Budapest. During the meeting, the participants agreed on the needs of:

- ✓ a more tailored and personalized approach towards the SME
- ✓ the need of SME to be coached and the need to create networks and organizations in Europe focused on SMEs support
- ✓ on despite of the massive communication capacity, the need to establish connection among the different actors of the triple helices model, and about the need of pursue a more synergic and harmonic approach focused on the regional smart specialization

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or more widely on thematic synergic themes (such us the nexus among energy, water and food).

- ✓ the need to involve the final beneficiaries/user of a product/service since the early beginning. On this regard, the involvement of the civil society also if at the level of a community of practice it is necessary.

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5. The need to change approach

The need to move toward a more open and entrepreneurial behavior has been observed in the transformation that in the last decades has affected the enterprises and the universities.

The enterprises are modifying their traditional model of innovation moving from the ***closed innovation model***

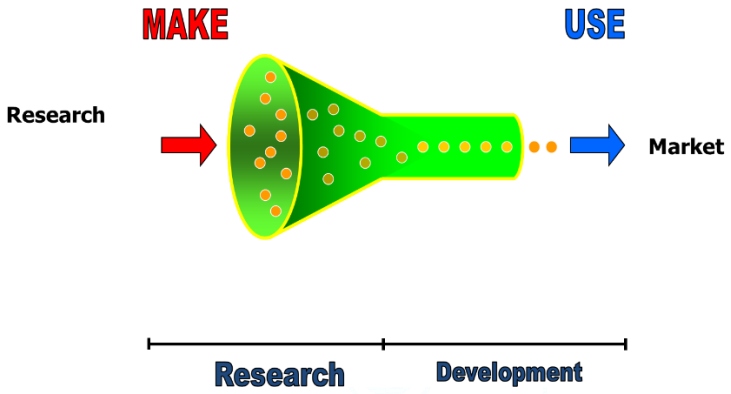

Figure 6: the closed innovation model

…toward ***the open innovation model***

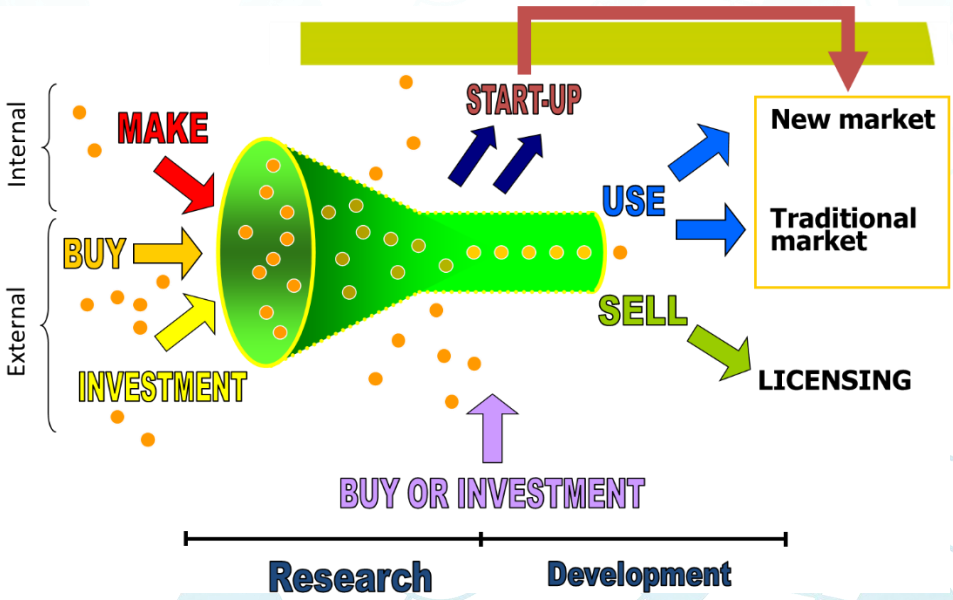

Figure 7: the open innovation model from H. Chesbrough

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Because of:

- ✓ New competitors
- ✓ New markets
- ✓ New customers' behaviors
- ✓ New economy more service approach than product approach
- ✓ Need for the companies to look for new sectors

This change in the paradigm has been stimulated also by:

- ✓ increased availability of partners with high capacity
- ✓ increased availability of venture capital funds for start-ups

The universities from their side have also modified their "skin". In fact, more and more universities are adding to their traditional mission the so-called third mission and they are turning in entrepreneurial university, by embedding entrepreneurship, creativity and innovation elements in their DNA and in their ecosystem. There are pressures to play an enhanced role in contributing to the international competitiveness of economies particularly via a process of commercialization of research. There are increasing demands to contribute more substantially to local economic and social development. Universities are increasingly being urged to take centre stage in regional development strategies in Europe[17].

The Committee of the Region in the study "Using the Quadruple Helix Approach to Accelerate the Transfer of Research and Innovation Results to Regional Growth" has recognized that "*Universities in the last decade have enlarged the scope of their activities either by explicitly defining a new mission (i.e. the third mission) or by reshaping teaching and research according to market requirements or societal needs. In both cases universities assume an 'entrepreneurial role' contributing to innovation with both science/technology-based knowledge and creativity-based knowledge*".

The study in its recommendation pronounces: "*rather than fostering direct contribution of universities towards innovation, an effective implementation of the triple helix and quadruple helix approaches needs improvement of* ***innovation interaction*** *where high-value knowledge*

17 Towards the Entrepreneurial University? – A. Gibb, P. Hannon

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produced by universities (already innovation-oriented) can be properly transferred and exploited by the Industry and Civil Society spheres".

Moreover, "*there is evidence that innovation in the public sector supports the establishment of governance conducive to innovation. Elements such as the presence of innovation culture, existence of one or more important pulling force(s) embedded in the territory, availability of knowledge hubs; management capacity of change and/or set up of '**innovation teams'**, if necessary relying on the **input of change professionals**; are powerful instruments to trigger innovation in the territory*".

In general, the changing and changed scenario described above can be translated into a need to design organizations of all kinds, public, private and NGO, to support effective entrepreneurial behavior.

Coming back to the conclusion of the study "Using the Quadruple Helix Approach to Accelerate the Transfer of Research and Innovation Results to Regional Growth", it highlights the need of Policy investments in reinforcing the industrial actors, combined with actions to foster **the innovation interaction with the other actors of the quadruple helix**, for increasing the innovation capacity of the regions. The study highlighted also the limited impact of universities as a leading actor in some EU regions. In fact, the universities alone rarely lead innovation-generation. *The innovation performance of universities may be improved by fostering its entrepreneurial role as i) technology transfer actor: this implies a strengthening of the capacity to reach the market; ii) knowledge transfer actor to the other institutional actors (i.e. government and industry). Incentivizing universities to increase their reliance on competitive funds rather than on institutional ones may leverage the entrepreneurial attitude of universities implying also a reinforcement of Innovation Interaction*.

In order to fully understand the relationship between the actors of the quadruple helix and their impact on the several European regions, it is worthily to came back to the above-mentioned report. Here the impact is analyzed by classifying the EU regions into 'innovator types' (ADV - advanced, MED - medium and MOD - modest).

Advanced Innovators regions

The best pullers of innovation are Industry (IND), Civil Society (CIV) and innovation interaction (INT), while the structural performance of University (UNI) and Government (GOV) seem to

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be limited. Furthermore, Advanced Innovators regions (ADV) seem to be characterized by the reaching of a certain 'critical mass' of each of the actors ..with a 'pulling' effect of one or more of the actors. ADV seem to have certain prevailing conditions in common, including governance conducive to innovation, science and knowledge excellence and/or assets, business concentration and/or hosting of world-leading businesses/companies, technology and/or knowledge-intensive industries, relevant ICT-based industry, and the presence of hybrid organisations allowing a structural interaction among the various helices.

Medium innovators regions

Those regions have the same pullers of innovation as ADV with an even more limited role of GOV and UNI. In fact, the University actors appear as the weak link of the innovation performance in this type, with the strongest role apparently being played by IND, in line with traditional models where innovation is a prerogative of the business community. MED share less common features than ADV but they are all characterized by IND-related features such as the presence of business concentration, business networking, co-operation, and/or connection, and presence of hybrid organizations.

Modest innovators regions,

The traditional actors of the triple helix model seem to have lost the leading position in innovation performance in favor of Civil Society (CIV). Notwithstanding the maturity of the civil society, MOD regions have a limited innovation capacity in the three other helices (UNI, IND, and GOV) and are not expected to experience improvements unless at least one of the 'traditional' helices starts playing a pulling role. In addition, it has been observed by the study a lack of a structured strategic approach for transferring research and innovation results to regional growth.

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6. A wider model of innovation agency

As described in the previous deliverables and in the sections above, it is necessary to refine the traditional model of innovation agency. Europe can count only on 13 Advanced Innovators regions also characterized by a strong innovation interaction. Considering this landscape, it emerges as essential to define new innovative models able to pull the SMEs competitiveness.

After having analysed all the above studies and having compared the experiences and the model of the innovation agencies partner of InnoMedia. It is possible to theorize a new role of agency built around the quintuple helix concept where the agency itself became one of the driving elements of the helixes.

According to this new role, the "agency" could be the interface with the regulatory body and the public authority, but at the same time, it will become the counterpart and the driving engine of the relationship with enterprises and research world.

In this regard, the agency has the role to involve in a continuous dialogue all the actors of the innovation value chain. In this model, the innovation agency will drive its innovation efforts on some key specific areas well defined and well interrelated among them as previously seen in the NEXUS model where energy, water, and food are strongly interconnected as suggested by the Smart Specialization Strategy and by the Committee of the Regions.

As already described above, there is a need to create a system that favours the cooperation among agencies located in different regional or extra-regional/national contest. In this framework, the agencies will have to act as a cluster manager/cluster facilitator that it is able to establish and stimulate the cooperation among all the actors of the clusters. To reach this point, it is necessary that the agencies act/are organized as described in the meta cluster concept. According to this concept the innovation agencies specialized in interconnected

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themes and located in different regional or national areas will try to cooperate between them and to exchange resources also by creating synergies.

The analysis run in deliverable 1.1 has highlighted the importance of some dedicated professional figure able to engage and activate the companies' ecosystem and provide support to those organization. In table 1, the "cluster manager or virtual organization manager" or like in the "SMED case" of the contact point between the organization and the company has been widely recognized as a key success factor. Thus, the innovation agencies need to define an organization model where the figure of the contact point is a key element for the development of the relationship between innovation agencies and enterprises. The element of the "innovation interaction" has been found as a driving element also by the EU Committee.[18]

The new role of the innovation agencies obliges them to open their attention to the society that it is surrounding them. It is worth to mention that innovation agencies have to work for the society and with the society. This role obliges the innovation agencies to adopt measures that allow them to establish a continuous dialogue with the civil society by activating antennas able to grasp the real need of the economic and social ecosystem. The agencies need to activate some rigorous monitory system in order to periodically refine their action and policies and to be able to report to the government level the results of the activities done.

This new modus operandi of the development agencies can be described in the figure below, where the development agency has the role to connect and develop the other agents of local development, as stated in the report of the Committee of the Region, it has to takes the role of ***agent for innovation interaction***.

18 ibidem

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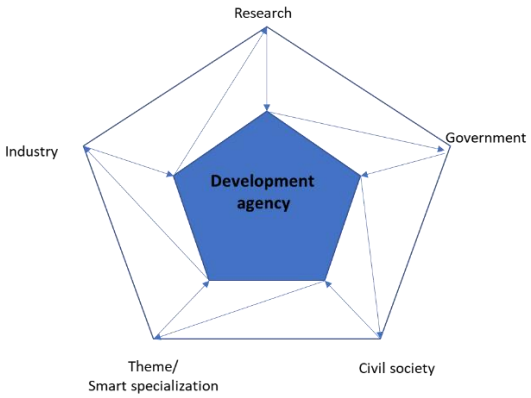

Figure 8: The development agency as engine of the 5 helices

By applying the above-described model at the meta cluster concept we will have a system where the entire system can cooperate around specific themes interlinked between them such as the NEXUS in the case of the figure below.

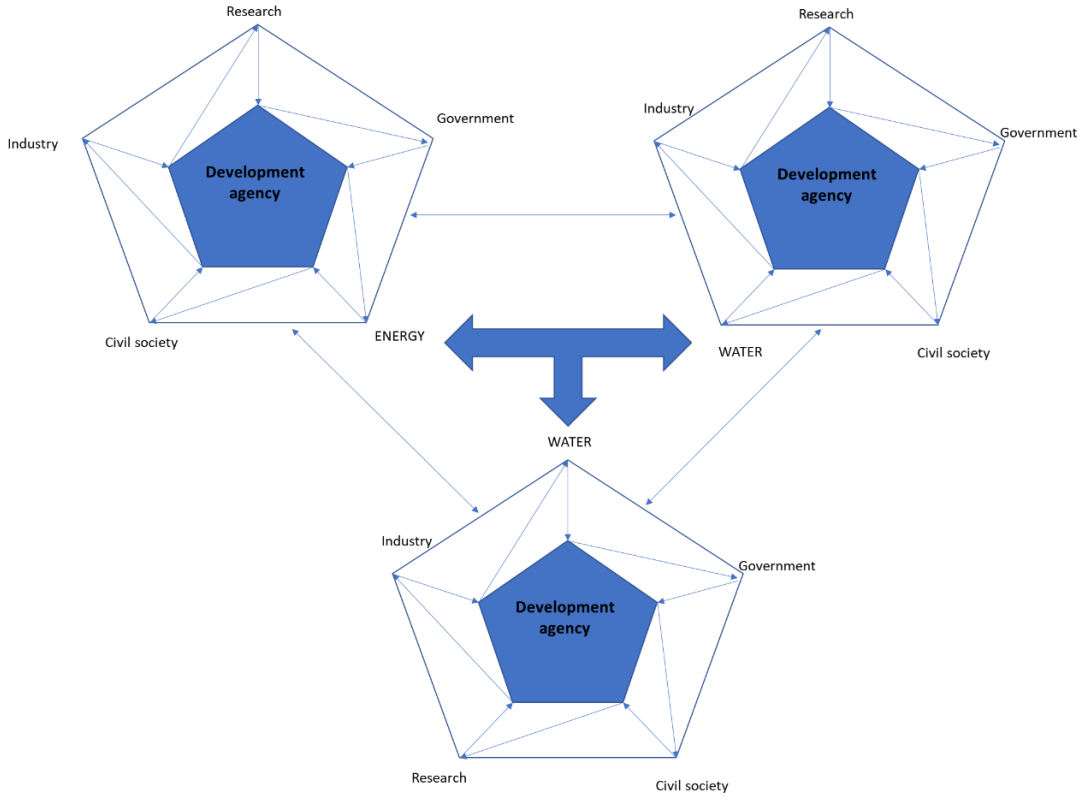

Figure 9: The development agency model in a meta cluster environment

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The model can be further elaborated considering that the several agents of the model can also establish one to one multidirectional cooperation, as introduced below, where some of the different possible relationships are described.

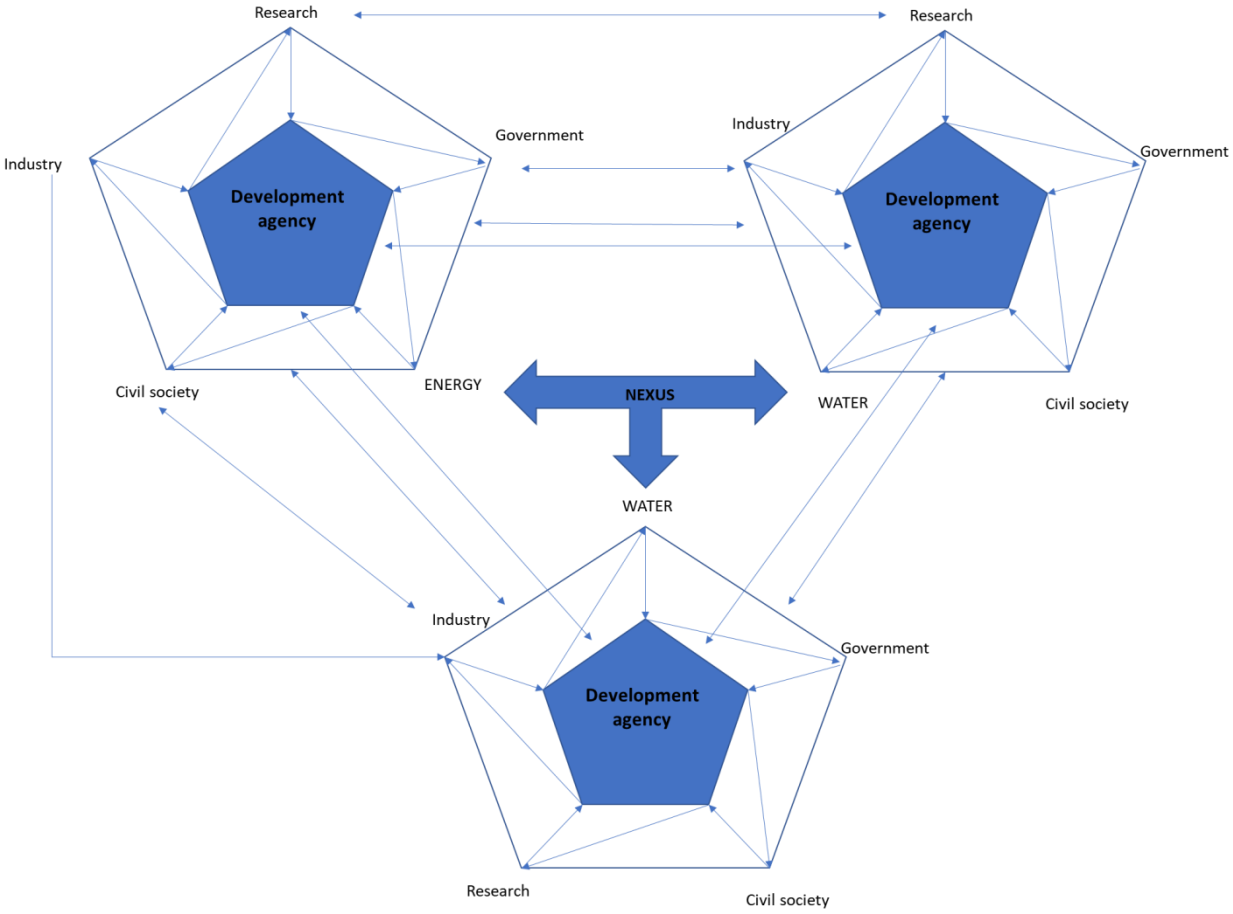

Figure 10: The development agency model in a meta cluster environment and P2P relationships

Moving forward at the level on how the development agency should operate, the InnoMedia partners in their peer 2 peer exercise, in line with the analysis previously mentioned, have recognized:

- ✓ the key role of the innovation interaction, that in the several cases previously seen took the form of the: facilitator, or mediator, or technology broker or contact point.

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This role can assume different names according to the programs and organization structure of the agency. As we will see after, in the section dedicated to the new innovation programme to be developed by the agencies, this role could be assumed by the coach, in that case.

- ✓ the need to be focalized around specific thematic areas where there are local competencies and competitive advantages. Those thematic areas should be as much as possible aligned and coherent with the regional smart specialization strategies. In fact, *considering that the less innovating regions suffer from a lack of cooperation among the triple helix actors the limited capacity for economic investments for innovation may be, partially, overcome by focusing on regional specialisation (in line with the Smart Specialisation Strategy and sustained through EU structural funds) and on the boosting of the innovative potential of civil society by adopting, with limited cost, a new perspective favouring bottom-up initiatives and social inclusion*[19].
- ✓ the need to open to collaboration among agencies, in order to exploit synergies and multiply the value of each intervention. This need is strongly linked to the need to put in practice a sort of "replication-internalization model", that allows to extend the network of agencies around a synergic trajectory, such as in the example of the NEXUS
- ✓ the importance of supporting the set-up or the empowerment of center of competence as hubs or living labs at disposal for the companies. Places where the 4 components of the quadruple helix can meet and find technical solutions.
- ✓ the strong value added by the accelerators programmes as a supporting tool for regional and local development agencies.

6.1 Toward an acceleration programme for the development agency

19 Ibidem

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In the deliverable D.1.1, we have seen several types of innovation programmes where the method adopted is the real factor that differentiates the innovation programs and determines the impact that the program implementation has on the territory. The benchmarking action has made possible to identify the case of innovation agency called upon to play a proactive role by creating centers of competence, also equipped with technical resources, and accelerators that are able to manage innovation directly and to bring innovation to market with a minimum burden on the company.

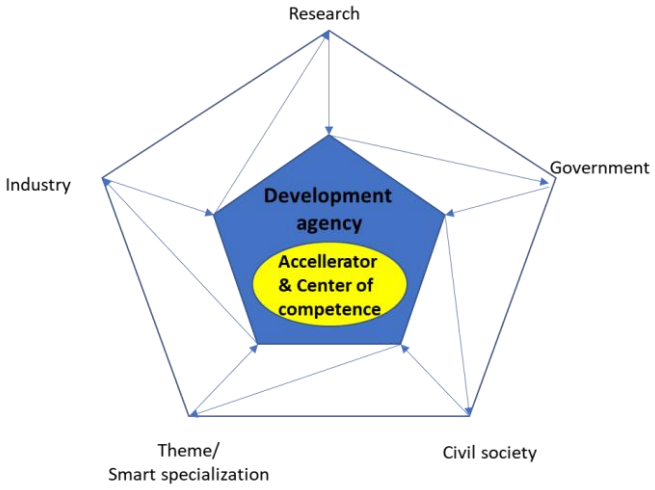

Figure 11: The new model of development agency and their role of accelerator

The concept of center of competence can be merged within the accelerator, where the accelerator incorporates business and technical competence and relay on the external supplier for hardware.

The accelerator model here proposed as an in-house organization within the development agencies has the following features:

- it has operational and financial independence, but it is subjected to respect the public laws regulation for transparency, conflict of interest, procurement rules, ect.
- it has a fund available for funding specific (per topic) innovation programs submitted by the SME interested to go from TRL 7 to 9, during the acceleration process.

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- the funds are disbursed via open call organized by the accelerator and widely promoted in the region.

In addition to the grants, the accelerators offer to the selected companies (grantees) that are led into an acceleration programme the following advantages:

- technical coaching: development and deployment of the technical project applications with the support of accelerator experts and external experts by activation a network of labs/research unit in the territory (center of competence)
- commercial/business coaching: development and definition of the business model, support in the analysis of potential customers and users site opportunities, reaching of the market uptake goals and commercialization through commercial coaching activities
- dissemination and visibility of the solution developed
- pan European networking
- partnership with potential clients
- European show-case event to publicize the solution
- access to business angels and venture capitalist and incubators
- education and training & summer schools;
- organizing international matchmaking events for innovative clusters
- thematic, administrative and financial project management
- scientific research and analysis; science incubation
- partnering events;
- workshops;
- boot camps;
- pitching events;

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- best practice exchange & peer 2 peer learning moments;

This methodology has the advantage to support the creation of each funding program of an ecosystem of companies working in the same market but not in the same segment/niche. Acting in this way the accelerator will have the role to create a co-opetition mechanism among the selected beneficiaries.

From their side, the beneficiaries will be submitted to periodical examination based on their capacity to reach pre-defined Key Performance Indicators and deliverables. The companies' low performers will be excluded from the programme. A key figure in the acceleration programme will be the coaches who will follow the day to day life of the companies under his/her responsibility.

The role of the coaches is double, from one side they will act as a consultant providing advice to the company, from the other he/she will be the first evaluator of the company performance.

6.2 The set-up of a trans-European network of accelerators

To achieve successful cooperation of SMEs and to build a bridge between companies, R&D organizations, and authorities, it is essential to involve relevant stakeholder groups. It will permit cross-border and interdisciplinary knowledge exchange combined with local innovation and technology transfer for specific needs of SMEs groups. Following a cross-sectoral and interdisciplinary approach, the results of the stakeholder collaboration will be an improvement of innovative products and services for SMEs and the civil society in the frame of smart specialization strategies.

In order to create a model for the set-up of an international network of accelerator managed by innovation agencies, it is possible to follow the following paths organized in an 8 points procedure (see figure 12).

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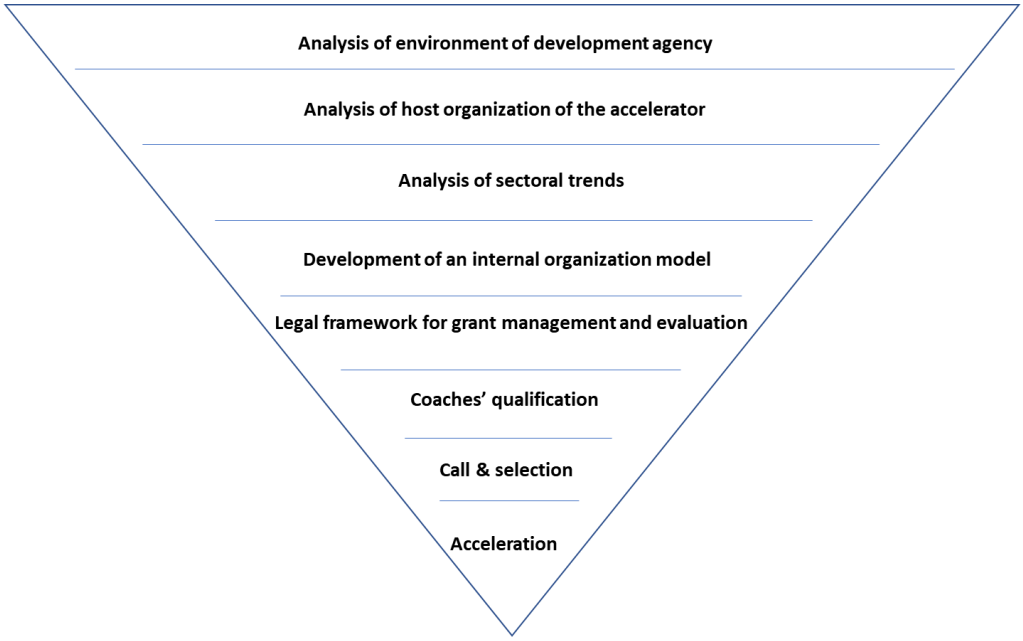

Figure 12: The way to set up an accelerator managed by innovation agencies

1. **Analysis of environment of development agency** regarding political, socio-cultural, economic, technological and environmental and legal aspects, smart specialization strategy adopted, key industrial/research areas is indispensable; identification of potential regions candidates;
2. **Analysis of host organization of the accelerator** such as local development agencies or regional agencies or cluster recognized at national regional level;
3. **Analysis of sectoral trends** to understand the spaces for development of the companies that will have to be financed;
4. **Development of an internal organization model for the management of the grants and of the grantees**;
5. **Legal framework for grant management and evaluation** to create a clear legal structure for the companies that will benefit from the acceleration grant (funding document, functioning of accelerator activity, etc);
6. **Coaches' qualification:** technical and commercial;

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7. **Call, selection** and contracting with the companies
8. **Acceleration programme** and companies' engagement evaluation

The organization of simultaneous acceleration programmes will have as results the set up of a companies' ecosystem where some of the elements of the system will be supported in finding some space of co-opetition or of cooperation (see figure 13).

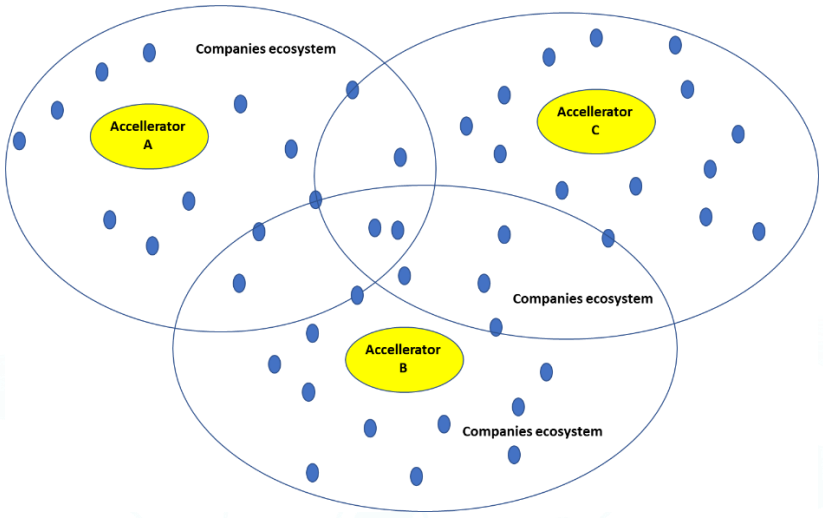

Figure 13: The creation of a company ecosystem stimulated by an acceleration programme

An optimum accelerator programme could see the set up of a fund of euro 6.000.000. This amount will be used for the creation of an investment programme for an amount of euro 4.500.000, while euro 1.500.000 could be used for the management and roll out of the acceleration activities. More in deep considering for each company integrated into the acceleration program a grant comprised in a range between 150.000 and 200.000 euro, it will be possible to finance the development and the "last miles to the market" of minimum 23 companies. The acceleration programme should last between 12-18 months and it should be designed in order to favorite the rapid market uptake by the participant companies.

The remaining amount for euro 1.500.0000 could be used for the normal roll out of the accelerator activities (project management, calls evaluation, etc) and for providing services

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to the company involved in the project. Moreover, this remaining part of the budget could be addressed to the general promotion of the grantees, their coaching and training and the networking activities. With and investment of about 18 mln of euro, could be possible to stimulate the development of a companies' ecosystem of about 70 companies that will works following the coopetition model.

6.3 The set-up of a trans-European network of development agencies

In the previous paragraph, we have observed the key role of development agencies – DA in establishing an ecosystem of companies working in correlated fields. The key point now is, how to establish a network of development agencies able to develop acceleration programmes? On this point, we can use a model already tested in the Danube Region. The long experience in the field of innovation and technology transfer as a member of Steinbeis Transfer Network has allowed to Steinbeis to set up a methodology for other regions in Europe.

The method is built around a 9-step process, illustrated in Figure 14.

Step 1: **Analysis of environment of DA** regarding political, socio-cultural, economic, technological and environmental and legal aspects is indispensable; identification of DA candidates;

Step 2: **Analysis of host organization of DA** such as universities; research institutes; clusters or regional agencies;

Step 3: **Analysis of demand for DA** because a DA must try to understand the needs of its target audience – SMEs;

Step 4: **Development of a business plan for DA**;

Step 5: **Legal framework for DA** in order to create a DA on a sound footing (founding document, the legal functioning of TTC activity, employment contracts);

Step 6: **Management profile of DA**;

Step 7: **Qualification of DA staff**;

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Step 8: **Financial management of DA** including the challenges of managerial finance and DA funding;

Step 9: **Growth strategies for DA** comprise mainly two areas: first, the connection of TTCs on regional, national and European level and second, the conception and elaboration of pilot projects.

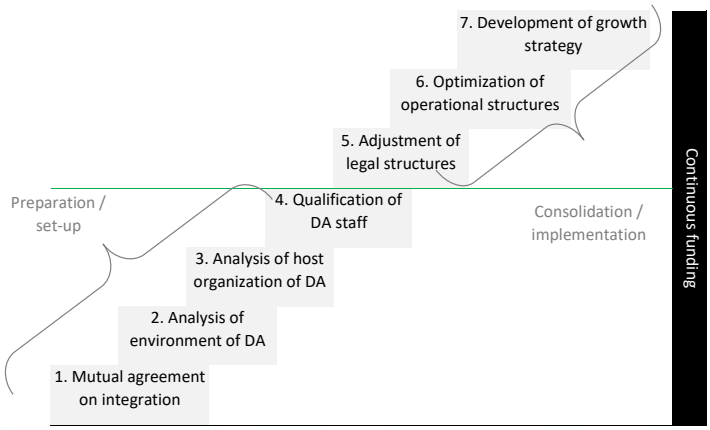

Figure 14: A 9-step process for establishing a DA

6.3.1 Preparation of the DA set-up (Step 1 – Step 3)

The creation of a development agency and later of a development agencies' network requires a broad ex-ante analysis of possible regions and candidates.

1. Selecting a region for a DA;
2. Distinguishing possible DA candidates and;
3. Sign the agreement

To prospect the success, the hosting organization should have a leading position within the region or country and provide access to well-known researchers, scientific excellence, but also an extended network of relationships with the business work and a good confidence on the market trends and companies need. But the implementation of a functioning DA does not only depend on the region and institution. One of the most important preconditions is

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the ambition in terms of financial and human resources of the host organization itself. The likelihood to implement a successful DA varies among aspiring candidates depending on the progress of human and financial resources. DA candidates can be assigned to the following groups:

1) **High Potentials**; are candidates that fulfill all of the target values and have already expressed their interest in creating a DA on site: They also completed the first implementation step – "Mutual Agreement"- Letter of Intent.
2) **Interested organizations**; fulfill the selection criteria but have not signed a Mutual Agreement, only an informal expression of interest (e.g. on a meeting or event).
3) **Question Marks**; are organizations that are possibly capable of creating a DA in terms of the selection criteria.

6.3.2 Implementation of the DA (Step 4 – Step 7)

The business plan of a DA represents an essential component and document which does not only serve for internal, but also for external use. In the beginning, it allows to structure ideas, thoughts, and actions as well as to analyze necessary key elements for a successful business. Later, it becomes a communication vehicle, describing the business concept to others.

In order to create a DA on a sound footing, the most suitable legal framework must be identified in each case.

The functioning of a DA requires certain legal conditions. The DA is a legal entity which is hosted by another organization such as a university, a business innovation center, a cluster, etc. As a consequence, there is a contractual relationship between the DA and its host organization. There are employment contracts between the DA and its staff or representatives. The employees can sign contracts in the name of the DA with clients such as SMEs. This creates a contractual relationship between the DA and the customer. The role of a chief manager of a DA is complex and demanding as he or she has to understand and work

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with both researchers and business people. The first step of the qualification of DA staff is the identification of skills & competencies needed in working with the companies.

Regional and national connectedness can be achieved by networking with regional research institutes, chambers of commerce, specialized NGOs, and specialized networks/clusters. Furthermore, networks can be established on common events. These offer the opportunity to exchange with national partners on innovation themes of general interest and allow dissemination activities of the centre's results (e.g. website, newsletter, social networks, conferences, seminars, public awareness events). Connectedness at a European level can also be achieved in a different way: The different DA themselves should meet periodically or at least exchange their experiences, ideas, and progress on a regular basis. This helps to keep each other updated, transfer best practices and thus, constantly improve DA services. Besides, interregional matchmaking and participation in international fairs and exhibitions is a good way to get connected on all levels. In addition, in order to get viable, DA should try to enter their partners' networks. These can include universities' network, Enterprise Europe Network, TT networks, etc. Joint memberships allow a further expansion of the own customer base at European level and make the DA activities more sustainable.

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7. Recommendation and lesson learned

7.1 Recommendation

- There is the need to stimulate the reinforcement of the SMEs structures, as the backbone of the European entrepreneurial system. The recent crises have demonstrated the risk in relying only on the large companies as a provider of working places and innovation in Europe.
- The need to create a synergic tissue of companies can be reached with investment in Smart Specialization by stimulating acceleration programme and cascade funding mechanism.
- The cascade funding coupled with the acceleration programme has the positive advantage to stimulate and support the development of existing companies able to scale up in the market.
- Could be useful the launch by the European Commission of a pilot action targeted to the setup of a wide European network of acceleration programmes. The investment of a budget of 18-20 mln of euro could be sufficient to enforce the development and the growth of an ecosystem of more than 60-70 companies, with the aim to move rapidly from TLR 7 to TLR 9.
- The actors involved in the operation of this accelerator programmes should be: private organization endorsed with an institutional mandate with proved experience in acceleration programmes and companies coaching, university (only for the part related to the technical coaching), an organization with a proven track record in SME supporting.
- Establishment of a common coordination platform for the trans-European network of development agencies (DA). This will help to realize synergies between the Innovation and Technology Transfer actors from different regions and identifying concrete recommendations for future Research and Innovation actions in Europa.

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This is also in line with the current activities and priorities of the European Commission towards open innovation approaches and the better capitalization of research results in order to increase the global competitiveness of Europe.

- The pilot action model above described could be - once tested – replicated in other geographical area characterized by low entrepreneurial capacity and low innovation proactivity, such as in the Mediterranean partners countries.
- A clearly communication on innovation and technology transfer topics emphasizing their benefits for people would secure the participation of stakeholders and would help them to clearly articulate their motivation and needs.

7.2 Lesson learned

- The peer 2 peer action was a valid exercise to stimulate mutual learning among the project participants
- The peer 2 peer methodology can be considered more fruitful of the typical best practice sharing and study visit methodology
- During the final conference, it was discussed the theme on how to influence and address the policymakers. On despite their position, all the participants agreed about the difficulties in addressing/influencing the policymakers. Those difficulties can be due to: a) the national model that doesn't foresee a decentralized activity by the development agency (everything is centralized in the Capital); 2) the lack of official discussion tables at regional/central level, tha could allow to the development agency to bring on, in a transparent way certain instances at regional level. In order to unlock this situation a stronger support by the EU could be opportune. In this case, the EU should acts with it, the informal power of "moral suasion" by pushing the institutions at the regional/central level to establish permanent institutional tables where the instance of the decentralized organization could be brought.

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- There is an added value in clustering different projects active in the same call. The clustering of initiatives is a powerful instrument that allows the mutual learning and the exchange of experience. On this regards, it should be included by the EC as a "standard requirement" in the grant agreement.

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