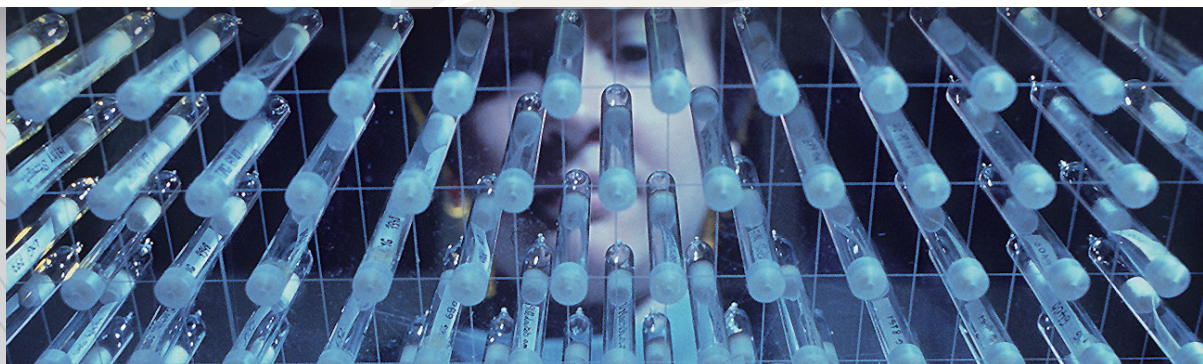


NEW CLUSTER CONCEPTS FOR CENTRAL EUROPE – AND BEYOND

ACTIVATING
THE ROLE OF CLUSTERS
IN VIEW OF EMERGING
INDUSTRIES AND CROSS-
SECTOR THEMES



CLUSTRAT



**CENTRAL
EUROPE**
COOPERATING FOR SUCCESS.

PROJECT INFORMATION

This publication represents the final brochure of the strategic project CluStrat – Boosting innovation through new cluster concepts in support of emerging issues and cross-sectoral themes. CluStrat was implemented by the CENTRAL EUROPE Programme (2007-2013) co-financed by the European Regional Development Funds.

CluStrat aimed at the development of new cluster concepts that foster cross-fertilization between industries, technologies and services and support the implementation of Key Enabling Technologies. The transnational consortium of 18 partners thus developed a joint strategy on new cluster concepts in view of emerging industries and cross-cutting issues for central Europe. The joint strategy is complemented by recommendations to policy makers and an action plan to introduce the latter into the regional and national systems.

Moreover, proposals for joint actions at transnational and macro-regional level were adopted. Following the implementation of eight pilot actions, single action plans proposing implementation of new cluster concepts to cluster practitioners were designed.

The project results were based on a mapping of potentials in the project regions and elaborated in a process of systematic policy dialogue at regional, national and transnational level, sharing and validating interim results with operational policy makers and relevant stakeholders throughout the project.

All project results are available at the project website

www.clustrat.eu/results/

Project countries: Austria, Czech Republic, Germany, Hungary, Italy, Poland, Slovenia and Slovakia

Project duration: October 2011 – November 2014

CluStrat was coordinated by Steinbeis-Europa-Zentrum, in close collaboration and with financial support from the Ministry of Finance and Economics Baden-Württemberg.

EXECUTIVE SUMMARY

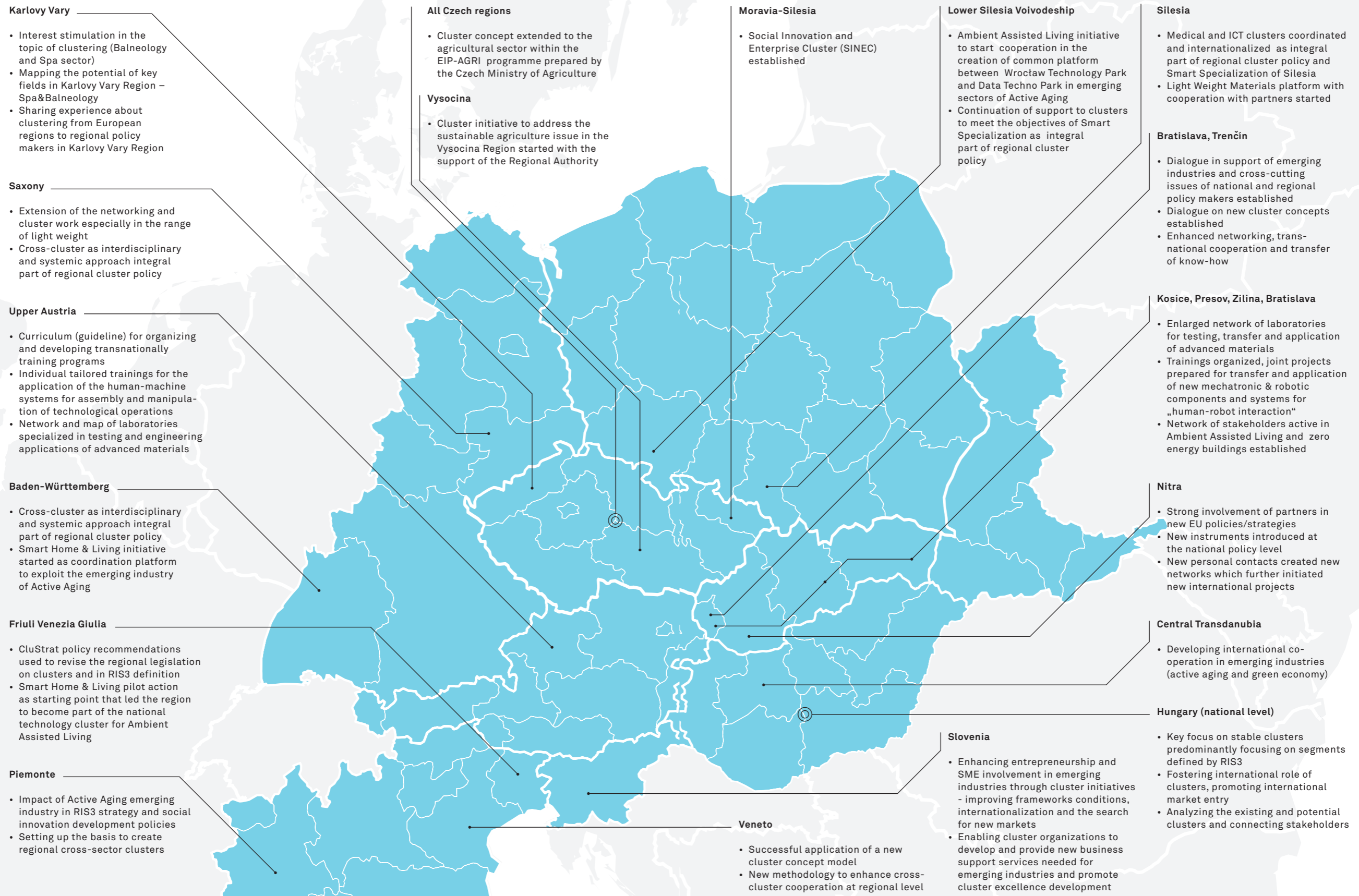
Emerging industries require innovation at the interface of industries, technologies and services including the cross-sector implementation of Key Enabling Technologies. New cluster concepts will help to seize the opportunities offered by emerging industries in the European regions. To this end, the project CluStrat delivers a new strategic approach identifying

- the need for selective cluster policy, which is tailor-made and cluster-specific, favoring at regional level the creation of clusters where justified by the regional scale, and of other suitable forms of collaboration and networking – within, among and beyond clusters;
- the need for a forward-looking cluster policy which identifies and exploits opportunities for cross-cluster cooperation between regions having different strengths and competences, in accordance with the Smart Specialization framework, thus supporting at the same time the internationalization and transnational cooperation of firms through clusters;
- the need for an evolution of cluster management organizations towards an entrepreneurial approach, rendering them capable of identifying and proposing to their members business opportunities as well as occasions of transregional cooperation.

Moreover, CluStrat suggests a systemic approach which sets cluster policy into a broader framework of

- the necessity to arrange occasions and contexts to exchange information, experiences and knowledge, as this is considered a key infrastructure to develop cooperation and innovation projects in the emerging industries;
- the importance of an appropriate knowledge institutions (sub)system, including Key Enabling Technology actors and institutional knowledge-intensive business services;
- supporting an early-on involvement/consideration of the demand-side, stressing the importance of laboratories where demand and supply can meet and interact as a cognitive resource, and proposing the development of complex and expensive experimentations between demand and supply as a possible subject of transnational cooperation;
- suggesting clusters as an especially suitable context to develop the innovation potential related to gender and diversity, making the necessity to release the innovation and creativity potential linked to diversity at all organizational levels a key objective of cluster policy.

OVERVIEW MAP: MAIN OUTCOMES IN THE PROJECT REGIONS



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INTRODUCTION

To ensure Europe's future competitiveness in a rapidly changing environment and to address upcoming societal challenges, Europe's economy needs a transformation process in order to interlink European Member States' economies to foster existing potentials, to become capable of identifying and exploiting new areas of growth. Emerging industries, representing new and promising areas of growth for regional or national economies, leading to radical innovations, new technologies or changes in existing economic activities and services, can play an important role to reach this goal¹.

Active and healthy aging, green economy and sustainable development as well as sustainable and intelligent mobility are but a few examples of emerging industries entailing considerable growth potential for European regions. However, none of these areas can be defined as industries in the strict sense of the word. In fact, a combination of skills and competences from various industries and technologies is needed to serve the related markets. To this end, Key Enabling Technologies (KET) including micro-/nano-electronics, nanotechnology, photonics, advanced materials, industrial biotechnology and advanced manufacturing technologies will "enable advances in all industries and sectors" and are thus "a key source of innovation"².

Cross-disciplinary cooperation is thus needed to enable innovation at the interface of different technology fields and industries, to exploit the chances of emerging industries. In order to facilitate the cooperation delivering such cross-fertilization, clusters represent promising subjects since they offer a dynamic business environment where different actors (mainly companies, scientists and intermediaries) from different sectors interact. Moreover, cooperation among clusters and beyond can further facilitate the cross-fertilization needed in the emerging industries. Thus, clusters form an effective tool of innovation policy and the combination with emerging industries becomes evident.

¹TACTICS Reflection Group, Task Force on Using Excellent Clusters to Address Emerging Industries (and Services), Input Paper for and Conclusions from the task force workshop held on 12-13 May 2011, <http://www.eca-tactics.eu/eca/page/tf6address-emerging-industries-including-innovative-services>; Püchner P. (2011), Discussion Paper on Emerging Industries, <http://clustrat.eu/results/results0/>; Meier zu Köcker G., Lämmer-Gamp T., Nerger M., Zombori Z. (2012), Clusters in Emerging Industries, Working Paper of the Institute for Innovation and Technology No. 09.

²European Commission, A European strategy for Key Enabling Technologies – A bridge to growth and jobs, COM (2012) 341 final, p. 3.

Yet, single-industry or single-technology clusters are not able to face the challenges of the emerging industries. To make innovation at the interface of traditional and emerging industries, technologies and services happen, collaborations within and across clusters, between clusters and external actors are needed. CluStrat has been working on new cluster concepts facilitating such cooperation. This brochure delivers the joint approach and shows the project results in terms of:

I. Recommendations to policy and proposals for actions at transnational and macro-regional level

Part 1 of this brochure shows the conclusions from the strategic project CluStrat in terms of: 1) The underlying mind-set proposed in regard to implementation of new cluster concepts, 2) transnationally shared recommendations to policy on how to activate the role of clusters in emerging industries, and 3) proposals for joint policy actions at transnational and macro-regional level.

What about region-specific results?

Based on the experiences from eight pilot actions implemented by the partnership, a "Joint Action Plan" was developed proposing for each project region how to introduce and implement the project results into the respective regional/national system. This document and further findings at the regional/national level are available from the project website.

II. Joint strategy on new cluster concepts in support of emerging industries and cross-sector themes for central Europe

Part 2 of this brochure shows the full joint strategy adopted by the project partnership of CluStrat. The strategy applies a systemic and challenge-driven approach to cluster policy and clusters' role in regional innovation systems (RIS), and acknowledges the importance of considering the variety of the existing clusters landscape in the EU.

The Joint Strategy deploys new cluster concepts around four pillars:

- 1) Involvement of key enabling actors specialized in KET and other relevant actors such as Knowledge-Intensive Business Services (KIBS)
- 2) Entrepreneurial cluster management, which is opening up to intra- and inter-cluster collaboration for firms, involving organizations from different sectors
- 3) Convergence of Smart Specialization strategies (RIS³) and regional cluster objects, proposing cross-cluster cooperation including the collaboration of clusters within the region as well as with extra-regional organizations
- 4) Consideration of the demand side in order to identify new market niches and researching and developing innovation in the field of emerging industries

Pilot Actions

Eight pilot actions have been implemented in CluStrat to test new cluster concepts in the project regions. The cluster concepts tested include systemic coordination, formation of new value chains, establishment of new clusters, transnational cross-clustering platforms, strategic/innovation partnerships, knowledge transfer networks, demonstration & training platforms etc. Each pilot action was implemented by a group of project partners either working together transnationally in a joint initiative, or implementing related/complementary actions in parallel in different regions, testing different ways to reach a joint objective.

Pilot actions mainly focused on one or several of the below objectives:

- Stimulation of cross-sector cooperation at regional and cross-regional level
- Measures to bring KET knowledge and implementation to clusters and their members
- Preparation or even establishment of new clusters, e.g. clusters going beyond single industries
- Facilitation of transnational cross-cluster cooperation, e.g. matchmaking, towards strategic partnerships and new value chains

The following information on the pilot actions can be obtained from the project website:

- Description of each pilot action and summary of results
- "Single Action Plans" serving as transferable manuals for implementing new cluster concepts

www.clustrat.eu/results/

Good Practices – beyond CluStrat

CluStrat has not been a lonely island. On the one hand, there has been a close interaction with other projects (e.g. ClusterPoliSEE, ClusteriX, ClusterCOOP, OECD Next Generation Competitiveness Initiative) as well as the Cluster Excellence Working Group in Priority Area 8 of the European Strategy for the Danube Region. On the other hand, various good practices, including for instance the project Comfort in Living and the Welfare Tech Cluster from the Baltic Sea Region, have provided inspiring impulses.

RECOMMENDATIONS TO POLICY AND PROPOSALS FOR ACTIONS

1. UNDERLYING MIND-SET³

The following generalised propositions offer a first mind-set on using clusters and cluster initiatives as a policy tool to foster the support of emerging industries and cross-sector issues in economies and innovation systems across Europe⁴.

Policy actions at regional and/or national level should take the following aspects into consideration to be successful:

- A. **Focus on results** – presupposing the existence of specific, shared objectives. To ensure operating to the set objectives – which are ideally confirmed by the cluster members – strategic planning, implementation and evaluation are essential for a good performance of clusters and cluster initiatives. Due to the nature of KET and the emerging industries themselves (new, high-risk, diversified & complementary knowledge needed ...), developing these systems can be challenging as it is difficult to capture dynamic effects and impacts on other areas.
- B. When addressing emerging industries with clusters, it should be done in a **smart and selective** way, meaning to build on existing regional strengths and seeking complementary combination in cross-regional alliances, in line with Smart Specialization strategies (RIS3). This framework also applies to the deployment of new emerging regional strengths. Clusters should be implemented in industries where niches have been identified. Supporting infrastructure – within the cluster or through relevant networks – is necessary to enable knowledge-intensive service provision.
- C. **New cluster services and training:** A cluster-based approach coupled with out-of-the-box offerings that aggregate membership interests and competencies to emerging market trends must be a consideration of future cluster services. This entrepreneurial mind-set of cluster management organizations (CMO) is essential for competing in emerging markets,

even if the organisations are NGO or publicly funded institutions and therefore training modules for cluster managers will be needed. This implies that CMO are sensitized towards the chances of the emerging industries and related cross-fertilization among and beyond clusters of different sectors and technologies, and incorporate the seizing of the related opportunities as part of their assignment.

- D. Also **cross-fertilizations or cross-cluster-collaborations** are a fruitful way to gain new market opportunities, especially when there are already regional clusters present. In this case it could be of advantage to bundle the management activities under one umbrella organization, to foster cross-fertilization in day-to-day routine. In other cases support programmes for linking the different actors, like matchmaking events (for demand and supply side, C2C, B2B) or even networking or partnerships between different European clusters can bring the hoped-for breakthrough. Especially European clusters within the sector or across disciplines, that supplement each other, should be interlinked to gain better European visibility and boost exchange of complementary skills and services.
- E. **Linking value chain activities** through cross-cluster and cross-region cooperation. Full value chains do not exist in many regions. Cooperation between players and end-users in different clusters of a region or among different regions provides opportunities to work along full value chains to expand the business of local industries. Moreover, such transnational combination of skills facilitates the development of new value chains as implied by in the emerging industries.
- F. **Involving end-users (demand side)** right at the beginning of drafting new product ideas reduces misguided developments at an early stage and saves a lot of resources in many ways. Cluster organizations can bring together various types of innovators at an early stage of the innovation process at the regional or transnational level. Also living labs, modern museums, laboratories where end-users can interact with new technologies, the innovator or scientist, are a valuable infrastructure and indispensable within the development process of emerging industries. At the same time, these players could be linked through a meta-level structure/platform/player providing methodological knowledge, information on trends, visibility etc.
- G. **Supporting the competitiveness of small and medium-sized enterprises (SME)** and growth by stimulating access to regional/European feasibility, testing, prototyping and manufacturing capabilities for research-intensive and end-user SME. Stimulating research and innovation activities involving SME both as part of the value chain collaboration and through specific actions aimed at SME. In particular, open innovation models along the value chain can further promote the collaboration between large industry and SME. Supporting the development of open-access pilot line and foundry services that provides SME access to manufacturing capabilities. For SME, the presence of cluster organisations represents a chance to get involved organically in the innovation transfer, and to participate in the chances and growth perspectives as outlined by Horizon 2020. If cluster organisations take up and deliver these new forms of cooperation, this will aid the implementation of Horizon 2020 across Europe, involving the SME.

³This section originates from the "Joint Action Plan" created in CluStrat. This project output consists of two chapters. Chapter 1 translates the main findings from the pilot actions into a generalized, underlying mind-set for future policy actions. Chapter 2 – which is available from the project website at www.clustrat.eu/results/ – shows the most promising strategic policy actions on clusters for each of the project regions/countries and deploys related recommendations for the respective national and regional systems.

⁴These may not be of relevance for every European Member State in the same way, due to different stages of development in economy, innovation systems and cluster policy.

2. RECOMMENDATIONS TO POLICY

The following recommendations address policy makers at European/transnational as well as regional/national level and serve to fertilize the conceptual phase on new cluster concepts at all policy levels. Some of the recommendations may seem to be more feasible at regional, some at European level, but are of interest for all levels.

Recommendation 1 | Cluster policy should be selective

Cluster policy should be selective, not supporting all the existing clusters but aiming at favoring the development of the formation of production systems that have the characteristics of a good cluster, i.e. advantageous inter-firm relationships, entrepreneurial firms, and effective institutions. Besides the fact, that cluster excellence is already taken care of at European level by the Cluster Excellence label, the approaches to cluster excellence at regional level may ask for other or additional criteria, which can also be object of tailor-made support initiated by policy makers. A (non-exhaustive) list of criteria in the light of CluStrat could be:

- A high quality cluster strategy, which is aiming at introducing KET knowledge to the cluster members and identifies opportunities for strategic partnerships
- Cluster members receiving services paid by membership fees
- Financial stability of clusters (high self-financing rate), not dependent on public funding

Recommendation 2 | Cluster Smart Specialization

In the context of selective policies to favor clusters, a crucial aim is that of the evolution of CMO towards an entrepreneurial approach, so that they get capable of identifying and proposing to cluster firms (or their combinations) business opportunities in emerging industries and to offer occasions of transregional cooperation. This way, CMO will facilitate the development of the cluster Smart Specialization, which already represents a key concept of the Europe 2020 policy framework. To secure the entrepreneurial approach of cluster organizations

- the cluster set-up should combine top-down AND bottom-up approaches;
- clusters should be supervised by an advisory board consisting mainly of representatives of industry and some from research;
- clusters should be aware of their members' needs (e.g. customer relation management systems, continuous company visits, ...);
- companies should pay for cluster services right from the beginning.

Recommendation 3 | Creation of regional cross-sector clusters

European policy should foster the support of regional cross-sector clusters in cases in which the regional scale (critical mass of partners) allows to take opportunities, linked with the emerging industries, which a smaller scale will not allow to catch. A similar approach should favor the development of other suitable forms of collaboration and network having the same aim, even so they do not fit common cluster definitions.

In this case, European policy should look at best practice cases which picture how successful cluster organizations have been set-up and developed and how they have managed to be a successful pioneer. Next bits and pieces of these approaches could be used for similar implementation of organizations and cluster policies in other regions all over Europe.

Recommendation 4 | Accreditation of innovation actors

In order to increase the ability of European regions to compete in emerging industries, innovation projects developed by firms and clusters – in particular projects implying transnational cooperation – have to be supported by an appropriate innovation institutions (sub)system. Accreditations for innovation actors, both key enabling actors (KEA) and institutional knowledge-intensive business services (KIBS), would show that they have reached the excellence in their field, work at the global level and thus be a valuable partner in projects of transnational cooperation on emerging industries. In order to ensure to involve just high level experts, a form of accreditation of both KEA and KIBS at the European level could be developed. This accreditation system could be developed using and adapting formats such as ISO (International Organization for Standardization), European Foundation for Quality Management (EFQM) and the labelling system developed under the European Excellence initiative.

Recommendation 5 | Strengthening and connecting technology transfer centers, laboratories and open innovation centers

The presence of laboratories networks, where demand and supply can meet and interact, represents a cognitive resource, entailing a high value to the development of innovation projects in emerging industries (e.g. advanced materials, ambient assisted living, etc.) and can become hubs for interaction between R&D, companies and end users. The formation of new contexts of this type and the strengthening of the existing ones represent a qualified object of EU policy in the emerging industries. Developing such kind of laboratories all over Europe, interlinking them with each other and hence develop completely new value-chains could be supported by funding schemes and calls at European level.

Recommendation 6 | Enhancing knowledge transfer and joint training activities

Developing and implementing KET requires a perfect blend of complementary skills of the workforce. Therefore a continuous improvement process for human capital and knowledge transfer is key to bring KET into industrial application. It is recommended to launch Europe-wide training schemes to secure the necessary knowledge transfer.

Recommendation 7 | Interconnecting projects – in central Europe and beyond

Many transnational projects run in parallel across Europe. Fostering an exchange of experiences and transfer of results among them will enable a consolidation of insights, bundling of competences and thus create added value and increased scope. E.g. common webpages with significant project events and possibilities for project partners from different project consortia to interact during these events or conferences would strongly strengthen transnational cross-project cooperation and would foster the generation of new ideas/innovations in the field of emerging industries.

3. PROPOSALS FOR JOINT POLICY ACTIONS AT TRANSNATIONAL OR MACRO-REGIONAL LEVEL

Compared to the general cluster policy recommendations the below proposals for joint policy actions aim at possible topics and instruments to be implemented at a transnational level. This includes macro-regions like the European Strategy for the Danube Region, the European Strategy for the Baltic Sea Region or programme area levels as the CENTRAL EUROPE Programme. The following proposals shall serve as guidance for policy makers and programme managers for joint actions at transnational or macro-regional level paving the way for new cluster concepts that enable clusters to take an active role in emerging industries⁵.

Joint Action 1 | Facilitate new types of networking & cooperation activities

Due to the fact that emerging industries tend to require multidisciplinary skills, new types of networking and cooperation activities are needed – within and between different innovation communities and their actors (clusters, firms, R&D, intermediaries, policy makers...), to stimulate cross-sector activities and knowledge transfer for continuous improvement of skills and competences to emerging market trends. Clusters should be encouraged through policy instruments to

- enforce intra-cluster cooperation among firms and between SME, knowledge providers and business services;
- encourage cross-cluster cooperation especially with clusters from different sectors or with different technology know-how.

Instruments to support clusters and their members in this could be the following:

- C2C or B2B match-making events, e.g. at international leading fairs
- Ad hoc-partnership building for Research and Technological Development (RTD)
- Innovation vouchers
- Living labs and platforms with strong end-user involvement

Demand-orientation, multidisciplinary or implementation of KET, ad hoc quality cooperation could be among the assets of such concrete cooperation to be funded; however, these features should certainly not be seen as exclusive. Programmes and policy instruments should also keep some kind of flexibility to take account of new insights, approaches, necessities etc. over the coming years.

In general, the range of activities should be left open to allow for and foster the development of completely new formats and constellations of clusters and networks. The cooperation types developed in this context will serve to illustrate the range of possible innovation cluster cooperation, allowing the deduction of models and good practice, thus generating a new set of tools for cluster policy.

Target groups: Clusters and cluster initiatives, innovation networks

The new topic here is to open such instruments in a very targeted way and selectively to clusters with a high potential for competitiveness. They are used as incentives for cluster managers or cluster members to take the lead to enhance their cluster competitiveness through cooperation with knowledge providers.

Policy makers are encouraged to even specify these instruments to

- a specific emerging industry or societal challenge and/or
- specific KET applications, as they are key for exploiting emerging industries.

Target groups: Policy makers on European, national and regional level

Joint Action 2 | Stimulate European clusters in various forms

The issue of meta-clustering is discussed and piloted already, whereby different definitions and understandings of meta-cluster are used. The proposition in CluStrat is that a variety of KET and possibly knowledge-intensive business services are needed to develop competitive products and services for the emerging industries. Very few regions in the EU can offer KET knowledge in all areas – and not all KET knowledge providers may know the specific characteristics of the application fields needed. A European clustering to join forces and bring together all the necessary partners should be targeted and strategic towards specific technological and market oriented objectives. The European Innovation Partnerships are one type of such a targeted “cluster”. But other forms are possible, connecting established and upcoming regional/national initiatives on a European level, to concentrate separated skills and competences, and exchange knowledge about existing R&D-infrastructure (maps). Cluster policy on regional, national and European level should create tools and services to help clusters to join forces with other clusters in Europe, following a cross-sector and cross-cutting approach. Clusters are to be encouraged to form transnational or transregional partnerships with other clusters, so that their cluster members can start strategic development partnerships, e.g. as project consortia for funding applications or as longer-lasting meta-cluster structures.

Instruments that would support this could be:

- Cluster matchmaking events
- Mapping of high level RTD infrastructures in Europe
- Mapping of SME service providers for technology and sector specific applications
- European expert workshops to interlink clusters, SME and research as well as user groups
- Innovation public procurement, where public demand e.g. in a hospital asks for a solution to be delivered by a European partnership
- European supplier workshops, where clusters bring together the demand side and potential solutions

This activity could be

- triggered by regional policy makers (NUTS 2)⁶ as well as programme area authorities as a top down approach according to EU market needs;
- encouraged as a bottom up process, where clusters or cluster members take the lead;
- a combination of a top down and bottom up approach to interlink the big picture of regional policy makers with day to day challenges faced by regional SME.

This leads to raising European and international visibility, strengthens communication, cooperation and supports a trust-building process within European actors.

Target groups: Regional/national clusters, initiatives, networks, policy makers, SME

⁵As regional/national set-ups in regard to innovation policy and practice differ in the central Europe region, the joint action proposals might have to be adapted to regional/national characteristics.

⁶NUTS: Nomenclature of territorial units for statistics; NUTS 2: Basic regions for the application of regional policies, see http://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST_CLS_DLD&StrNom=NUTS_33&StrLanguageCode=EN.

Joint Action 3 | Internationalization activities supported by cluster initiatives

Clusters can play an important role in supporting internationalization activities of SME. They are well connected to all regional/national experts for starting internationalization efforts, can identify possible partners, provide contacts to other foreign cluster initiatives and can therefore provide the required target market information. This is key in times of saturated European markets – hit by the financial crisis – to widen the scope of selling their products outside the single market but also conducting knowledge transfer (both ways – incoming and outgoing) to make Europe competitive for the future.

Instruments that would support this could be:

- Cluster matchmaking events outside Europe (India, China, Indonesia, Brazil etc.)
- Supplier innovation days (see Automotive Cluster Upper Austria)
- Mapping of high level RTD infrastructures outside Europe (India, China, Indonesia, Brazil etc.)
- Mapping of SME service providers for technology and sector specific applications outside Europe (India, China, Indonesia, Brazil etc.)
- European expert workshops to interlink clusters, SME and research as well as user groups to better capitalize on internationalization activities and to better join forces
- Global supplier workshops, where clusters bring together the demand side and potential solutions

Target groups: Regional/national clusters/(SME)

Joint Action 4 | Improve Excellence of Cluster Management Organizations and know-how carriers to make them capable of anticipating and exploiting emerging market needs and trends

To compete in rapidly changing environments as emerging markets tend to be, an entrepreneurial mind-set oriented towards identifying necessary services and market trends will cause higher efficiency and professionalism in innovation activities.

Promising actions could be:

- Trainings for entrepreneurial mind-sets and in view of the multidisciplinary requirements of emerging industries and chances of KET (e.g. training modules/voucher schemes)
- Training in innovation management techniques such as roadmapping
- Networking of cluster managers with professional business service providers such as the Enterprise Europe Network

Target groups: Regional/national clusters, initiatives, networks, policy makers, R&D

Joint Action 5 | New sustainable sound business models

With new forms of clusters – on regional or European scale with long term or with targeted short term perspectives etc. – new business models for the cooperation or innovation networks are to be encouraged. Also in view of new ways for innovation support (funding), e.g. through innovative public procurement or service contracts, new business models should be tested and legal frameworks developed. This includes also a set-up of business models for clusters, in which clusters develop

SME technology platforms or living labs to test and pilot new products and services (who pays for the necessary infrastructures, who keeps them updated to newest standards etc.). Competitions for new and best solutions could be called by policy makers in specific areas, e.g. in advanced manufacturing and for specific sectors, to identify working business models for the future.

Possible schemes:

- Clusters as project managers for innovation vouchers of their cluster members
- Cluster services are paid by a percentage of income from new product/service
- Clusters as project managers to write applications for funding schemes on regional or national level for their cluster partners (focus: product development)
- Clusters as evaluators of outcomes of initiated projects (how many products developed, how many products sold, how many follow up projects initiated)
- Clusters as compilers of the most suitable blend of SME joining the consortium
- Clusters as imitators of follow-up projects

Target groups: Regional/national clusters, initiatives, networks, policy makers, R&D, SME

Joint Action 6 | Integrating targeted cross-sector cluster cooperation in available funding schemes

Borders are still a limitation of knowledge exchange all over Europe. This is not just caused by language barriers but also by different legal frameworks, which limit the transfer of experts willing to be trained in a specific issue abroad and supported by European funds. The CluStrat pilot action “Human Machine Interface” developed cross-border training modules bookable by interested experts. To support the vice versa knowledge transfer between experts, the development of and possibility to participate in such trainings should be fostered. In this case cross-border funding schemes or the applicability of different funding schemes should be improved.

The funding scheme should be

- applicable to cross-sector topics;
- easy to apply to;
- short time to grant;
- almost free of reporting hurdles.

Target groups: Regional/national clusters, initiatives, networks, policy makers, R&D

Joint Action 7 | Evaluate project outcomes within and between different funding schemes

During the last EU funding period it became obvious that within and between different funding schemes, the topics for funding are very much alike (funding schemes: Competitiveness and Innovation Framework Programme/CIP, CENTRAL EUROPE Programme, South East Europe Programme ...). The outcomes for example of the clusters projects in CENTRAL EUROPE and the South East Europe programmes render, besides important additional findings, a variety of cluster platforms, cluster management tools and indicators or mapping activities etc. Many of these outcomes have substantial overlaps.

If similar things are funded it is crucial that the actors involved know about these activities and that they can capitalize on the experience of similar projects (see e.g. CluStrat, ClusterPoliSEE). To capitalize best on already existing knowledge and lessons learned, Europe should also identify regions, which are innovation pioneers outside Europe. The support mechanisms, funding schemes etc. set up e.g. in Silicon Valley could be of high value for Europe boosting innovation by focussing on KET, emerging industries and grand societal challenges.

In this case, the High Level Expert Group (including experts from outside Europe; see Cluster Policy Joint Action 8) – supported by financial and personal resources – can secure a big picture and give advice to policy makers on the outcomes of European and non-European projects and funding schemes initiated, to make their funding schemes more cost effective.

Target groups: Policy makers on European, national and regional level

Joint Action 8 | Setting up a High Level Expert Group on European Level

To pool and streamline the above-mentioned joint actions and to support their implementation at European, national and regional level a High Level Expert Group should be set up whose scope and objective should be to share intelligence about cluster policies in view to further explore how to better assist Member States in supporting the development of:

- Internationalization activities of clusters and their SME
- Knowledge transfer to close the gaps within the global value-chain by means of international networking, trainings, funding schemes etc.
- New, better structured, developed and supported value-chains
- Exchange of good practices for new business models
- To identify and evaluate funding schemes and projects abroad and check their applicability for Europe (e.g. funding schemes in Silicon Valley)

Target groups: Policy makers at European level

STRATEGY ON NEW CLUSTER CONCEPTS

1. THE BASIC ELEMENTS OF THE CLUSTRAT PROJECT

In the first section of this document – setting out the validated joint strategy of the CluStrat project – the CluStrat’s founding concepts and their interconnections are presented. The founding concepts are:

- clusters,
- emerging industries, and
- cross-cutting issues.

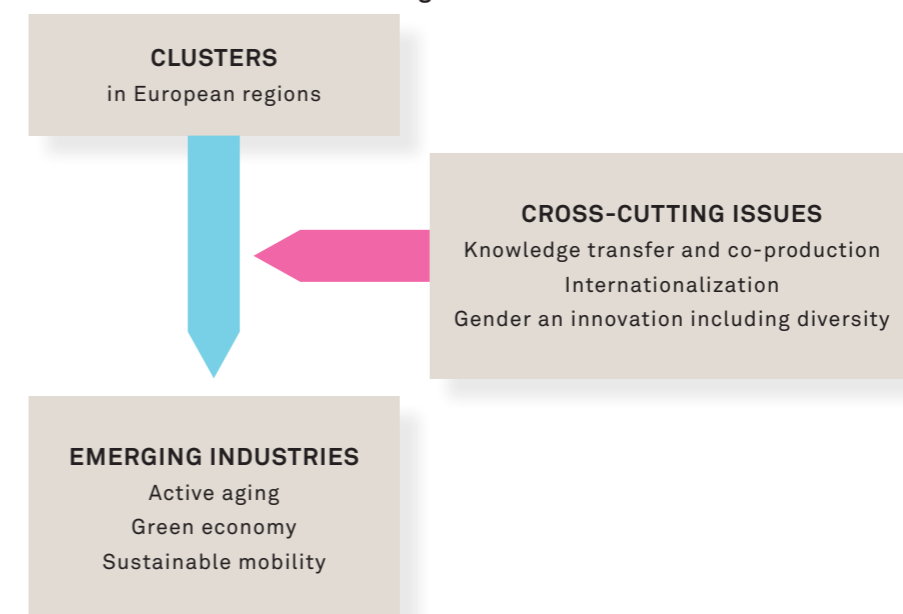
The connections between the three concepts have been clearly outlined in the CluStrat’s earlier documents, as summarized in Figure 1. Clusters, whether traditional-sector clusters or high-technology clusters, do not constitute a pre-condition for the development of the industries identified by CluStrat as “emerging”, that are:

- active aging,
- green economy, and
- sustainable mobility.

Rather, these emerging industries offer the clusters an opportunity for future development and competitive evolution. In other words, the clusters can actively participate in the emergence of these new industries, which in turn “are a reaction to challenges of society” (p. 3)⁷ and cannot therefore prescind from considering the demand side and the social dimension. Using the specific advantages of clusters to exploit the opportunities of the emerging industries represented the main objective of CluStrat, and the cross-cutting issues were strategic leverages for the achievement of this goal. They are:

- knowledge transfer and knowledge co-production,
- internationalization, and
- gender and innovation including diversity.

Figure 1 The basic elements of CluStrat’s strategic framework



1.1. DEFINITION OF CLUSTERS

Several definitions of (geographical) clusters have been developed, but the most diffused and wide-spread accepted by scholars and policy makers is the one formulated by Michael Porter, who defines them as “geographic concentrations of interconnected companies and institutions in a particular field” (p. 78)⁸. The author adds that “clusters encompass an array of linked industries and other entities important to competition. They include, for example, suppliers of specialized inputs

⁷Püchner P. (2011), Discussion Paper on Emerging Industries, 2nd Draft, Steinbeis-Europa-Zentrum, available from www.clustrat.eu/results/.

⁸Porter M.E. (1998), Clusters and the new economics of competition, Harvard Business Review, 76(6): 77-90.

such as components, machinery, and services, and providers of specialized infrastructure. Clusters also often extend downstream to channels and customers and laterally to manufacturers of complementary products and to companies in industries related by skills, technologies, or common inputs. Finally, many clusters include governmental and other institutions – such as universities, standard-setting agencies, think tanks, vocational training providers, and trade associations – that provide specialized training, education, information, research, and technical support” (p. 78). Following this definition, the main elements that characterize a cluster are three:

1. the concentration in a regional or subregional area;
2. the existence of a number of firms and institutions being interconnected;
3. the presence of firms specialized in the production of different intermediary or final goods, services or technologies, but all related to one category of products (“a particular field” to put it in Porter’s words).

It is important to notice that the definition of cluster used in the CluStrat context prescind from the presence of a cluster management organisation (CMO), but considers the existence of a recognised set of actors, mostly firms but also institutional actors, operating in that industry, or in those related industries⁹. Also, the understanding of clusters used in CluStrat project does not include just clusters specialized in traditional manufacturing industries, such as clothing, eyewear, furniture, but includes geographical concentrations of firms and institutions specialized in the production of high-tech products and services. Actually very often firms specialized in services (e.g. service providers, logistics, designers) or advanced technologies (e.g. nanotechnologies, ICT, ...) co-exist within clusters specialized in the production of ‘traditional’ products, such as furniture, and vice versa. Moreover, firms that were initially mainly manufacturing ones develop over time into service firms, such as in the case of a shoemaker that became a designer or a distributor of shoes manufactured by others.

Even though this definition does not give specific criteria and yardsticks to identify what is a cluster and what is not, it is clear that not all regional specializations are clusters, but that there is a need for a ‘critical mass’, which anyway may differ from region to region, from industry to industry. Actually, the CluStrat partners, in agreement with the advisory board experts, decided to refrain from a jointly agreed cluster definition that goes beyond the very general characteristics of a cluster as outlined above. Regional innovation policies in the central Europe Region differ according to the regional specific challenges and industrial history and culture, in which Italian regions speak about industrial districts or where Baden-Württemberg has a joint dedicated research target as a mandatory asset for a cluster.

1.2. CLUSTERS, EMERGING INDUSTRIES AND CROSS-CLUSTER COOPERATION

Active aging, green economy and sustainable mobility are emerging industries entailing a high growth potential. However, none of these can be defined as an industry in the strict sense of the word, or even as a specific technology, even though it is industries (in the strict sense) or technologies the normal references for the definition of clusters. In this paragraph we explain the link between the concept of cluster with that of emerging industries within the context of CluStrat.

Both scholars and policy makers have acknowledged the importance, in the case of clusters, of providing the economies of many European countries with a competitive advantage, at least until recently. And European Union documents and programmes have always acknowledged the importance of clusters. Similarly, CluStrat supports that “clusters are known to enhance innovation in businesses and are thus an accepted part of the innovation framework”, as reported in the project’s application form.

Notwithstanding, the clusters we refer to are not able to face the challenges of even a single emerging industry alone. None of them, even the most advanced in terms of technology, business relations and research infrastructures, are able to do this. In fact, the emerging industries such as active aging or sustainable mobility cannot be served without combining a variety of technologies, services and traditional sectors. After all, clusters in Europe represent important tesserae to build each of the emerging industries’ mosaic, aiding the combination of complementary specializations in accordance with the emerging industries themselves. Similarly, emerging industries offer to clusters the necessary perspective to revamp their competitiveness in the global economy.

In this way, CluStrat has offered an important context to experiment one of the key concepts of the Europe 2020 policy framework, i.e. that of smart specialization¹⁰. This concept was developed by a group of academicians in 2008 and had very quickly a significant impact on the EU policy audience. Indeed, the European Commission announced in 2010 the setting up of a platform (S³Platform) in order to assist regions and states in developing, implementing and reviewing regional smart specializations strategies. According to the smart specialization concept, regions have to focus on their peculiar strengths. Such strengths may be defined as activities and industries well diffused in a region, which hold a competitive advantage at the global level and for which it seems appropriate to develop innovation policies aimed at support their competitiveness. A Smart Specialization Strategy shall therefore begin with an analysis of potential partners in other regions to avoid unnecessary duplication. In this sense, regional smart specialization and transregional (transnational) cooperation are two sides of the same coin, as we will better discussed in paragraph 2.3.

⁹This statement has not to be understood as in opposition with what proposed in the CluStrat framework in par. 2.2, i.e., the importance of an entrepreneurial CMO. In fact, even though clusters without a CMO may exist, its presence is needed to develop successfully toward emerging industries and take on societal challenges.

¹⁰Council Conclusions on Innovation Union for Europe, 3049th Competitiveness Council Meeting, Brussels, 26 November 2010.

¹¹European Commission, Guide to Research and Innovation Strategies for Smart Specialization (RIS 3), May 2012.

Obviously, clusters represent a fundamental resource to design and implement smart specialization strategies. This is explicitly recognized by the “EU Guide to Research and Innovation Strategies for Smart Specialization”¹¹. More precisely, to ensure that this resource can be effectively used in the prospect of smart specialization, the policy makers have to bring three types of action onto the field:

- using cluster mapping to identify regional competences and assets;
- support clusters to meet the objectives of smart specialization;
- strengthen local and international cluster cooperation, in particular for addressing emerging industries with the aim of making use of complementarities between regions.

CluStrat has moved along the lines of these policy recommendations as other EU strategic projects, e.g. the INNO-Net project TACTICS (within the PRO INNO Europe), acronym for Transnational Alliance of Clusters Towards Improved Cooperation Support. Similarly to CluStrat, TACTICS involved initiatives of cross-cluster cooperation oriented to addressing emerging industries¹².

The strategic links between (smart) specialized clusters and emerging industries are thus obtained through cross-cluster cooperation, involving clusters that may be located in other regions or countries. Given the intrinsically complex nature of the emerging industries, where Key Enabling Technologies (KET) such as nanotechnology or advanced materials support new methods of producing and consuming goods and services, this cooperation must also involve clusters specialized in advanced technologies and traditional clusters. Such cooperation is to be intended as a cross-fertilizing process, a mean to introduce KET into traditional industries and to identify new and profitable applications for KET. The interaction of high-tech or KET clusters and traditional clusters with the intent to establish strategic and object-oriented partnerships has therefore represented the central aim of each pilot project of CluStrat. The result of such cross-fertilization/ cross-cooperation is the generation of new products or services that answer societal challenges and, thus, boost innovation and economic growth.

Cross-cutting issues support the development of the smart specialization and cross-cluster cooperation and, more generally, of the elements of the strategic framework which will be discussed in section 2. Section 3 will discuss more in detail the role of cross-cutting issues for the strategic framework. It is useful to provide already at this point, however, a definition of the cross-cutting issue on knowledge. When the project started, in fact, it was defined as “knowledge and technology transfer”, but we then modified it in “knowledge transfer and co-production”. Indeed when looking at the strategies for smart specialization of clusters and cooperation between clusters from a cognitive perspective, the cross-cutting issue that really counts is much more far-reaching than simple transfer – from one, more advanced region, firm or institution to a more backward one – assuming rather a form of knowledge co-production, considering for the break-through level of innovativeness represented by emerging industries.

1.3. THE VARIETY OF CLUSTERS

Within the regions participating in the CluStrat project and more generally European regions, clusters are very diversified as far as their structural characteristics and competitive capacity is concerned. Such evidence attracted a large attention in the CluStrat project and will be developed in this and in the next paragraph. Porter’s definition itself is a rather broad one; consequently, the category of clusters is somewhat heterogeneous. The literature studying clusters suggest that the most important variables along which to classify such diversity are:

- the geographical extension – existing very large and very small clusters;
- how they were formed – spontaneously vs. thanks to the determined effort of policy makers;
- the role of policies to develop them, once formed – being very strong or rather marginal;
- the specialization – high-tech vs. low-tech;
- the size of firms – being mostly small firms or having also an important share of medium or large firms;
- the presence or absence of a cluster management organization (CMO) and of a cluster strategy;
- the presence or absence in the cluster of knowledge institutions such as universities and technology transfer centers;
- the type of prevalent inter-organizational relationships – e.g. quasi-hierarchical vs. relational ones;
- the stage of the cluster development – e.g. mature vs. developing-ones;
- the existence of common cluster services and cluster projects.

In the literature, several models of cluster have been proposed, representing an attempt to reduce the complexity emerging from these axes into a small number of general instances. Among the models proposed, those for which an adequate number of empirical cases have been observed are:

- Marshallian industrial district;
- High-tech cluster;
- Hub-and-spoke cluster.

The first model is the so-called Marshallian industrial district, first studied by Alfred Marshall in the latter half of the 19th century and then discovered again by Giacomo Becattini in Italy a century later¹³. Such a model, however, has been observed also in other European countries, such as Spain, France and Germany.

Marshallian districts differ from other clusters for two peculiarities (Figure 2): first, they occupy a geographically circumscribed, naturally and historically bounded area (being therefore concentrated in a narrower area); second, within them there is a strong interpenetration between the production domain and the social domain. This overlap between production activities and daily life reduces frictions (transaction costs) in the relationships between the firms located within the cluster, and facilitates the circulation of knowledge (especially tacit knowledge) at the local level.

¹² TACTICS, Using Clusters to Address Emerging Industries and Services. Working Paper, October 2012.

¹³ Pyke F., Becattini G. and Sengenberger W. (eds.) (1990), *Industrial Districts and Inter-firm Cooperation in Italy*, Geneva, International Institute of Labour Studies.

Figure 2 The peculiarities of the Marshallian variant vs. generic clusters



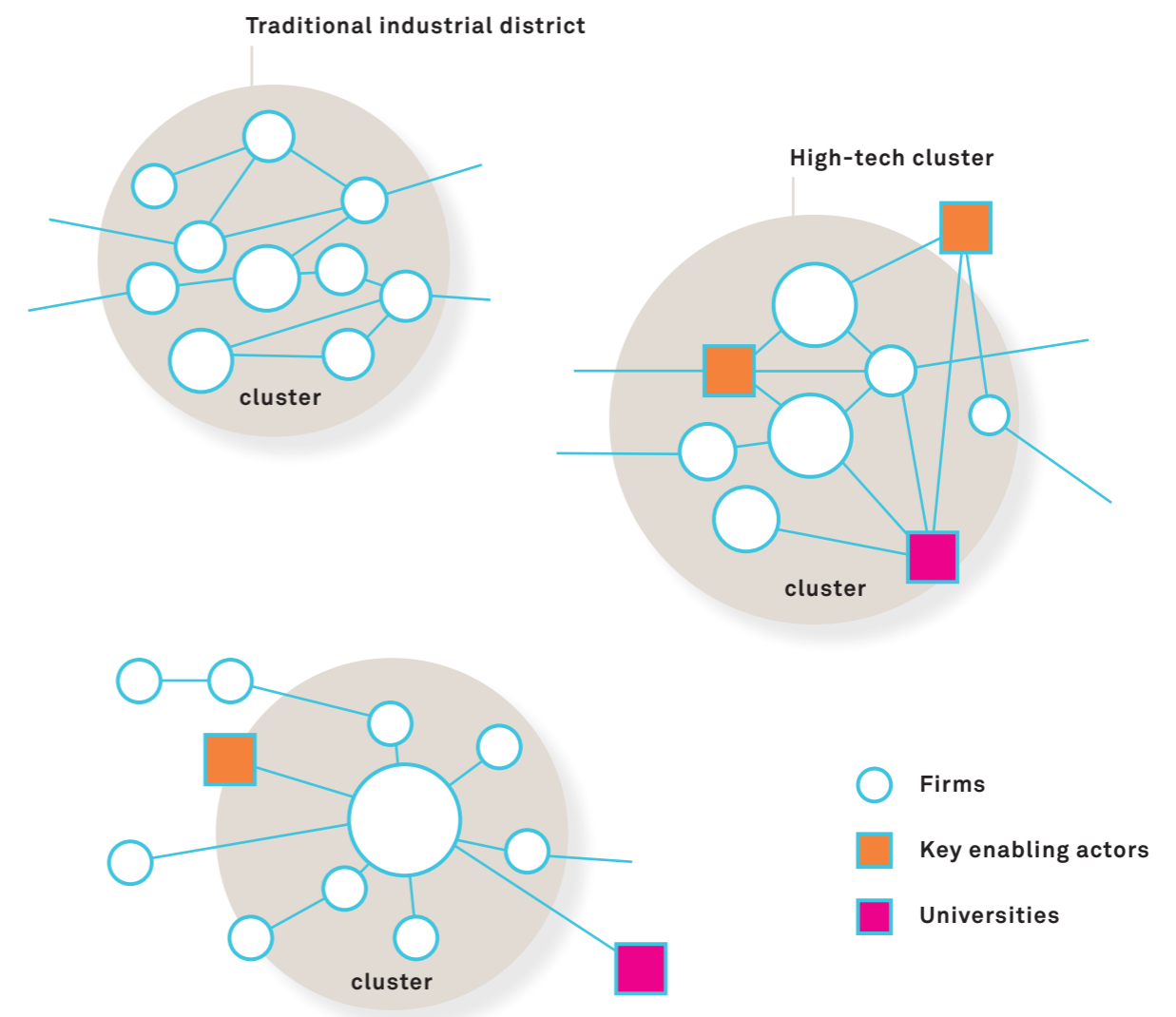
According to the literature, a second type of cluster is the high-tech one, specialized in high-tech sectors and characterized by a significant interaction between firms and research centers, classic examples being the Rhône-Alpes medical technology cluster¹⁴, and the clusters in Baden-Württemberg, the region that inspired the model of the regional innovation system and that of the triple helix¹⁵. The average size of firms in this second type of cluster is much larger than in the Marshallian districts, and so is the geographical extension of the cluster. Moreover, the role of policies is by far more relevant and knowledge codification process is more intense.

A third model, less studied in the literature but well-spread in Europe, especially in the South and East regions, is what Markusen named hub-and-spoke¹⁶ and other scholars defined hierarchical or also captive cluster, since the governance of the cluster is mainly driven by one large firm or a handful of key firms, which may be located within or outside the cluster, so that the other firms are mostly working as sub-suppliers for them. Figure 3 draws the three clusters model described.

It is important to notice at this point that this list of models is not a prescriptive but rather descriptive: each model has its own evolutionary path, advantages and disadvantages, also considering for different geographical areas and no one-best-way is available for regions. Similarly, it is not to be considered complete but rather indicative of the variety of clusters (more specific models may describe the variety of clusters characteristics the EU context). Moreover, beyond such a static variety, i.e., focused at a point in time, it is worth mentioning the existence of a dynamic variety, i.e., the presence of a plurality of evolutionary trajectories of cluster that could once be

ascribed to the same model. Such trajectories include the “concentric diversification” – the progressive enlargement of the cluster business specialization, such as in the case of the Medical Technology Cluster in Tuttlingen (Baden-Württemberg, Germany) that passed from the production of surgery instrument to a much larger variety of applications for medical engineering¹⁷ – and the “glocal cluster”, moving from a prevalence of cluster-contained inter-organizational relationships to a local-global configuration.

Figure 3 Models of clusters in the European landscape



¹⁴ Andersson S., Evers N. and Griot C. (2013), Local and international networks in small firm internationalization: Cases from the Rhône-Alpes medical technology regional cluster, *Entrepreneurship & Regional Development*, 25(9–10): 867–888.

¹⁵ Cooke P. and Morgan K. (1994), The regional innovation system in Baden-Württemberg, *International Journal of Technology Management*, 9(3–4): 394–429.

¹⁶ Markusen A. (1996), Sticky places in slippery space: A typology of industrial districts, *Economic Geography*, 72(3): 293–313.

¹⁷ Halder G. (2004), Local upgrading strategies in response to global challenges: The surgical instrument cluster of Tuttlingen, in Schmitz H. (ed.), *Local Enterprises in the Global Economy: Issues of Governance and Upgrading*, Cheltenham, Edward Elgar, pp. 200–232.

1.4 FROM A CROWDED TO A SUSTAINABLE CLUSTER LANDSCAPE

As suggested by a number of policy documents produced at the regional, national and European level so as by the reports on regional or national potential written by CluStrat partners, Europe is filled with clusters. Considering for such a rich cluster landscape and if we believe in the theory of the competitive advantage of clusters, we should expect European regions to have higher competitive performance, on average, than what data show¹⁸. Likewise, the concerns of several observers on the loss of competitiveness of Europe to the advantage of BRIC countries and other emerging economies such as Mexico and South Korea should not take place. In reality, it is reasonable to think that a not negligible part of the number of clusters identified in Europe that have been institutionalized are not “competitive clusters”, meaning systems that are able to guarantee a competitive advantage to the firms that belong to them.

Following the literature on clusters, competitive clusters are those that achieve these five requisites:

1. the existence of a web of local business relationships that keep alive because cluster firms consider them advantageous with respect to relationships with external firms;
2. the presence of entrepreneurial firms that have the ability to seek, identify and exploit new business opportunities¹⁹, pioneers in the development of innovations that then get spread into the cluster;
3. the presence of institutional actors that are able to create a favorable context for cluster inter-firm relationships;
4. the connection to research and innovation drivers;
5. the ability of the cluster to operate as an open local cluster, or a “glocal” cluster.

The last characteristic suggests that clusters, so as firms, are embedded in a global competitive landscape and should therefore be able to defend against its threats and take advantage of its opportunities, avoiding lock-in risks. Competitive clusters can thus be seen as “glocal”, that is local (regional or subregional) concentrations of organizations and inter-organizational relationships (local networks) extensively interconnected by means of inter-organizational relations with other external actors (global networks)²⁰. In these clusters, entrepreneurial players are relatively numerous and varied, including leading manufacturing companies and providers of knowledge-intensive business services, and they maintain relations (albeit selectively) within their cluster. They can thus act as knowledge gatekeepers between the cluster and the global circuits where much of the knowledge relevant to the sector in which the cluster specializes is generated, circulated and used²¹. Of course, each of the clusters that fits this bill, fulfilling the requisites of the competitive cluster, has its own particular features, depending partly on the sector, partly on the district’s history, and partly on the more recent strategic choices made by single enterprises and institutional actors within it.

In the light of what discussed, we can think of two policy implications that – as the others that will follow – can be applied at the European, national and regional level. Even if not naming them explicitly, this policy implication is to be understood in the light of emerging industries. In fact, in order for clusters to take opportunities on the most advanced frontiers – the emerging industries indeed – it is necessary for the cluster to have good foundations.

Policy implication 1a – Cluster policy should be selective, not supporting all the existing clusters but aiming at favoring the development or the formation of production systems that have the characteristics of – or the potential for – a competitive cluster, i.e. advantageous inter-firm relationships, entrepreneurial firms, effective local institutions, connection to innovation drivers and global links.

Policy implication 1b – Cluster policy should be cluster-specific, meaning to provide different support and tools to clusters considering for their peculiarities in terms of specialization, size, presence of key enabling and other relevant actors, models and the like.

It is important to highlight that the first policy implication is applicable to three, distinctive situations, being:

- a. clusters obeying the above-mentioned competitiveness requisites, so that policy should be oriented towards their consolidation;
- b. clusters which do not obey to all such requisites but have an important potential, so that policies should consider to fill in such gaps without diminishing the strengths of the cluster;
- c. regions that have not full clusters yet²², for which the above-mentioned requisites represent a useful benchmark to develop policies aimed at supporting the emersion of local clusters and the cooperation with existing clusters outside the region.

¹⁸At this regard, see the brand new draft report on regional competitiveness, which is one of the preparatory studies for the sixth report (2013-14) on economic and social cohesion: Annoni, P. and Kozovska, K. (2013), EU Regional Competitiveness Index 2013.

¹⁹Shane S. and Venkataraman S. (2000), The promise of entrepreneurship as a field of research, *Academy of Management Review*, 25(1): 217-226.

²⁰De Marchi V. and Grandinetti R. (2014), Industrial districts and the collapse of the Marshallian model: Looking at the Italian experience, *Competition & Change*, 18(1): 70-87.

²¹Morrison A. (2008), Gatekeepers of knowledge within industrial districts: Who they are, how they interact, *Regional Studies*, 42(6): 817-835.

²²A useful case in point, within the CluStrat project, is represented by the Karlovy Vary region.

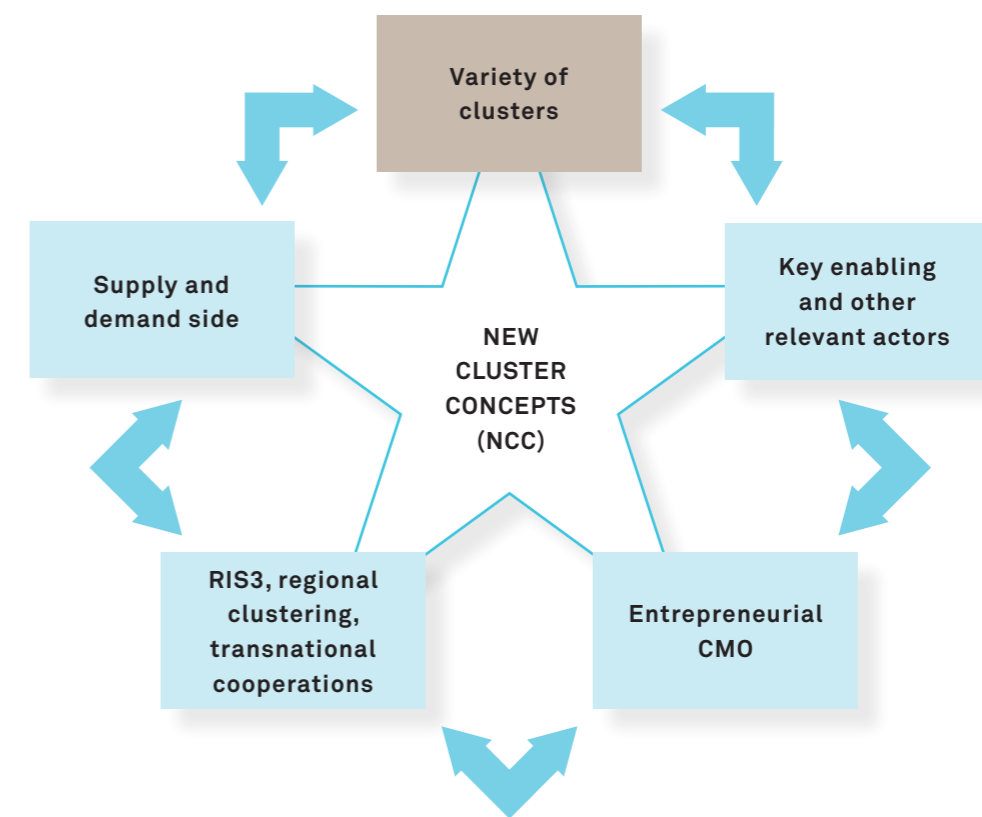
2. DEVELOPING NEW CLUSTER CONCEPTS: THE CLUSTRAT FRAMEWORK

As mentioned in paragraph 1.4, the presence of entrepreneurial firms – that have the ability to seek, identify and exploit new business opportunities – is a fundamental requisite to support the competitiveness of clusters. A new entrepreneurial idea can be either developed by an existing firm or introduced by a new venture, as in the case of entrepreneurial spin-offs, where an ex-employee pursues a business opportunity that his/her parent firm is unable to recognise or unwilling, or slow to pursue. Entrepreneurial processes always create new economic activities. The degree of newness to the market of these activities may vary considerably, from breakthrough to incremental innovations.

Entrepreneurial firms represent the drivers of the competitive evolution of clusters, to which they belong to, thanks to the relations they establish with other cluster firms and other forms of knowledge transfer and spillover. However, in the present scenario, being very competitive and complex, cluster success depends also upon a series of conditions that overcome the firms, i.e., upon the design and implementation of good cluster policies.

Leveraging on the documents developed within the CluStrat project, the discussions held at the regional, national and transnational policy dialogues and the experiences learnt through the project pilots, this document aims at setting some considerations useful for developing the policy recommendations that will be fully developed in subsequent documents considering for the results of the pilots. In particular, the main aim of this document is that to provide a comprehensive framework to understand all the main elements that are to be considered for the development of policies for new cluster concepts (NCC), as emerged from the project. Figure 4 provides a summary of the main elements of CluStrat's strategic framework that will be discussed in detail in the following paragraphs. Each element needs to be considered to develop NCC but is not to be understood in isolation: rather each of them is emphasizing a different aspect of a common framework. They are instrumental to develop NCC and complementary to better describe how to achieve them.

Figure 4 Developing new cluster concepts: CluStrat's strategic framework



Key enabling and other relevant actors – The first element of the proposed framework discusses about the actors that need to be involved into clusters to effectively achieve a specialization in one or more of the emerging industries. Other than (small, medium and large-sized) firms and universities, traditionally considered by policy makers, the effective development of new specializations within the emerging industries trajectories requires the involvement of key enabling actors (KEA), specialized in Key Enabling Technologies (KET) and (institutional) knowledge-intensive business services (KIBS), which support the transfer of knowledge among the cluster's actors and their innovation processes.

Entrepreneurial Cluster Management Organizations – The second element of the framework highlights the importance of the cluster management organizations (CMO) in supporting the evolution of clusters toward emerging industries, highlighting that, in order to face the challenges posed by emerging industries and, more generally, by competitive markets, CMO need to take on an entrepreneurial character, opening up opportunities of transnational collaboration for firms.

Smart Specialization Strategies (RIS3), regional clustering and transnational cooperation – The third element of the framework regards how to achieve RIS3 objects proposing different cross-cluster cooperation alternatives including the regional clustering – i.e. developing “new clusters” combining existing clusters and/or actors present in the region having complementary specialization toward emerging industries – and transnational cooperation, i.e., extending cooperation with actors based in other European regions.

Considering the demand of emerging industries – The fourth element of the framework suggests the importance to consider the demand side other than the supply one, creating contexts in which they can interact, so to identify new market niches and researching and developing innovation in the emerging industries field.

The variety of clusters - All of the elements presented, are to be considered in light of the variety of clusters discussed in the paragraph 1.3, which suggest the need for the NCC to be adapted to the local specificities and for variations across clusters in terms of the actors involved, the way in which the supply and demand side are interacting, the integration with the RIS3 and the role of CMO.

The general aim of the topics addressed and the related policy indications, taken together, is the very essence of the CluStrat project: to improve the competitive ability of European regions on the emerging industries by creating better conditions for the development of cross-cluster and transnational projects of cooperation on innovation.

2.1 KEY ENABLING AND OTHER RELEVANT ACTORS

As suggested in the initial paragraphs, a defining element of clusters is the existence of a number of interconnected firms and institutions. Considering the complexity and inter-sectorial character of emerging industries, however, it is clear that clusters willing to develop in such directions will not have already all the relevant knowledge within their boundaries. In this sense, clusters may find complementary competences to introduce innovations outside their boundaries.

As suggested by the regional innovation system (RIS) model together with the “twin” model of the triple helix²³ (declined at the regional level), which had a great influence on European policies on innovation, innovation – be it technological or non-technological, radical or incremental – has to be seen to be taking place within a system, involving a number of actors and their interactions. The whole point in the RIS literature is that the presence and actions of these actors, and the complex relations between them create a favorable setting for the development of knowledge and innovation, which can then be capitalized by firms through the development of new products or processes. In this sense, regions act as knowledge accumulators, favoring interactive learning among the actors in the region that are directly or indirectly embedded in the production processes²⁴. Autio clarified this concept by emphasizing that RIS are systems consisting of two interacting subsystems: the first (knowledge application and exploitation) includes the region's firms with their co-localized clients, suppliers, partners and competitors; the second comprises the various organizations and institutions (starting with the universities) that engage in the production and circulation of knowledge and skills²⁵. Therefore, the highly innovative performance of a regional system of innovation depends to a significant degree on two factors: an effective institutional subsystem that produces and circulates knowledge and competences, and intensive interactive relationships within and between this subsystem and the subsystem of firms. In this context, the role of policies institutions is key to create and support forms of interaction among the different actors involved.

As far as the firms are concerned, the presence of both small and medium-sized enterprises (SME) so as of large firms, being both local or multinational, is very important, with the first group being the most numerous and the second being even absent in some clusters. It is also important to remember, at this point, that such firms are not specialized just in manufacturing activities but also in (business) service ones. As a matter of fact, service activities are getting increasingly relevant and may play a particular role in the pursuing of emerging industries. A case in point is the sustainable mobility where the most interesting solutions are those realized through the development of services (e.g. car-sharing services) rather than through innovative technological manufacturing solutions (e.g. new engines).

As far as the other institutions are concerned, we propose that there are two important categories of actors to be included in order to pursue effectively cluster specializations in emerging industries, i.e., key enabling actors (KEA) and institutional knowledge-intensive business services (KIBS).

²³ Etzkowitz, H. and Leydesdorff, L. (2000), The dynamics of innovation: from National Systems and “Mode 2” to a Triple Helix of university-industry-government relations, *Research Policy*, 29 (2): 109-123.

²⁴ Cooke, P., Gomez Uranga, M. and Etzebarria, G. (1997), Regional innovation systems: institutional and organisational dimensions, *Research Policy*, 26 (4-5): 475-491.

²⁵ Autio, E. (1998), Evaluation of RTD in regional systems of innovation, *European Planning Studies*, 6 (2): 131-140.

Key enabling actors (KEA)

Key enabling actors (KEA) are research centers specialized in one of the key enabling technologies (KET) associated with the emerging industries. The KET identified by CluStrat are the same ones that the European Commission selected in its 2009 Communication “Preparing for Our Future: Developing a Common Strategy for Key Enabling Technologies in the EU” including:

- nanotechnology,
- micro-nanoelectronics,
- advanced materials,
- photonics,
- industrial biotechnology, and
- advanced manufacturing systems.

In addition to these KET, also cross-cutting services should be considered, e.g. ICT and creative industry applications, in that they represent enabling technologies with high potential for many traditional industry sectors (e.g. the application of ICT for home automation in the building industry). Such actors are recognized at the European level for holding frontier competences on such knowledge, being of a basic type, and may be university department, public research centers and the like.

(Institutional) knowledge-intensive business services (KIBS)

We propose that, additionally to KEA, also institutional knowledge-intensive business services (which from now on we will name KIBS) are key component of clusters willing to effectively develop in emerging industries. KIBS differ from KEA in that they include knowledge institutions in a more specialized field, e.g. a specific category of materials or of products. They are service organizations having highly qualified human capital that transfer to and co-produce knowledge with their clients, playing therefore a crucial role in supporting the innovation processes taking place in the territories where they work. Despite KIBS may be both private firms or public or institutional organizations, in this context we focus just on institutional ones, being those entailing the higher innovation potential for emerging industries. Institutional KIBS are often founded to address the demands of firms part of a local or regional cluster: the more they act as knowledge gatekeepers between the cluster and the external competitive environment²⁶, the more effective in addressing them. Several institutional KIBS developed the capability to work on transnational projects on innovation: they are for sure among the most interesting actors to involve, in the perspective to develop emerging industries at the European level. If KEA are well recognized at the EU level, KIBS are usually less visible, meaning that there may be the need to support firms in identifying which may be the best fit for their needs.

These institutional KIBS are present in all sectors, being particularly numerous in some of them in Europe. Among such KIBS-intensive sectors is, for example, the home-furniture industry, where InnovaWood is active – a network of KIBS to support innovation in the forest, wood-based and furniture activities²⁷. InnovaWood members are active in the areas of research, education and training, technology transfer and business services. They are located in 25 European countries; some of them are part of universities and other not, but still have a public or institutional character, such as the Thünen Institute for Wood Research (Germany), the Wood K-plus (Competence Center for Wood Composites and Wood Chemistry, Austria) and the Instytut Technologii Drewna (Poland).

The role of KEA and KIBS

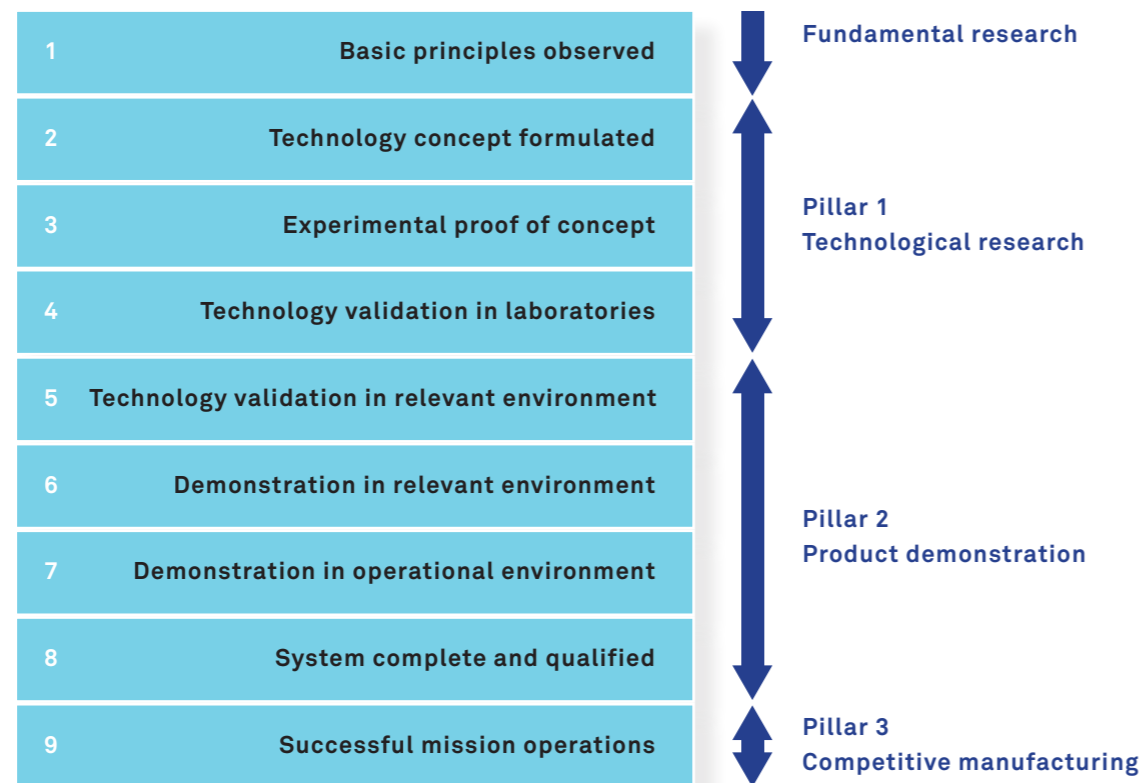
To understand the role of KEA and KIBS in supporting the development of emerging industries in clusters is particularly important to consider that innovation involves several steps, including: the initial generation of ideas, the selection of the most promising and feasible ones, the development of the selected projects to transform them into new products, services or business models and finally the development and the diffusion of the innovation on the market. At this regard, the concept of Technology Readiness Levels (TRL), used also by the European Commission²⁸ in the effort to set the EU strategy for KET and developed to assess the maturity of evolving technologies, is helpful to understand the different steps part of the innovation value chain in the context of technological innovations. According to the TRL scheme (Figure 5), fundamental research is the first step; technological research steps follow (including the formulation of technology concept; the experimental proof of the concept, and the validation of the technology in laboratories). Before the successful implementation on the market, other four phases of product demonstration are considered, i.e. the technological validation in relevant environment; the demonstration in relevant environment; the demonstration in operational environment and finally the completion and qualification of the system. Of course, not all the phases are applicable for all the innovations introduced (e.g. incremental innovation or business model innovation). What is relevant here, however, is the recognition that each of those phases needs different competences (e.g. in the first steps knowledge in basic and applied research is mostly important, whereas in the last ones management competences are rather the most relevant). The cooperation with KEA and KIBS is relevant especially for the first steps of such a chain, to allow firms identify and develop fruitful ideas, which they will then transform in products to be sold on the market leveraging on their private knowledge.

²⁶ A model of institutional KIBS acting as knowledge gatekeeper is that discussed in Grandinetti, R. (2011), Local/global interfaces within industrial districts: an Italian case study, *The Learning Organization*, 18 (4): 301-312.

²⁷ More precisely, InnovaWood is an umbrella organisation that integrates four European networks (Eurifi, Eurofortech, Eurologna, Eurowood).

²⁸ European Commission, A European Strategy for Key Enabling Technologies – A bridge to growth and jobs, 26.6.2012, COM(2012) 341 final.

Figure 5 The TRL scheme for R&D&I funding under EU policies and laws



It is important to highlight, at this point, that KEA and KIBS are not necessarily to be located within a cluster: the more specialist and cutting edge the needed knowledge, the more likely that just few actors held it, therefore the lower the possibilities that they are co-located with the firm which is looking for their knowledge. This is the case for both KEA and KIBS, but the relevance of this evidence for policy making is even higher in the case of KIBS, considering that they are less “visible” in the EU context. Being more specialized in sub-fields and usually of smaller dimensions and more numerous, it is important to support a system that allows firms and clusters to recognize who held which knowledge, so to allow for the highest innovation potential. Of course, the fact that they are located far away from cluster firms increase potential difficulties for reciprocal knowledge and interaction: in this sense, it is even more relevant the role of an ‘entrepreneurial’ CMO, who can support the creation and development of such interaction (see par 2.2).

The KET unit within DG Enterprise, understanding the need especially for SME to receive supporting services for bringing innovations to market, especially in TRL 5 – 8, has started a new initiative to identify KET platforms that offer services to SME in those TRL on a European scale. This

initiative thus follows the same understanding for the need of KIBS, especially SME, which are the core target for policy makers in regard to cluster policy²⁹.

The importance of knowledge institutions to the development of innovations in challenging areas, suggest the subsequent policy implications.

Policy implication 2a – In order to increase the ability of European regions to compete in emerging industries, innovation projects developed by firms and clusters – in particular the projects implying transnational cooperation – have to be supported by an appropriate knowledge institutions (sub)system. Such system shall include both Key Enabling Technology actors (KEA) and institutional knowledge-intensive business services (KIBS). They should have reached the excellence in their field, work at the global level and thus be a valuable partner in projects of transnational cooperation on emerging industries.

Policy implication 2b – In order to ensure to involve just knowledge institutions being particular knowledgeable, a form of accreditation of both KEA and KIBS at the European level could be helpful.

2.2 ENTREPRENEURIAL CLUSTER MANAGEMENT ORGANIZATIONS

As discussed in the initial paragraphs, not all the clusters have a cluster management organization (CMO) that leads and coordinates joint activities. In principle, the presence of a CMO is not a requisite of the competitiveness of the cluster (as suggested by the Silicon Valley example),³⁰ which is the reason why it was not included in the list of requisites presented in paragraph 1.4. However, considering the challenges connected with the specialization in the emerging industries, such as active aging or sustainable mobility, which require a great deal of collaboration with firms and institutions being located both within and outside the cluster and having a different knowledge base, the role of the CMO became crucial, and should therefore be recognized, also even in the form of participation fees, by cluster partners.

Not all CMO, however, have the ability to play this role, but just those that we define “entrepreneurial CMO”. In the literature, entrepreneurship is defined as the ability to seek, identify and exploit new business opportunities³¹. Even if this term normally refers to firms, we consider appropriate to extend it also to CMO and suggest that they should take on the task of search, recognition and pre-exploitation, even if they are non-profit organizations and are public or publicly funded institutions. Entrepreneurial CMO should also support entrepreneurship at cluster firms

²⁹ Steinbeis-Europa-Zentrum, coordinator of CluStrat, is the main contractor to DG Enterprise supporting the implementation of this initiative. First publicly available results are expected for December 2014.

³⁰ Saxenian A. (1994), *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*, Cambridge, Harvard University Press.

³¹ Stevenson, H.H. and Jarillo, J.C. (1990), A paradigm of entrepreneurship: entrepreneurial management, *Strategic Management Journal*, 11 (Special Issue): 17-27; Shane, S. and Venkataraman, S. (2000), The promise of entrepreneurship as a field of research, *Academy of Management Review*, 25 (1): 217-226.

and the development of the needed competences, facilitating the emergence of strategic initiatives responding to the strategic challenges of the clusters.

Different are the activities that CMO should perform in order to be “entrepreneurial” and therefore being actively supporting the development of the cluster partners toward emerging industries.

Intra-cluster collaboration

First of all, entrepreneurial CMO should favor collaboration between firms part of the cluster. Considering that the majority of firms part of the cluster are too small, as it is typically observed in many European clusters, the CMO should favor their aggregation in the form of consortium or other collective configurations, so that they can better dialogue with (external) partners and be better able to recognize and take advantage of new business opportunities, so as entering foreign markets. In order to do so, CMO should look for all the possible opportunities, being fund raising or the development of contracts suitable to support cooperation and innovation. A useful case in point is represented by the “business network contract” developed in Italy through the Italian Law 9 April 2009, n. 33 art. 3, co. 4-ter, part of the “small business act for Europe”, and which is now being proposed for enlargement at the European level too³². Such contract allows two or more enterprises, on a purely contractual basis, to jointly perform one or more economic activities in order to increase their potentials for innovation and competitiveness. Among the lawful goals of the contract there is the capacity to approach relationships otherwise precluded to the single business: funding, facilitation, public contracts (public call for bids) and in general all kind of businesses and strategic activities where an “organisation trigger” is necessary to reach more ambitious and dimensional targets. The interest in such tool, suited for small and medium enterprises for SME, relies on the fact that it is focused on specific (innovation-oriented) goals and that establishes a common body for governance, that support cooperation and the interaction with external (potentially international) commercial and innovation partners.

Intra-cluster collaboration also includes the involvement of research organisations, who are permanent players in the cluster eco-system of many European clusters. In Germany, a focus on research collaborations involving industry and high-level research organisations is a key issue to form a cluster and receive funding. This research driven cluster approach is especially useful for SME that are members of the cluster, as they get access to knowledge and at the same time the services to apply this knowledge for their own competitiveness.

Cross-cluster, transnational collaboration

In a demanding and increasingly competitive global market environment, CMO are challenged to take up a more complex role than in the past, and to focus not only on the inside of the cluster but also on how to link it to the outside. Adopting the perspective of emerging industries, CMO should, in fact, help cluster firms to recognize opportunities that they would have a hard time to identify, being focused just on their cluster (industry) specialization. Entrepreneurial CMO should support cluster firms collaboration toward emerging industries involving actors part of different industries and different clusters, especially at the international level, which hold competences and production specializations complementary to the cluster firms, in order to jointly take advantage of

emerging opportunities. A useful solution in this sense is the support of transregional cooperation, also in the form of meta-clusters, which will developed more thoroughly in paragraph 2.3.

Support to new ventures

Other than supporting the cooperation among existing firms within and beyond the cluster, entrepreneurial CMO should work also as a sort of “smart” business incubators, supporting the creation and development of new firms, especially when established specifically to target a need or specialization related to one or more emerging industry. This could be the case especially when new services/products – which cannot be covered by the involved capacities/actors or which are not interesting to the firms because of the small size of the market – are generated as a result of the process. Despite the small size and impact on the local economy, new ventures may be an essential tool to drive the cluster towards the development of a specialization in emerging industries, since they are usually capable of break-through innovation and may develop to satisfy specific market niches, complementary to the specialization in the existing cluster.

Leveraging on this discussion on the role of entrepreneurial CMO we propose the following policy implication.

Policy implication 3 – In the context of selective policies to favor clusters, a crucial aim is that of the evolution of CMO towards an entrepreneurial approach, so that they get capable of identifying and proposing to cluster firms (or their combinations) business opportunities in emerging industries and to offer occasions of transregional cooperation.

2.3 SMART SPECIALIZATION, REGIONAL CLUSTERING AND TRANSREGIONAL COOPERATION

“Smart specialization must not be associated with a strategy of the simple industrial specialization of a particular region in tourism or fisheries (to take two fairly low tech sectors as an example). Instead, smart specialization is about R&D and innovation and it might suggest that such a region should specialise in R&D and innovation related to the sector of tourism or fisheries. This means that smart specialization is a process addressing the missing or weak relations between R&D and innovation resources and activities, on the one hand, and the industrial structure of the economy, on the other. A key point is that smart specialization is not just for the ‘best’ regions and technology leaders. On the contrary, this concept provides strategies and roles for any region” (p. 5)³³. And, this enables every region and every area of competence to recognize its specific strengths, evaluate them/their relevance in the regional economic context, and deploy them.

³² More information are available at the website: http://www.retedimpresa.com/?page_id=188

³³ Foray D., David P.A. and Hall B.H. (2011), Smart Specialization: From academic idea to political instrument, the surprising career of a concept and the difficulties involved in its implementation, MTEI Working Paper, November 2011.

Following such considerations, developed by the inventors of the smart specialization concept, innovation and regional development policies in Europe have changed, recognizing that each region should define its specific path leveraging on the existing regional strengths and assets. Moreover, considering that “no region is an island”, the specialization of a region raises its competitive value if it connects and cooperates with a complementary specialization of another region.

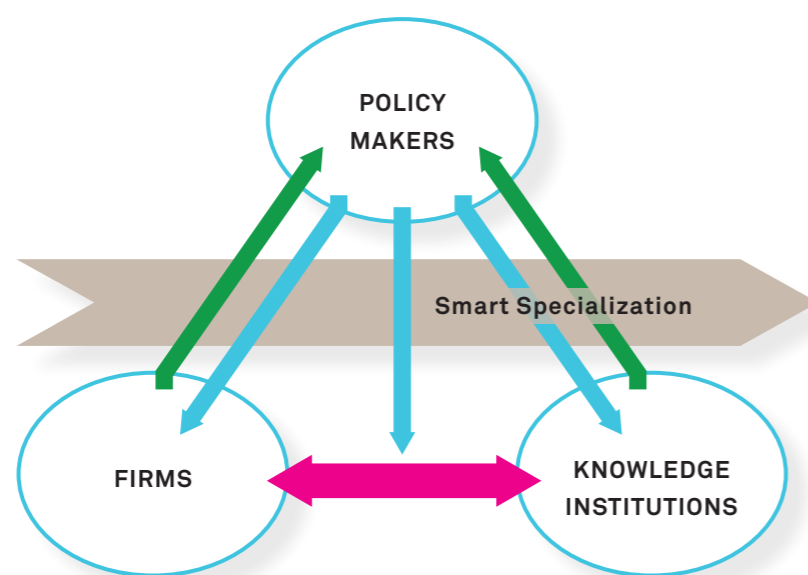
Following the triple helix approach, a RIS3 comprises three types of actors:

1. firms, being manufacturing or service;
2. knowledge institutions³⁴;
3. policy makers, first of all the regional ones.

In order for the selected specialization to be truly smart, such three subsystems need to interact in an effective and efficient manner, such is suggested in the triple helix model. In several European regions and countries the interaction between the first and the second actors is particularly weak. For this reason, the identification of the smart specialization should pave the way to policies that favor such interaction so the transfer of the result from the research to firms (see Figure 6). Regions should therefore favor the knowledge institutions that are specialized in the RIS3 fields so that they become excellence centers and promote their cooperation with other EU research centers having complementary specializations. In this sense, the RIS3 should be accompanied by the mutual learning of clusters and policy makers within EU regions.

Taken together, the RIS3 and the triple helix concepts arrange an appropriate framework to develop a strategy on European clusters.

Figure 6 Smart specialization and the triple helix



³⁴The triple-helix model originally included as knowledge institutions just universities and public research centers, whereas more recently also technology transfer centers, corporate research centers and public or private KIBS have been included.

Regional clustering and transregional cooperation

As mentioned in paragraph 1.2, the Guide to Research and Innovation Strategies for Smart Specialization, drawn up by a group of experts for the European Commission, assigns an important role to clusters. In particular, this document states: “the use of clusters for smart specialization may imply important political decisions regarding the development of new cluster initiatives or the use of existing ones. New cluster initiatives can be launched, provided that they are crucial for implementing the regional governments’ visions and that will therefore be strongly supported in the future. Otherwise, new cluster initiatives should be avoided. Fragmentation and proliferation of cluster initiatives often leads to dispersion of forces and financial resources as well as to less cooperation and fewer synergies between them” (p. 67).

With the aim of adhering to these guidelines, CluStrat has provided the stimulus not so much for the creation in a given region of brand new clusters, but rather the development of regional cooperation projects stemming from existing sub-regional (industry-based) clusters and potentially from businesses and institutions which, even if not part of a cluster, still possess competences that are relevant for cross-cluster cooperation. Such cooperation initiatives at the regional level are normally temporary and very targeted, being thematically-driven and flexible in their composition³⁵, but can even constitute the starting point for the formation of a new and permanent regional cluster. These regional clustering projects have an important strategic meaning for CluStrat, as the regions involved increase their capacity to actively participate in cross-cluster (transregional and transnational) cooperation initiatives, in view of the emerging industries selected by CluStrat.

The pilot project developed by the Veneto Region – in collaboration with other CluStrat Regions (Friuli-Venezia Giulia, Piemonte, Baden-Württemberg) – is a good example of this strategy of regional clustering. The aim of the pilot has been to develop the basic conditions so to form a regional cluster in the field of the sustainable living and housing, which address the sustainable economy and active aging emerging industries. The region, in fact, hosts several “pieces” that are useful to the purpose of creating such a regional cluster: industrial districts (subregional clusters) and single medium or large firms with good internal R&D capabilities specialized on home-furnishing, electronic appliances, ICT and other related sectors; a wide and widespread construction sector; knowledge-intensive business services; national and internationally recognized universities (Padua, Venice and Verona) having departments specialized in chemicals, engineering and the like. A relevant part of these businesses are devoting a great deal of attention and efforts to improving the environmental sustainability of their processes and products, or of those of their clients; several institutional actors are yet engaged in innovation projects dealing with topics on sustainable living. All such actors have interests, knowledge and competences, products and services that can be organized in various ways to develop new projects linked with sustainable living and housing, and also to participate in initiatives for transnational cooperation in this field. Such a choice is even more interesting considering that the Veneto Region has contextually introduced a regional law (L.R. 13/2014) that encourages the formation of regional innovation clusters such as that described above, and that it identified “sustainable living” as one of its smart specializations.

The approach to regional clustering by Baden-Württemberg was different. Given the existence of highly competitive clusters in KET both for health care and the building sector, a cross-clustering

³⁵Such non-permanent targeted innovation networks or clusters are already described as example for Finland’s cluster policy in the TACTICS publication: ‘Where the cluster winds are blowing - Better cluster policies and tools for implementation’, by Emily Wise and Cecilia Johansson, Vinnova in October 2012.

between those targeted on the topic of smart home and living was achieved through a dedicated coordinating platform, in which cluster managers as well as other key actors from research and industry take the lead for developing targeted intra-cluster cooperation. Without policy intervention, this topic would not have been taken up as an intra-cluster target, but would have remained in the ICT and housing ecosystem, neglecting the chances and opportunities of all the other competences.

The option of regional clustering is meaningful if it allows to put together existing actors (including firms, knowledge institutions, sub-regional clusters) specialized in different fields that are complementary, so that the system as a whole will have better chances than its single parts. In other words, the idea of regional clustering is based on two conditions:

1. the elements part of the regional clustering are adequate in terms of their number and quality;
2. the result of such process is to improve the chances of the region to reach a competitive position in one of the emerging industries.

So, regional clustering in the context of an emerging industry is not necessarily a realistic aim for every region. Indeed, it is just one among the several possible cooperation forms among actors willing to work in the context of emerging industries and cross-cutting issues, which is the interest of the CluStrat project. When the regional clustering strategy is feasible, such regional clusters will have larger capabilities to produce services and products and to develop innovation in one emerging industry, and it will get a credible interlocutor for transregional and transnational cooperation projects. If a region knows its strengths, it is capable to get engaged into the implementation of KET in a much more targeted way. The precondition for this is to know one's assets and the relevance of different KET for the industries and product portfolios of the region. This is why Smart Specialization processes in the regions can represent a good starting point for implementation of KET through cluster initiatives.

Towards European clusters or meta-clusters?

The experiences of cross-cluster and transnational cooperation activated in CluStrat pilots may also constitute the embryo for the formation of clusters on a European scale, or of meta-clusters, to use a concept introduced in another project of the European Regional Development Fund, i.e. Alps4Eu³⁶, where a meta-cluster is defined as “a transregional network of cluster initiatives, which focus on the same or complementary specific technological field or sector. A meta-cluster consists of at least three cluster initiatives in three different regions”. The practice of this and similar initiatives shows that meta-clusters are often formed among clusters of the same topic. Photonic clusters of different regions from one bigger unit to exchange among photonic active industries and research.

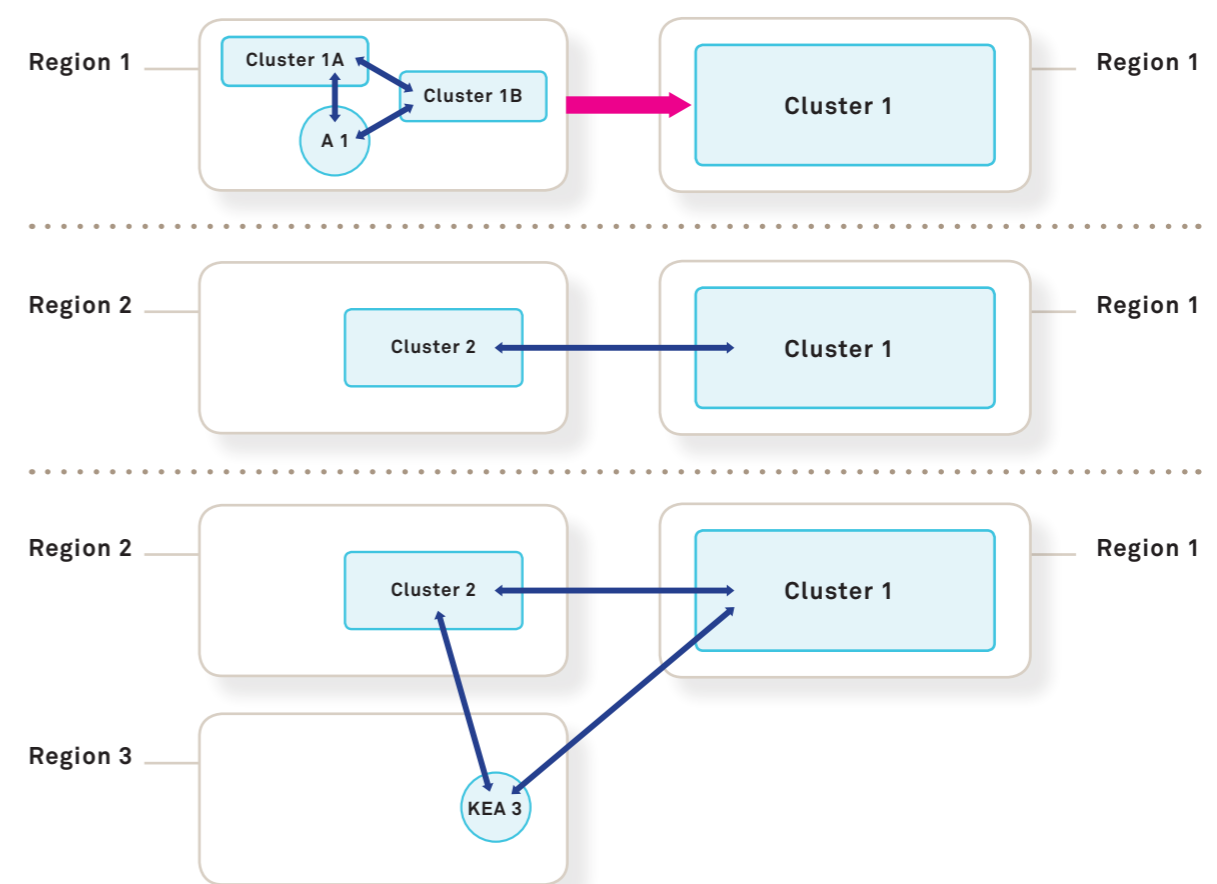
In the case of CluStrat, the factor that would hold together the clusters of a meta-cluster is an emerging industry or a narrower segment of an emerging industry. This implies that in active aging, for example, food clusters, health clusters, ICT and photonic clusters etc. join forces on a meta level, supporting their members to develop ideas and projects, products and services which use the variety of competences to answer the needs of the market. Such meta-cluster not necessarily

has to be durable and institutionalized, but may consist also of dynamic and flexible cross-regional cooperation networks and projects. This might in fact differ between different industries/ technological fields: for instance, as for the experience of the Baden-Württemberg's pilot, for the field of “smart home”, the creation of a platform at meta-level was necessary; at the same time, for the field of green technology, rather a temporary cooperation appears feasible.

Smart specialization and diverse modes of cross-cluster cooperation

In this section we discussed several cross-cluster cooperation options coherently with the smart specialization, being summarized in Figure 7. The first one is regional clustering, where one or more sub-regional clusters and other actors (A) such as lead firms, a university department or a KIBS develop cooperation initiatives in the context of an emerging industry. The second one is a transregional (or even transnational) cooperation where each region participates with own clusters; the third is a transregional (or even transnational) cooperation where some regions participate not with a cluster but with a Key Enabling Technology actor (KEA).

Figure 7 Strategies of cross-cluster cooperation



³⁶ Alps4Eu has been co-financed by European Territorial Cooperation Programme Alpine Space 2007-2013 and coordinated by the Piedmont Region - Directorate of Industry and Productive Activities.

Following the route indicated, three levels are clearly identified in the definition of the strategies focusing on cross-cluster cooperation, and of the public policies, in particular:

- the European Union level (or a smaller interregional and macro-regional level, like the central Europe), where the measures aimed at boosting transnational cross-cluster cooperation and the formation of smart meta-clusters (transnational clustering) are to be adopted;
- the national level, where the national government bodies should make use of the existing tools (if any) or prepare new ones to boost transregional cross-cluster cooperation;
- the regional level, where the regional government bodies should make use of the existing tools (if any) or prepare new ones to boost smart specialization of existing clusters, intraregional cross-cluster cooperation and the formation of smart regional clusters (regional clustering).

The considerations written above have the following policy implications, holding at the European, national and regional level:

Policy implication 4a – Cluster policy should favor the creation of regional clusters in cases in which the regional scale allows to take opportunities linked with the emerging industries, which a smaller scale will not allow to catch. A similar approach should favor the development of other suitable forms of collaboration and networking having the same aim.

Policy implication 4b – In accordance with the smart specialization framework, which stresses the potential of the combination of regions having different strengths and competences, a forward-looking cluster policy identifies and exploits – on a transregional and transnational scale – opportunities for cross-cluster cooperation being useful to improve competitive chances of clusters and regions in emerging industries.

2.4 CONSIDERING THE DEMAND SIDE OF EMERGING INDUSTRIES

The quadruple helix model

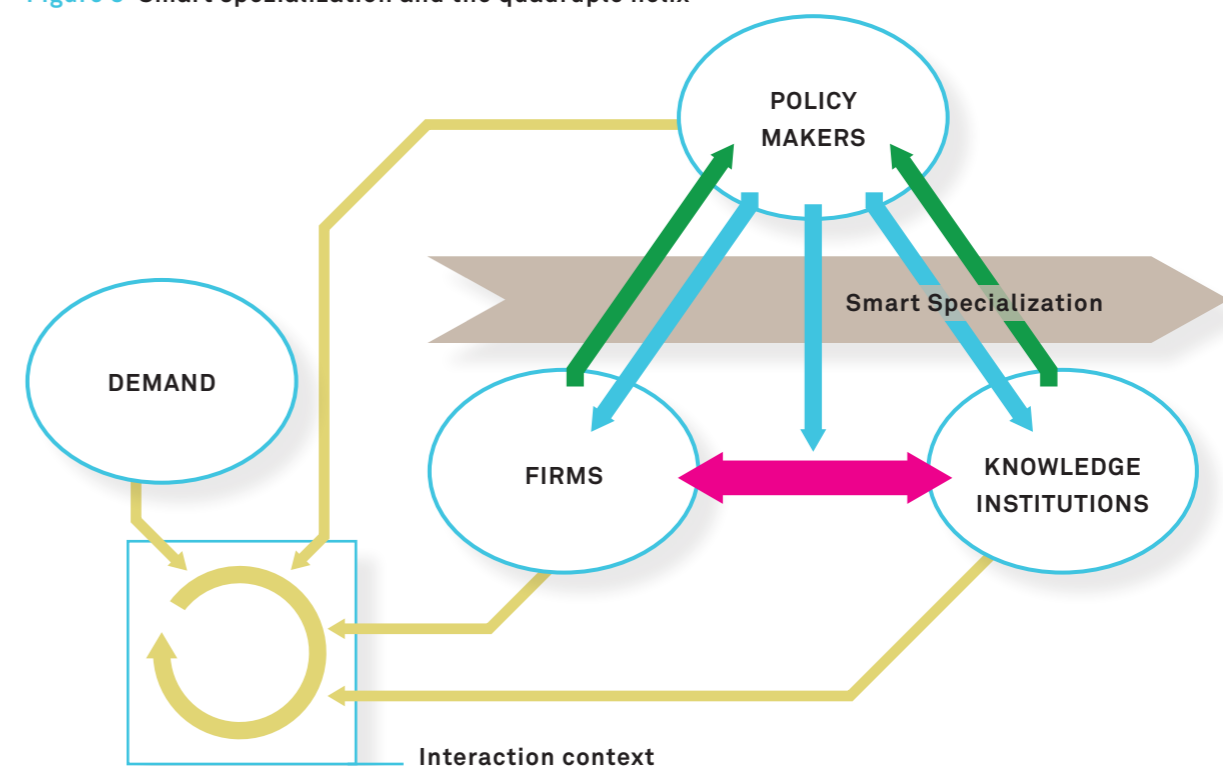
The Guide to Research and Innovation Strategies for Smart Specialization states that “the perhaps most common, tripartite governance model based on the involvement of industry, education and research institutions, and government (the so-called Triple Helix model), is no longer enough in the

context of smart specialization. Innovation users or groups representing demand-side perspectives and consumers, relevant non-profit organisations representing citizens and workers should all be taken on board of the design process of RIS3” (p. 22). The quadruple helix is the approach through which the involvement of the demand side is modelled; the adding helix is composed by a set of demand actors, starting from the products and services users³⁷.

As suggested in Figure 8, the four helixes are different and represent an autonomous system within the overall framework. Similarly, also the interfaces that connect such systems are different. Indeed the possibility that the sub-systems interact and co-evolve is dependent on the effectiveness of the interfaces, which add to the complexity of the system. The inclusion of the demand sub-system adds particularly to the complexity of the framework, since it is much more fragmented than the others, which opens up the problem of how to organize it in order to interact with the other sub-systems (e.g. through non-profit organizations, consumers associations, virtual community of users). Moreover, the cognitive distance between users and the other actors is very high, which requires the setting up of specific contexts to favor the interaction.

The quadruple helix model is particularly important for CluStrat, in that the involvement of the demand is considered the sine qua non condition to successfully explore open and complex issues such as those connected to emerging industries, as these are closely related to the grand societal challenges.

Figure 8 Smart specialization and the quadruple helix



³⁷ Arnkil R., Jäervensivu A., Koski P. and Piirainen T. (2010), Exploring quadruple helix: Outlining user-oriented innovation models, University of Tampere, Work Research Center, Working Paper No. 85 (Final Report on Quadruple Helix Research for the CLIQ project, INTERREG IVC Programme).

Creating contexts where the supply side and the demand side of emerging industries can interact

In CluStrat emerging industries are defined as those sectors “which are most likely to come in the near future or are even already seen to develop. Those emerging sectors or industries are a reaction to challenges of society. The trend in society is visible, but the industrial and service sectors have not yet exploited it. Thus, it needs to emerge to exploit the market opportunities already visible. This means there is a clear potential seen for new products and services, and policy looks for instruments to actively strengthen the existing potential to play a major part in those emerging industries” (p. 3)³⁸. This definition leads to the acknowledgement that the emerging industries are frontiers of innovation, featuring high levels of complexity due to the range of problems and needs to be dealt with. Within this scenario and also bearing in mind the specific nature of the emerging industries of CluStrat – i.e. active aging, green economy and sustainable mobility – an important factor is the set-up of contexts (territories) for experimentation and experience in which the innovative competences of producers of goods, services and technologies, the “voice” and the behaviour of users and consumers, and the functions of the policy makers in those territories may converge and cooperate.

Integrating the perspective of the supply side with that of the demand side constitutes a highly qualifying element of CluStrat. In concrete, this meant conceiving the pilot projects so that the two perspectives co-exist and may interact with one another. In particular, the demand side has been considered in the initial stage of the project, in the form of an initial assessment of the demand needs or new demand trends and the involvement of stakeholders representing the demand, but also in the final stage, in order to communicate the outcome of the project to the potential customers. Pilot results confirm the importance to integrate the demand helix in order to develop valuable innovations in the emerging industries realm.

The cognitive interaction between supply and demand is a key aspect in the context of emerging industries, where several of the innovations to be introduced are breakthrough (disruptive), rather than consisting in the optimization of existing products. Actually, it is a matter of thinking to problems and needs of people and to develop new ways to satisfy them, rather than looking for incremental improvements to the existing products (or services). For instance, to tackle the problem of the reduced mobility of elderly people in their homes, it is necessary to observe them and dialogue with them in order to understand the obstacles and difficulties they face, prescinding from which are the technologies now available to face these issues. On the other hand, this approach may allow also to find ways to develop the potential demand, in the cases in which technologies have already been developed but have not been successful on the market.

In the realm of marketing studies, several **techniques to analyse the demand** have been developed, that are useful to support the process of new product development – from idea generation to market test before the launch of the new product – and that may be very useful in the case of complex innovations such as those targeted by CluStrat.

Considering for the high fragmentation of the fourth helix, a further important mode to include the demand in the innovation process consists in favoring the **aggregation of potential users into groups** (like in the case of ethical purchasing groups). This may be the case, for example, of products

improved for their environmental character, developed by firms in an agri-food cluster. Potential consumers of an organised group might get informed about the specific issue of sustainability considered and buy the products and services generated by firms part of the cluster with a better deal, guaranteed by the collective demand and its management.

To the same general perspective (supply-demand interaction), it could be useful to develop **laboratories where the demand and supply sides can meet, for the purpose of researching and developing innovations**. More specifically, in such labs researchers and developers can observe the behaviours of users in experimenting new technologies and services and cognitive interaction between users and producers are developed. A case in point is that of the FZI Living Lab Ambient Assisted Living (AAL) in Karlsruhe (Baden-Württemberg), a best practice in active aging. This lab consists of a series of rooms that offer a realistic living environment for elderly people acting as a design, implementation and evaluation context for a broad range of existing technologies, research prototypes and related services. The lab is composed by a network of researchers, companies (both technology and service providers), and end user organizations working together in end-user oriented research on ambient assisted living³⁹. A further interesting example is LAK (Living for All Kitchen) in Friuli Venezia Giulia. LAK is a project promoted by a group of small and medium-sized firms and regional research centers led by Snaidero Rino Spa (one of the largest producers in Europe of fitted kitchens), whose objective is experimenting and integrating new home automation technologies (home automation) in the kitchen-environment, to make it more liveable, especially for elderly or people with slight mental disability.

If the study of consumer behaviours nowadays is well supported by information and communication technologies that allow to design sophisticated virtual consumer environments, we must not overlook the observation in real environments. As supported by an influential study on ambient intelligence in assisted living of elderly people, “test and evaluation of technology and prototypes should be done in controlled environment simulating real-life, such as the Assisted Living Laboratory” (p. 111). A similar approach is useful also to arrange suitable activities in terms of information and training, which are necessary “to make the elderly people aware of the ambient and unobtrusive assistance in their home environment” (p. 111)⁴⁰. It is important to add that user can be usefully included in the research and development process not only as the subject under scrutiny, but also as a subject that can actively contribute to the definition and development of innovations⁴¹.

Another context in which the quadruple helix model can be applied is the **societal pilots**, i.e., projects in which the introduction of new products and services into a real-life environment is intended to result in societal innovation. In Europe, there are already a number of experiences of this kind⁴².

Similarly to what has been discussed in paragraph 2.3 as far as transregional cooperation was considered, the interaction context could be located in a different region than those where clusters and key enabling actors are located, being a suitable territory under the profile of demand, i.e. a context in which clusters’ producers (from other regions), local users and local policy makers can interact and work together on the innovative frontier of an emerging industry (Figure 9).

³⁸ Püchner P. (2011), Discussion Paper on Emerging Industries, 2nd Draft, Steinbeis-Europa-Zentrum, available from www.clustrat.eu/results/.

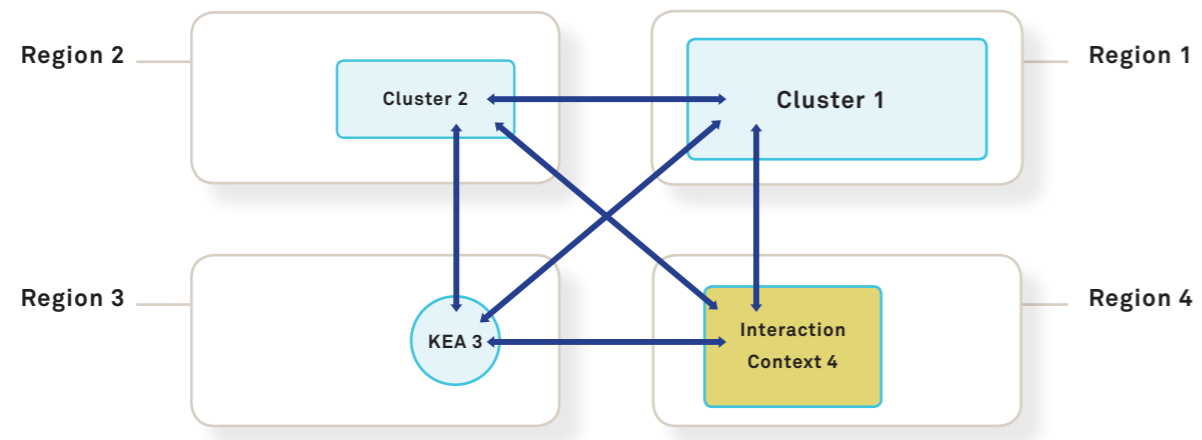
³⁹ <http://aal.fzi.de>

⁴⁰ Kleinberger, T. Becker, M., Ras, E., Holzinger, A. and Müller, P. (2007), Ambient intelligence in assisted living: Enable elderly people to handle future interfaces, in Stephanidis, C. (ed), Universal Access in Human-Computer Interaction: Ambient Interaction, Part II, Berlin-Heidelberg, Springer-Verlag.

⁴¹ The role of customers, being them consumers or organizations, as knowledge co-creators in the development of new products has been analysed in a number of theoretical and empirical studies. See, among others: Nambisan, S. (2002), Designing virtual customer environments for new product development: Toward a theory, *Academy of Management Review*, 27 (3): 392-413.

⁴² Ballon P., Pierson J. and Delaere S. (2005), Test and experimentation platforms for broadband innovation: Examining European practice, Conference Proceedings of ITS 16th European Regional Conference (International Telecommunications Society), Porto, Portugal, 4–6 September 2005.

Figure 9 Broadening the framework of cross-cluster cooperation



The transregional and transnational cooperation to improve the supply and demand interaction might be particularly useful in the context of very complex and expensive experimentations, being the way to make them economically sustainable. This is especially true in the case of very complex “products”, having different and interdependent components (goods, services, technologies, organizational routines), for instance a project to improve the usability of historical centers by people with disabilities. Costs of such solutions may be spread across more cities co-operating in its development or may be better overcome if it is then sold to other cities at a later stage.

A set of important policy implications follows this discussion on the importance to make supply and demand interact.

Policy implication 5a – The presence of laboratories where demand and supply can meet and interact represents a cognitive resource entailing a high value to the development of innovation projects in emerging industries. The formation of new contexts of this type and the strengthening of the existing ones represent a qualified object of cluster policy aimed to seek and exploit new opportunities in the emerging industries.

Policy implication 5b – Considering that demand is much more fragmented than the other sub-systems, another qualified object of cluster policy in the emerging industries is supporting its organization.

Policy implication 5c – Complex and expensive experimentations between demand and supply in the context of emerging industries may be developed thanks to transnational cooperation.

Policy implication 5d – Acceptance of new products and services by the market may be an issue to look at by supported and targeted early dialogue processes among clusters and user groups.

3. THE CROSS-CUTTING ISSUES AND THE NEW CLUSTER CONCEPTS

Aim of the CluStrat project was to assess systematically the cluster potential in relation to three emerging industries, considering for cross-cutting issues that can be understood as “strategic leverages” for the advancement of the emerging industries. The emerging framework has clear implications for the three cross-cutting issues considered in the project: knowledge transfer and co-production, internationalization, and gender and diversity for innovation.

3.1 KNOWLEDGE TRANSFER AND CO-PRODUCTION

When the project started, this cross-cutting issue was defined as “knowledge and technology transfer”, but we later modify it in “knowledge transfer and co-production”. Indeed, considering for the break-through level of innovativeness represented by emerging industries the cross-cutting issue that really counts is much more far-reaching than simple transfer – from one, more advanced region, firm or institution to a more backward one – assuming also a form of knowledge co-production.

All the elements discussed in the framework have a potential clear incidence to the cross-cutting issue considered. First of all, this is the case for the **smart specialization, regional clustering and transnational cooperation**, where cross-cluster collaboration to the strengthening of the regional potential is envisioned, and the **entrepreneurial CMO**, who support the development of the clusters and the individuation of new opportunities. In fact, according to the literature, an important aspect determining the success of industrial districts and, more generally, of clusters, is the fact that they function as learning systems, where information and knowledge circulate and combine to generate new knowledge, to identify new opportunities and to activate new business relationships⁴³. Similarly, the clusters should be able to develop existing technologies that have not found a market yet but that may find suitable applications in the context of emerging industries. This cognitive capability of clusters depends on their (industry) specialization, which is challenged by emerging industries that are, by definition, complex and intersectoral. For actors willing to work on such frontiers of innovation and production – the emerging industries identified by the CluStrat project – it is therefore crucial to equip with an appropriate cognitive infrastructure, or better, to have multiple occasions and contexts to exchange information, experiences and knowledge, which shall be proposed by the entrepreneurial CMO.

An example of how such infrastructure can be created or developed is the experience of the Knowledge and Innovation Communities KIC – established under the European Institute of Research and Innovation⁴⁴ – which however has not the territorial approach that is suggested in CluStrat and is focused mostly on education and training. In addition, it is possible to think about other forms of exchange of information, experiences and knowledge. An interesting example emerging from the CluStrat project is that developed within the pilot led by the Austrian partner, consisting in the creation of a space for matchmaking among firms during the world’s leading trade fairs for water, sewage, waste and raw materials management. Moreover, in order to ensure the flow of knowledge from best practice, study visits abroad and a virtual platform to exchange ideas have been organized for the firms participating, which supported knowledge transfer.

Also the involvement of **key enabling and other relevant actors**, another element of the framework, favoring the synergic cooperation across knowledge institutions (intra-region and across-region) is a key aspect in order to support the cluster to work as a “learning system”. Finally, also the **integrated demand/supply perspective** has interesting implications with regard to the knowledge issue: the insertion of demand subjects expands the knowledge community to be created and empowers the cognitive processes developed within. This is particularly important, as it allows firms and clusters to capture and develop market knowledge, which they would otherwise miss, and which is often the one missing in traditional clusters, not allowing firms to capitalize on existing technologies and competences.

Following this discussion, we propose a final policy implication.

Policy implication 6 – To arrange occasions and contexts to exchange information, experiences and knowledge represents a key infrastructure to develop cooperation and innovation projects in the emerging industries.

⁴³ Asheim, B.T. (1996), Industrial districts as “learning regions”: a condition for prosperity, *European Planning Studies*, 4 (4): 379-400.

⁴⁴ <http://eit.europa.eu/kics>

3.2 INTERNATIONALIZATION AND TRANSNATIONAL COOPERATION

The cross-cutting theme internationalization and transnational cooperation is well embedded in all the factors considered in the emerging framework, even though the experience of the pilots suggests that it may be very difficult to be achieved.

Internationalization and especially transnational cooperation has been at the core of the proposal of **smart specialization, regional clustering and transnational cooperation**. The prospect of meta-clusters, proposed in the paragraph 2.3 leads us to consider the cross-cutting issue of internationalization in all its potential. Thanks to the cooperation within meta-clusters, each of the actors involved internationalize, being a very advanced form to strengthen the competitive position of Europe and its regions in the emerging industries on a global scale.

The involvement of **KEA and institutional KIBS** located in different EU regions is necessary to develop competences in the emerging industries. Such institutions hold competences and specializations that are very advanced and key to transform the clusters' existing specializations, like furniture or building, into emerging industries, like the sustainable living. As discussed above, they are not necessarily located within the region where the cluster is located: the more specialized the knowledge needed by the cluster firms, the higher the probability that to find it they will have to look for KEA or KIBS located in other EU regions. The collaboration with KEA and KIBS will become therefore another occasion for cluster firms to go international.

The experience of the CluStrat project is that both the collaboration with foreign KEA and KIBS or clusters is not easy to be achieved. The main role of the **entrepreneurial CMO** should indeed be to promote internationalization and transnational cooperation, overcoming potential barriers. A first problem preventing firms to connect with institutions and companies located in other regions and countries is that there is not the awareness about their existence and their specialization, and therefore about how relevant such an interaction could be to develop toward emerging industries. Against this situation, the CMO has a key role to be played, by identifying clusters, firms, KEA and KIBS being potentially fit for cluster's firms, creating occasions for firms and institutions to learn about each other and supporting the development of joint projects, and supporting sensitization and awareness-raising processes together with cluster policy in order to facilitate the later acceptance of the new solutions.

Also the integration between the **demand and the supply** has a particular relevance for the internationalization issue, as the relevant market for firms and cluster is no more the region they are embedded in. Considering that each market has its own specificities, such integration may provide a key avenue for firms to understand how to insert into global markets in the emerging industries context. Moreover, as suggested in the paragraph 2.4, the context where demand and supply can meet may well be located in a different region than where the firms are located, and even in another country, being an additional avenue for companies to increase their cooperation at the international level.

Such an impact of the CluStrat strategic framework on the cross-cutting issue internationalization is even larger if we consider that the concept of cluster proposed in this framework exceeds the region even as far as the supply is concerned, and advocates the integration of firms, clusters, KIBS or KEA specialized in traditional industries with other mastering KET and advanced knowledge being located in other EU regions.

The policy implication 7 follows such a reasoning.

Policy Implication 7 – The new cluster concepts developed have to aim at supporting the internationalization and transnational cooperation of firms through clusters, so to support the specialization of EU regions and increasing the competitiveness at the international level.

3.3 GENDER AND DIVERSITY

Diversity (in a wide sense, even beyond the – still important – gender issue) is a strategic leverage for CluStrat to the extent that its potential value is recognised and used especially as far as innovation is considered, and thus enhancing both business performance (considering the level of single firms) and economic development (considering the cluster and region level). Gender and diversity are mandatory factors for innovation environments like clusters, especially as the business case for gender diversity in technology and innovation has been extensively made. The participation of female researchers and entrepreneurs in all the stages of the innovation value chain has a great potential in terms of innovation success. The more diverse the workforce, the larger the diversity in the knowledge base and the probability the firm will innovate successfully⁴⁵. Gender, and more generally diversity, supports creativity and therefore the identification of new needs and the definition of new products, which is particularly important in the context of emerging industries, since it allows to mix different perspective and capabilities and to identify products tapping gender-specific markets. This issue is not solved by simply adding women to the team, but implies a new thinking and permitting that traditionally-used methodologies in research and innovation are on the test and implications of research on different types of societal groups are on the radar. In this sense, innovation policy in clusters cannot prescind from thinking about gender issues in workforce, considering labour market related policies and education related policies⁴⁶.

The element of integration of **supply and demand side** makes it particularly evident how gender and diversity might contribute to the competitiveness of clusters specialized in emerging industries. On the one hand, knowledge of diversity of consumers and users and their involvement stimulate the design of innovative solutions in every emerging industry and increase the probability that these solutions are achieved successfully (demand side). For example, women and men have

⁴⁵ Vinnova (2011), *Innovation & Gender*, Västra Aros AB: Västerås, Sweden.

⁴⁶ Püchner P. (2011), *Cross-cutting issues for boosting innovation through new cluster policies*. Innovation and Gender. 1st Draft, Steinbeis-Europa-Zentrum, October, available from www.clustrat.eu/results/.

different ways to use products, leave different ecological footprints and are affected by global warming to different extent. Understanding diversity and such differences means exploring new, profitable opportunities in the realm of emerging industries. On the other hand, diversity of people is a resource for both the enterprises and institutions that are involved in the various emerging industries (supply side), a resource that is widely neglected.

Diversity per se has been an issue in one pilot action, and can certainly be found as a cross-cutting issue in quite a few of the others. The newly started social innovation cluster in the Czech Republic develops mainly around the topic of diversity in the workforce and in manufacturing in regard to social inclusion of handicapped people. Quite certain, this cluster will further develop into other diversity issues in regard to social innovation, depending on the cluster member's interests.

The emerging industry "active aging" is certainly one, where you would consider that diversity – in terms of gender as well as topics like seniors/juniors, less educated and highly educated, etc. – play a role. Interestingly, the smart home and living industry is mainly male driven, as ICT and the building sector are major player until now. Including female perspectives as from the health&care sector brings very fruitful additional aspects into the topic, as could be showcased in the international cluster forum in Stuttgart on active aging, where a female health-care professor identified the weaknesses of today's approach in a few clear-cut sentences, convincing the technology driven audience in a minute that change is needed.

Clusters in Northern Europe are giving us good examples of how diversity and gender bring additional value to technology-driven environments. Certainly, there is no one key that fits all approach. One cluster may start with activities to attract a more diverse workforce, including measures to strengthen for example their small female workforce. Another cluster starts to understand that the market is not only male but also female. Asking potential female users of their products for ideas new concepts and innovation is generated for the product range and at the same time a new market opened.

If gender and diversity is a general issue for firms, it entails an even larger meaning when it comes to clusters. The high concentration of firms and institutions (and therefore human resources) that defines a cluster, on the one hand, makes the gender issues better visible, on the other hand, provides a context to tackle it better, especially considering for the fact that are constituted mainly by SME. Differently from large firms, in fact, small firms lack resources to create the condition for gender issues to be tackled e.g. through the formation of specific educational programmes to support the entrance of female workers in male-dominated industries, or by the provision of a nursery within the firm buildings to facilitate working mothers. If such services are beyond SME' means, considered as single firms, they are not if considering them as a group: a cluster. Clusters could therefore become the perfect context where experimenting new forms of services to support female presence at all the organizational level, e.g. by developing cluster nurseries, cluster-related trainings and other services.

Considering for the difficulties in transforming all such potentials into reality, it is clear that there is the need for a central actors to spur the development of such joint projects and disclose to

clusters' partners the importance for them to be fulfilled. In this sense, **entrepreneurial CMO** should support diversity both in entrepreneurship (ethnic entrepreneurship, woman entrepreneurship, youth entrepreneurship) and human resource management as source of creativity and innovation for firms and institutions involved.

Policy Implication 8 – A key object of European cluster policies should be to create forms to release the innovation and creativity potential linked to favoring diversity at all the organizational levels. Clusters represent especially suitable contexts where to develop gender and diversity inclusion forms suitable also for small and medium-sized enterprises.

4. CONCLUSIONS

The CluStrat project has been developed around three founding concepts, i.e. clusters, emerging industries and cross-cutting issues. Clusters – a geographical concentration of interconnected businesses and institutions in a specific field – are the backbone of the European economy, being challenged by international competition. The three emerging industries identified in the project – active aging, green economy and sustainable mobility – offer clusters an opportunity for future development and competitive evolution. Involving the clusters in emerging industries represents the main objective of CluStrat, and the cross-cutting issues are strategic leverages for the achievement of this goal.

The project proposed the definition of new cluster concepts, being summarized in the CluStrat strategic framework, which are all interconnected among them. In other words, they have to be considered as different sides of the same coin. The new cluster concepts identified to support the development of emerging industries are four:

- **Smart Specialization Strategies (RIS3), regional clustering and transnational cooperation** – suggesting the importance to connect existing clusters or actors in new inter-sectoral ways at the regional level and supporting transnational cooperation as a means to achieve the regional RIS3, so that the RIS3 highlight the strength of regional clusters and regional clustering is done to fulfil RIS3 objectives;

- **Key enabling and other relevant actors** – suggesting that other than firms (small, medium and large-sized) and universities, also KEA and KIBS have to be involved in clusters specializing in emerging industries;
- **The demand side of emerging industries** – supporting that the supply side needs to be integrated with the demand side, with the creation of contexts where they can interact so that new markets needs and innovation potentials are discovered and exploited;
- **Entrepreneurial cluster management** – proposing that CMO should increasingly perform more complex activities, identifying and proposing to cluster partners opportunities of intra-cluster, cross-cluster and transnational collaboration in the field of emerging industries so as supporting new ventures.

Those interwoven elements have to be understood in the light of an additional one – the variety of clusters – which states that the existing differences across clusters, in terms of specialization, size, actors involved, history, have to be considered in order to develop adequate cluster policies. Moreover, each of them have clear and specific implications for the three cross-cutting issues considered in the project, being knowledge transfer and co-production, internationalization, and gender and innovation including diversity.

Such an analysis drove the identification of 8 policy implications, one for each of the elements identified by the framework plus those relating to the cross-cutting issues.

ABBREVIATIONS

AAL	Ambient Assisted Living
B2B	Business to business
BRIC	Brazil, Russia, India and China
C2C	Cluster to cluster
CIP	Competitiveness and Innovation Framework Programme
CMO	Cluster management organization(s)
DG	Directorate General (European Commission)
Ed./eds.	Editor/s
EFQM	European Foundation for Quality Management
E.g.	For example
Etc.	Et cetera
EU	European Union
EUBSR	European Strategy for the Baltic Sea Region
EUSDR	European Strategy for the Danube Region
ICT	Information and communication technology/ies
I.e.	That is
ISO	International Organization for Standardization
KEA	Key Enabling Technology actor(s)
KET	Key Enabling Technology/ies
KIBS	Knowledge-intensive Business Services
KIC	Knowledge and Innovation Community/ies
NCC	New Cluster Concept(s)
NGO	Non-governmental organization(s)
No.	Number
NUTS	Nomenclature of Units for Territorial Statistics
P./pp.	Page/pages
Par.	Paragraph
RIS	Regional innovation system
RIS ³	Research and Innovation Strategies for Smart Specialization
RTD, R&D(&I)	Research and technological development, Research and Development (and Innovation)
SME	Small and medium-sized enterprises
TRL	Technology Readiness Level

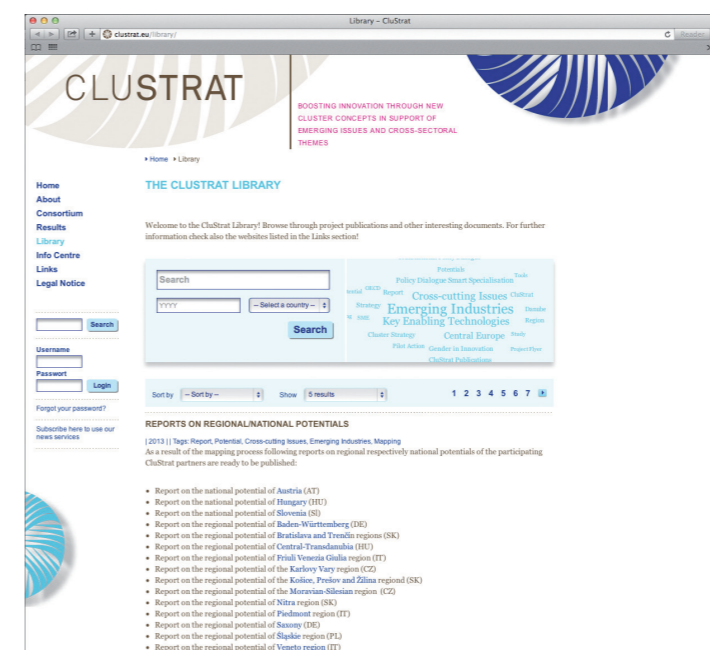
FURTHER DOCUMENTS AND INFORMATION

Further documents and information in English and central European languages can be found online, e.g.:

- Discussion papers on emerging industries, cross-cutting issues, gender and innovation, systemic coordination
- Reports from the 4 Transnational Policy Dialogue events implemented in CluStrat, which have framed the strategy development and generation of outputs
- Reports showing the regional/national potentials in regard to selected emerging industries and cross-cutting issues
- 'Joint Action Plan' showing the most promising strategic policy actions and related recommendations for each project region/country
- National reports reflecting the major project results for each project country
- Pilot action information, including implementation manuals ('Single Action Plans')
- Info center including a press corner and information in central European languages
- CluStrat library

... and more!

www.clustrat.eu/results/



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Austria	Upper Austrian Technology and Marketing Ltd.	
	Clusterland Upper Austria Ltd.	
Czech Republic	National Cluster Association / Czech Republic	
	Business Development Agency of Karlovy Vary Region	
Hungary	Hungarian Economic Development Centre	
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New Cluster Concepts for central Europe – and beyond | Activating the Role of Clusters in view of Emerging Industries and cross-sector Themes

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Clusters are known to enhance innovation in companies and are thus an accepted part of the innovation framework. Policy makers strive for new concepts which deploy the full potential of clusters to increase regional economic development and competitiveness.

This brochure addresses the potential role of clusters in emerging industries. It is targeted at policy makers at operational level as well as regional economic development players.

Implementation-related recommendations for cluster practitioners, including schemes for cluster actions to exploit the chances offered by emerging industries and cross-sector themes, are available at the project website.

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