STEINBEIS-
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CReATE
ICT-Innovations in Creative Industries

# Strategic Cluster Development:
## Applying Strategic Policy Intelligence to create a Joint Research Agenda

**Background paper for the CReATE project**

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# CReATE

## Creating a Joint Research Agenda for Promoting IT-innovation in Creative Industries across Europe

Support Action

Analysis, mentoring and integration of research actors

Work Package 1:
Background Information and Framework for Regional Analysis

# Deliverable 1.2:
# Regional foresight and Cluster policies paper

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# Outline

The EU-project CReATE is funded under the 'Regions of Knowledge' initiative, which aims to strengthen the research potential of European regions, in particular by encouraging and supporting the development, across Europe, of regional 'research-driven clusters', associating universities, research centres, enterprises and regional authorities.

In line with this objective, CReATE supports European co-operation of innovative clusters in the field of creative industries. This sector is one of the emerging lead markets of the European knowledge economy, and is concentrated in highly innovative regional clusters. The Information and Communication Technologies (ICT) play a key role in the creative industries in developing internationally competitive products and services. Against this background, the project intends to activate and enable a more systematic use of the research and innovation potential of the ICT (in particular for the benefit of SMEs) by

- analysing the state of play and the most promising technology and market potential in each region regarding ICT innovation in creative industries;
- prioritising and harmonising the outcomes of the different regional strategy processes in the form of a cross-regional, cross-cluster Joint Research Agenda;
- initiating cross-regional, cross-cluster projects and business plans, and in the end
- increasing the impact and European outreach of the project through concrete dissemination and training measures.

Therefore, this background paper on cluster development and regional foresight aims at

- supporting the development of a common understanding in the CReATE consortium with regard to cluster policies for better competitiveness and innovation and to regional foresight (as an important strategic policy intelligence tool for priority setting to improve the focus, effectiveness and efficiency of the respective policies), and thus
- providing a basis for developing the common methodological framework which will be used for the regional analysis and the development of (trans-)regional research priority areas by each regional partner (as the prerequisite for the cross-regional, cross-cluster Joint Research Agenda).

The background paper is divided into three parts.

The first part focuses on clusters, cluster initiatives and cluster development/policies. As the CReATE Kick-off and the initial CReATE survey (cf. Appendix A) illustrated, the involved partners (respectively regions) partly differ in their understanding of the cluster concept. Whereas e.g. the British cluster concept focuses primarily on company networks and involved business actors, the partners in Germany, France and Italy pinpoint the interrelations of all actors in a related field coming from industry, academia and government ('triple helix'). Thus, the major terms like clusters (pôles de compétitivité, distritto industriale), cluster initiatives, cluster organisations, cluster development/policies will be differentiated and described. Following the explanation of terms it will be outlined, why clusters are widely

considered powerful engines for regional growth and why policy-makers on all administrative levels try to apply cluster policies. Hence, the competitive advantages but also potential risks of clusters will be described followed by the description of knowledge creation as a key determinant for competitiveness. Consequently, the role of research- and knowledge-driven clusters (notably creative industries clusters) acting in a world of 'open innovation' will be outlined with specific respect to the global knowledge economy concept. At the end of the first part, success factors and common failures of cluster development will be summarised.

The second part illustrates the role of Strategic Policy Intelligence and management (SPI) tools for regional decision-making processes enhancing sustainable cluster development. Initially it will be described, why and how the systematic use of SPI tools such as foresight, innovation audit, benchmarking, technology assessment, evaluation etc. can support the whole regional decision-making process. Secondly, relevant SPI tools will be described and their specific application will be discussed in some detail. Different stages of decision-making process require different types of knowledge and thus rely on different SPI tools. Thus, SPI tools supporting stock-taking activities are differentiated from SPI tools supporting forward-looking activities. Finally, the value added of linking forward- and outward-looking (i.e. Open Innovation) approaches for strategic cluster development is described to set the basis for the concluding Chapter.

Based on the first two Chapters, the third part of this background paper draws conclusions for the elaboration of the CReATE methodology. This common methodological framework for the regional analysis and the development of regional research priority areas facilitates the common development of the cross-regional, cross-cluster Joint Research Agenda.

At this point it is important to note that CReATE as a Regions-of-Knowledge project and consequently the proposed CReATE methodology doesn't follow a regional approach per se. It rather has a specific market and technological focus within and across the regions (i.e. regional and cross-regional value chains), and thus follows a cluster-related approach. Thus, the regional and cross-regional activities described in this background paper mainly refer to regional cluster activities and the cross-regional collaboration between the specific clusters (inter-cluster collaboration).

# 1 Clusters, cluster initiatives and cluster development

Regional clusters have attracted growing interest among both academics and policy-makers during the last decades. In the 1970s and 1980s clusters established a strong position in the world market for both more traditional products (e.g. 'Third Italy') and high technology products (e.g. Silicon Valley). During the 1990s clusters were widely recognized as important settings in stimulating the productivity and innovativeness of companies and the formation of new businesses, in particular since the work of Harvard Business School's Professor Michael Porter, *the Competitive Advantage of Nations* (1990), popularised the concept.

More recently and in the context of the global knowledge economy concept, the importance of non-local, international aspects of clusters are attracting more attention from both research and policy. Thus, clusters are increasingly understood as local nodes for global knowledge flows, widely recognised as 'innovative hot spots'. The Innobarometer 2006 on "cluster's role in facilitating innovation in Europe" confirmed that companies situated in clusters are more innovative and finally more competitive than companies outside the clusters. The enhanced innovativeness and competitiveness on the firm level finally results in sustainable regional economic development. Hence, policy-makers on all administrative levels embraced the cluster concept as a great opportunity to boost competitiveness and innovation leading to some confusion of terms.

In the following, the different meanings of clusters (and related concepts), cluster initiatives, cluster organisations and cluster development / policies are outlined. After this, the competitive advantages and potential risks of clusters are specified followed by the description of knowledge creation processes as a key determinant for competitiveness. Subsequently, the role of research- and knowledge-driven clusters (notably creative industries clusters) acting in a world of Open Innovation is described. Finally, success factors of cluster development are summarised.

## 1.1 Explanation of terms

### 1.1.1 Clusters (and related concepts)

The cluster concept has become nowadays a somewhat fuzzy concept, as it has been used differently in various contexts and purposes. In the political arena, the cluster concept is broadly seen to catch all the relevant mechanisms underlying dynamic regional development and thus is often used as a metaphor and buzzword in designing regional development policies adapted to the needs of the globalising knowledge economy.

In academia, the cluster concept is the product of the convergence of several strands of thoughts: localisation economies in economic geography (starting with the seminal work of Alfred Marshall about industrial districts more than a century ago and encompassing the many studies of the Italian districts [distritto industriale] starting from the late 1970s), regional innovation systems and "learning regions" in regional economics, the systemic view on innovation in economics of science and technology, and firms' decentralised governance

modes in business organisation. The cluster concept has been a convenient vehicle to encompass new thinking in those areas, but doing so, it has become a multi-facet and versatile concept, lacking focus and clear boundaries.

The most widely used definition of cluster, and the one that is most pervasive in policy circles, is that of Porter (1998). He defines clusters as

- *geographical concentrations*
- *of interconnected companies, specialised suppliers, service providers, firms in related industries and associated institutions (e.g. universities, standards agencies, trade associations)*
- *in a particular field*
- *that compete but also co-operate.*

This definition pinpoints four key elements of the cluster approach.[1] Though, there is no general agreement on the fact that these are neither necessary nor sufficient to put boundaries to the cluster concept.

1. The geographical concentration is at the heart of the cluster approach. Some approaches consider the case of "virtual clusters" of firms spread over a large territory, thus lacking geographic proximity. The new possibilities offered by ICT can in part overcome the distance, but overall, geography still matters! Physical closeness is still a key feature for effective collaboration and thus for learning and innovation processes.
2. The specialisation of the businesses in a particular thematic field (specific value chains mostly spanning across several industries) is prerequisite for realising the benefits attributed to clusters (Marshallian external localisation economies). Commonalities such as common orientation towards closely-related technologies, markets, processes etc. provide the businesses within the cluster e.g. with specialised suppliers, customers, infrastructure, skilled workers or tacit / non-codified knowledge.
3. The presence of companies together with other institutions denotes the business focus of the concept with a broad understanding of the relevant business environment (training and research institutions, regulatory institutions, public bodies, intermediaries, financing institutions, etc.). The cluster concept broadens the classical understanding of business development and reflects that framework conditions and non-firms actors play an important role on the business activities. It broadens the horizon with regard to all the interrelationships in the 'triple helix' of business – academia – public administration. Though, cluster concepts with exclusive focus on firms coming from the same industry are still existent. In line with the globalising knowledge-based economy, a systemic understanding however is important reflecting the necessity of interacting in the fields of research, education and innovation

[1] Empirically identified clusters show varying significance of these elements e.g. according to their cluster type, life cycle stage etc. (see for some typologies Appendices B to D).

(knowledge triangle) to secure regional competitiveness and sustainable growth and development.

4. The connectivity in line with the cooperative competition (co-opetition) in clusters shows, that companies can compete and co-operate with each other at the same time. Companies, competing e.g. in the same market, sometimes co-operate and join forces in specific fields, e.g. if the current core competences are not affected, all partners suffer from the same shortages and/or all partners equally benefit from the joint initiative. The cooperative aspect is an important feature e.g. for the industrial districts approach were mainly small sized enterprises have multifaceted relationships with each other as well as with the local community. Porter himself highlighted for a long time the value of competition as an important incentive for innovation in clusters. New approaches (e.g. innovation system approach) though emphasise the interrelations between actors as an essential component. Figure 1 exemplifies the connectivity between different stakeholders in a specific thematic field.

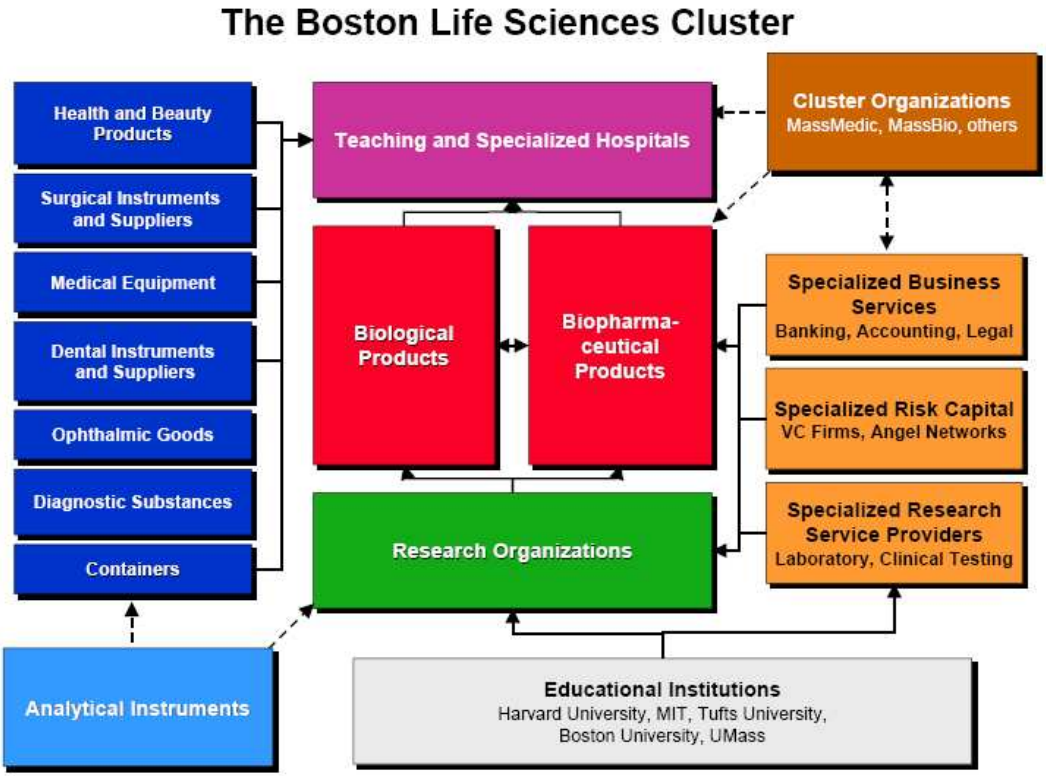



Figure 1: Illustration of the diverse actors/elements in a cluster (Boston Life Sciences Cluster) Source: Porter 2008

The linkages and interrelationships of cluster actors in the triple helix as key elements of the cluster approach show the proximity to the network concept and the concept of innovation systems (cf. European Commission 2002).

The **network concept** is often introduced to characterise the specific forms of governance based on social relations, trust and the sharing of complementary resources that typifies many

regional clusters (Vatne and Taylor 2000). Social relations are seen as the most important channels through which information flows, and geographical proximity facilitates the formation of trustful social networks.

In the second half of the 1990s, the related **concept of a regional innovation system** arose as a new buzzword in scientific and political debate. Initially, the concept of innovation system has been applied to the national level (cf. Lundvall 1992, Nelson 1993) followed by a growing interest in regional innovation systems (cf. Autio 1998, Braczyk et al. 1998, Cooke et al. 2000). The core of a regional innovation system is made up by three sub-systems embedded in a common regional socioeconomic and cultural setting:

- *industrial system* responsible for knowledge application and exploitation
- *education and research system* responsible for knowledge generation and diffusion
- *political system* influencing and governing other sub-systems and elements

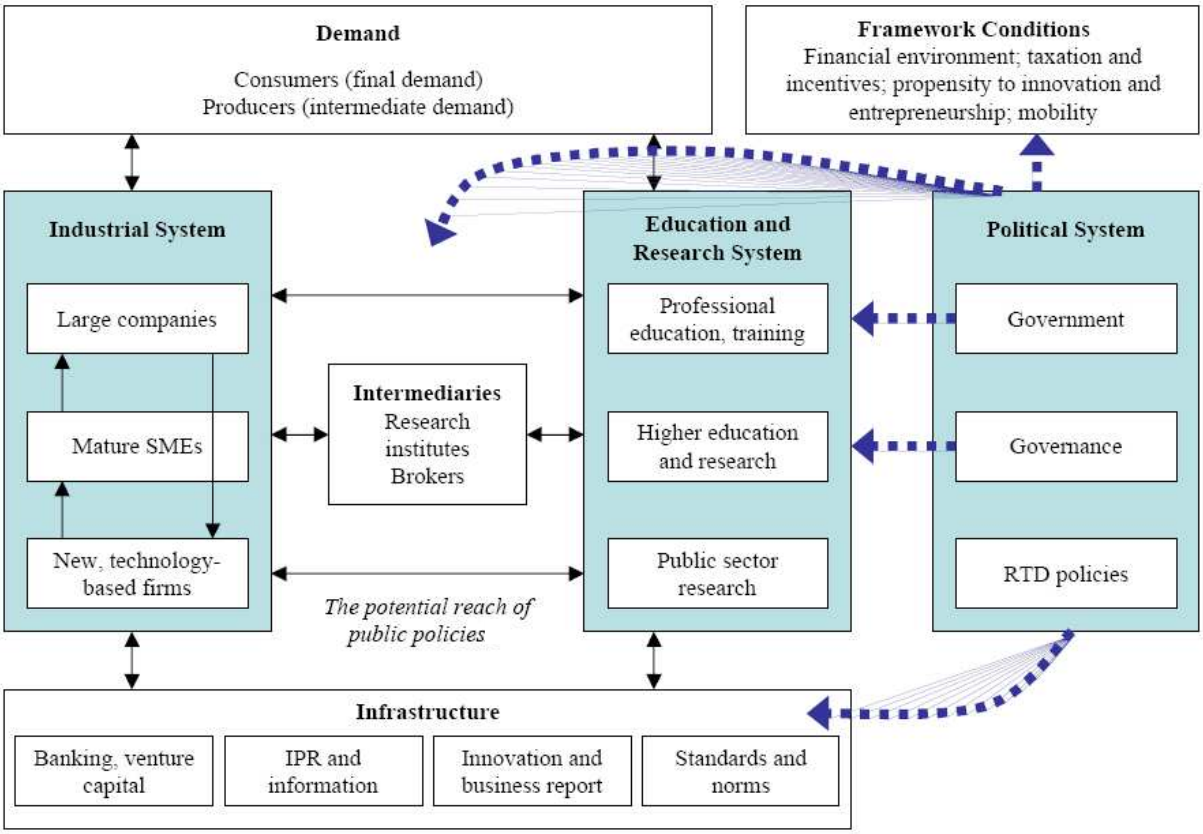



Figure 2: Main elements of and relations within innovation systems
Source: Kuhlmann & Arnold 2001

The need of policy-makers to explore novel strategies and systemic approaches in line with the changing innovation processes and growing global competition produced a great political interest in the cluster concept (cf. Section 1.1.3). Therefore, the following Section describes cluster initiatives and cluster organisations as important instruments of regional innovation policies.

### 1.1.2 Cluster initiatives and cluster organisations

Clusters and cluster initiatives are often used synonymously in practical terms. However, whereas clusters describe existing economic structures (independent from political initiatives) **cluster initiatives** are defined as[2]

- *organised efforts*
- *to increase growth and competitiveness of clusters within a region,*
- *involving cluster firms, government and/or the research community.*

Although cluster initiatives can also be driven completely by private actors, most of them are (at least to some extent) dependent on some form of public funding indicating the significance of cluster policy for the outcome of cluster initiatives. As already mentioned above, cluster initiatives are generally seen as adequate and effective instrument of innovation policy to concentrate resources and means in order to achieve a critical mass and to accelerate the transfer of knowledge and know-how. These organised regional and sectoral networks among partners coming from business, academia and public administration (triple helix) have become an important feature of improving innovation performance and international competitiveness. In the meantime, a lot of countries promote the development of cluster initiatives using different labels such as **pôles de compétitivité**[3] in France**, Kompetenznetze**[4] in Germany, etc.

The Cluster Management Guide from the CLOE initiative[5], that provides guidelines for the development and management of cluster initiatives, divides the main tasks of the initiatives into five fields of action:[6]

- Information and communication
  e.g. via homepage, cluster database, communication platform, newsletters, meetings, events, company visits
- Training and qualification
  e.g. vocational training sessions, workshops, seminars, study trips, inter company learning
- Co-operations
  e.g. co-operation projects between companies, R&D and educational institutions and/or special service providers
- Marketing and PR
  e.g. information brochures, advertisements/articles in trade journals, trade fairs, company visits, lobbying

[2] cf. The Cluster Initiative Greenbook 2003 (Sölvell et al. 2003)
[3] http://www.competitivite.gouv.fr
[4] ttp://www.kompetenznetze.de
[5] www.clusterforum.org
[6] The Global Cluster Initiative Survey 2003, which identified more than 500 cluster initiatives around the world, allocated the identified objectives of the cluster initiatives to similar segments: Research and networking, policy action, commercial cooperation, education and training, innovation and technology, cluster expansion (Sölvell et al. 2003).

- Internationalisation
  e.g. access to international events, topics and trends; participation in international projects; network activities between different clusters

In comparison to the cluster initiatives as networked partners and organised efforts, **cluster organisations** (such as the CReATE partners MFG, Imaginove or Advantage Westmidlands) are the responsible bodies for the cluster initiatives. These organisations act as cluster agencies, where cluster managers provide the partners of the cluster initiatives with specific services.

### 1.1.3 Cluster development and cluster policies

Governments and other public institutions on all administrative levels (from regional to European level) try to boost competitiveness and innovation by applying cluster policy.[7] Cluster initiatives as mentioned above are an important new direction in economic, regional and innovation policies and are seen as a specific instrument of regional innovation policy. For example, at EU level the European Commission emphasises the relevance of clusters to achieve the Lisbon goal to become by 2010, "the most competitive and dynamic knowledge-based economy in the world" and established a High-Level Advisory Group on Clusters and supports several activities in this field under the PRO INNO Europe initiative (e.g. European Cluster Alliance)[8] and the Europe INNOVA initiative (e.g. European Cluster Observatory)[9].

In comparison to cluster initiatives, **cluster development** and **cluster policies** refer to the

- *process of making and implementing strategic decisions*
- *of actors in both the public and private domain*
- *with the overall aim to sustain and/or to increase regional economic development.*

Of course, cluster development and cluster policies are linked to cluster initiatives. Whereas the term "cluster initiatives" focuses on the organizational form of joint actions, cluster development and cluster policies emphasize the process of decision-making and setting the right framework conditions for business success and finally successful regional economic development.

Cluster development and cluster policies are not limited to decision-making processes in the public sector. However, it is widely recognized that public policy, whether explicitly directed at clustering or not, plays an important role on the formation and development of clusters.

[7] See e.g. OECD (1999, 2001, 2007)

[8] The European Cluster Alliance prepared the "European Cluster Memorandum – Promoting European Innovation through Clusters".

[9] The European Cluster Observatory continuously monitors clusters, their dynamics and evolution over time using the same technique all over Europe, and analyses their impact on the economic development and performance of regions. The first cluster mapping project, completed in June 2006, covers the (then) 10 new EU member states (Ketels/Sölvell 2006), while the second, which started in September 2006 will cover the EU-15, Bulgaria, Romania and Turkey, as well as Iceland, Israel, Norway and Switzerland.

The Cluster Policies Whitebook (Andersson et al. 2004) identified three main rationales for public policy involvement:

- **Market failure**:
  Knowledge generation, for example, is strongly affected by market imperfections. Government policies aim at stimulating R&D by private firms in strategic relevant fields (e.g. technologies of the future) if a low rate of return on private investment impedes future-oriented knowledge generation. For example, lead market initiatives shall bridge the gap between current investments and future returns of private investments. Furthermore, strategic knowledge generated by big companies could serve smaller companies as starting point for new business development. Cluster policy could create a business ecosystem, where the business partners share strategic knowledge and develop strategic partnerships and joint initiatives.
- **Government/policy failure**:
  Governments and other public bodies are not necessarily informed enough about market needs and thus in general run the risk to set wrong, ineffective or inefficient framework conditions for the regional actors. Cluster policies, which aim at linking the stakeholders coming from industry, science and policy as well as supporting public private partnerships, thus principally have the potential to improve public investments with respect to fundamental needs. However, cluster policies are not immune to misallocation of investments (cf. Section 1.2)
- **Systemic failure**:
  Systemic failure occurs when there is a mismatch or inconsistency between the actors, institutions, organisations etc. interrelated in the innovation system. The innovation systems consist of multi-actor, multi-level and multi-disciplinary interrelationships, which require a systemic perspective and a coordinated approach. In this respect, cluster policies as a systemic and comprehensive multi-level multi-policy approach across different ministries and public authorities enhances the coordination and thus the development and implementation of effective and efficient coherent innovation strategies.

With respect to the three main rationales for public policy involvement, the Cluster Policies Whitebook (Andersson et al. 2004) summarized the following widely used approaches:

- **Broker policies** to enhance the dialogue and cooperation between the various relevant stakeholders involved in clusters.
- **'Demand side' policies** like stimulating the development of specific lead markets relevant for the cluster via public procurement, fostering the development of units providing strategic intelligence (monitoring technology trends, competing clusters, etc.) or establishing educational activities to stimulate curiosity and openness to new ideas.
- **Training policies** to upgrade skills and competencies especially of SMEs (e.g. strategic management capabilities).

- **Measures for the promotion of international linkages** to enhance the interplay between foreign and domestic actors.
- **Framework policies** providing effective and consistent rules for inter-actor transactions. Hardly to define and to quantify aspects such as social capital and attitudes, and habits that support trust in transactions are important variables to be considered by policy-makers.

## 1.2 Competitive advantages of clusters and potential risks

Clusters are considered powerful engines in the economic structure of national and regional economies. **Competitive advantages** within clusters enhance the micro-economic environment for businesses, leading to improved opportunities for innovation, enhanced productivity and improved business formation, and thus contribute to regional growth and competitiveness.

The companies within clusters principally benefit from competitive advantages like

- the pool of specialised workers,
- the pool of specialised suppliers and customers,
- the specific infrastructure with tailored training institutions, research and development organisations, seed and venture capital providing organisations etc.
- the spillover of knowledge.

These so-called ‘Marshallian external economies’ lower the transaction costs fundamentally. Every company within the cluster has the opportunity to benefit from these ‘passive gains’ without co-operating. In contrast, companies have to actively collaborate if they want to benefit from joint activities such as:

- joint sourcing of materials, services etc.
- joint marketing activities, starting a cluster initiative to attract attention, new business, (public aid) money etc.
- joint innovation activities, starting an interactive learning process which could lead to unique ‘localised capabilities’ (Maskell/Malmberg 1999),
- …

The active gain of these competitive advantages relies on mutual trust and common norms, rules, and routines as fundamental elements of social relations between the stakeholders (‘social capital’). Due to the (latent) competition in many clusters, specific methods and tools (cf. Chapter 2) have to be used to mobilise the commitment and support consensus-building of the cluster actors.

While clustering can strengthen business and regional competitiveness and innovation, cluster policy is not a panacea. Clusters are not immune to **pitfalls and risks** that may actually reduce competitiveness and result in stagnation or decay. There may be various kinds:

- **Vulnerability**: Specialisation can invoke vulnerability for a region. Technological discontinuities may undermine specific cluster advantages, as may shifts in the general economy, trade patterns and customer needs.
- **Lock-in effects**: Excessive reliance on local contacts and tacit knowledge in combination with neglect of external linkages and lack of foresight may account for lock-in effects due to dominance of established practices.
- **Creating rigidities**: Dense existing structures risk delaying a radical re-orientation or hindering needed structural adjustment. For example, some years ago several authors identified in Baden-Württemberg some problems with adapting its dense institutionalised engineering clusters to the flexible demands of international markets.
- **Decrease in competitive pressures**: Cooperation can cause a reduction in competitive pressures and hence in the driving forces for innovation. It can create societal inefficiencies as tight-knit groups of actors block entry by newcomers.
- **Self-sufficiency syndrome**: Growing used to past successes, a cluster may fail to recognise changing trends. Harrison and Glasmeier (1997) suggest that industry clusters respond best to incremental changes in technology and market demand. In the presence of significant changes, clusters could hinder adjustment at odds with learning accumulated collectively through previous success periods.
- **Inherent decline**: Just as social capital may be essential for shaping the basis for the development of clusters, the latter may undermine and even destroy the social fabric that underpinned it in the first place. As a successful cluster will generate higher factor costs, the neighbourhood may experience increased property prices and exclusion of outsiders (Portes/Landolt, 1996).

Thus, to reduce these pitfalls and risks and to unfold the competitive advantages of the cluster, it is important to open the cluster to new ideas and partners from outside and to stimulate a kind of ‘out-of-the-box’ thinking and acting across the actors.

## 1.3 Knowledge creation as a key determinant for competitiveness

Cluster policies try to increase growth and competitiveness of clusters, but they cannot start clusters from scratch. What cluster policy can do is to induce or support local learning processes and to provide the relevant framework conditions for a flourishing cluster development.

Porter distinguishes in his well-known so-called ‘diamond’ four components relevant for the emergence and evolution of clusters (cf. figure 3). These four elements of Porter’s ‘diamond’

describe relevant framework conditions for the microeconomic competitiveness in clusters. According to Porter, the main driving forces for the microeconomic competitiveness are

- the sophistication of company operations and strategy (innovation orientation),
- the quality of the business environment (common innovation infrastructure),
- the state of cluster development (cluster-specific external economies) and
- the quality of the linkages between these building blocks.

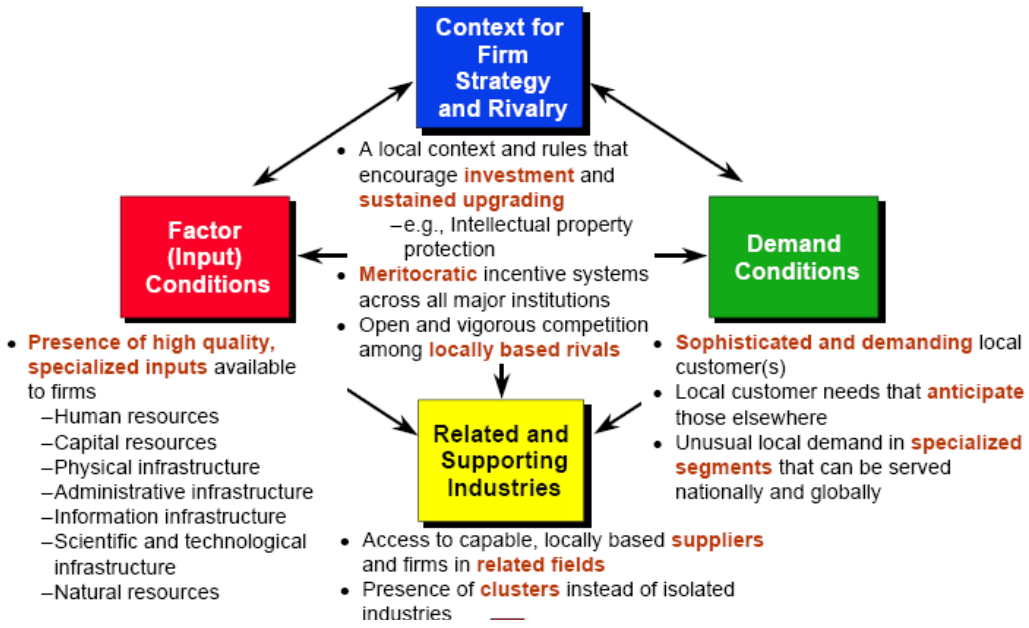



Figure 3: Porter's 'diamond' of relevant components of cluster emergence/evolution
Source: Porter 2008

Whereas such traditional concepts of economic agglomeration have a more static perspective and focus on the rather classical external economies, recently an increasing number of authors call for a more evolutionary oriented **knowledge-based theory of spatial clustering** (cf. Malmberg/Maskell 2002). These authors highlight the value of knowledge creation processes localised within clusters for sustainable cluster development and trans-regional competitiveness. Bathelt et al. (2004) emphasise four relevant dimensions enhancing the creation of knowledge in clusters:

- Vertical dimension: **sequential knowledge flows in value chain**
  In the vertical dimension, knowledge complementarities are the most important source of relatedness. Firms specialised in different stages along the value chain are inter-linked through sequentially input/output-relations and provide business partners with knowledge, experience, or skills useful for complementary activities.
- Horizontal dimension: **knowledge flows between competitors**
  Knowledge flows between competitors take place either via unintended knowledge

spillovers or in some cases via intended co-operation activities (cf. collaborative and open innovation strategies Section 1.4). Spatial proximity between competitors allows spontaneous, automatic observations and comparisons (benchmarking). In clusters it is much easier to identify promising avenues from competitors and to imitate superior solutions while combining them with ideas of one's own.

- Social / institutional dimension: **'local buzz'**
  The 'local buzz' refers to intended and unintended knowledge spillovers that are inherent in the everyday communication of people living and working closely together. Numerous face-to-face contacts support
  - learning processes in organized and accidental meetings;
  - the application of the same interpretative schemes and mutual understanding of new knowledge and technologies; as well as
  - shared cultural traditions and habits, which taken together makes interaction and learning less costly.

  Actors continuously contribute to and benefit from the diffusion of information, gossip and news by just 'being there' (Gertler 1995).
- External dimension: **'global pipeline'**
  Access to new knowledge does not just result from local and regional interaction but is often acquired through strategic partnerships of inter-regional and international reach. In many cases, decisive, non-incremental knowledge flows are often generated through 'global pipelines'.

Whereas the first two dimensions are already addressed by Porters cluster concept, the specific value of the social / institutional dimension (local buzz) and the external dimension (global pipeline) are seen as important cornerstones for the knowledge creation process in clusters (cf. figure 4).

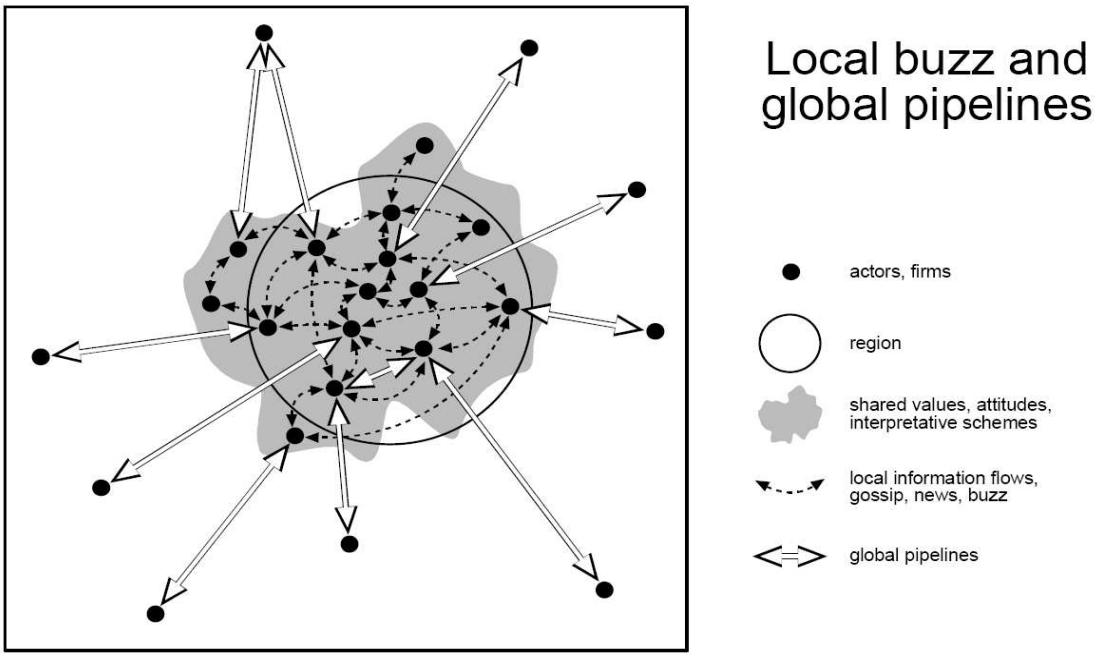



Figure 4: Local buzz, global pipelines and the process of knowledge creation
Source: Bathelt, Malmberg, Maskell 2004

For a sustainable knowledge creation process, a certain degree of knowledge variety is necessary. Cutting-edge knowledge and innovations emerge especially at the borderlines of different technological fields and/or in combining new or existing knowledge in a new way. Thus, it is important to refresh the existing knowledge stock within clusters with input from outside. In this context, recent findings (cf. Delgado et al. 2008 etc.) show that cluster perform better if they have a unique and specialised knowledge stock ('localised capabilities') which derives from

- a combination of different competencies within the cluster,
- interrelations with related clusters (other sectors) e.g. within the region and
- sharing competencies and joining forces with similar clusters in international networks.

In this respect, the Aho Report "Creating an Innovative Europe"[10] comes to the conclusion:

"It is important to ensure that **clusters are defined in terms of the new market and knowledge relationships needed for emerging sectors to thrive**. It is even counter-productive to reinforce traditional sectoral clusters as these may inhibit the necessary mobility. Firms in traditional sectors are far more likely to find innovative growth by **forming new linkages** and **applying new technology** to their existing products and services. This can be facilitated by **opening the clusters to cooperation with and learning from other clusters in the same or other sectors**."

[10] http://ec.europa.eu/invest-in-research/pdf/download_en/aho_report.pdf

## 1.4 Research-driven clusters in a world of Open Innovation

Henry Chesbrough introduced 2003 the term 'Open Innovation' with his book on "Open Innovation: The New Imperative for Creating and Profiting from Technology". He claims a fundamental shift in innovation paradigms from closed to open innovation. Traditionally new business development processes and the marketing of new products took place within the firm boundaries. In recent times, more and more (in particular multinational) enterprises develop and implement collaborative and open innovation strategies due to increasing complexity of RTDI processes, growing global competition and increasing pressure to bring quickly products and services onto the market etc.

Following a collaborative and open innovation strategy means to open internal innovation processes and to benefit from collaborating with external partners. Accordingly, enterprises look - in addition to internal sources - for external ideas to find innovative solutions, support external commercialisation of internal inventions, e.g. through licensing, and to form strategic RTDI partnerships or networks with innovative partners. In some cases businesses even build a specific 'business ecosystem', where they co-evolve their capabilities around a new innovation and jointly design in a kind of 'mass customization' new products and services to satisfy individual customer needs.

In line with the broader understanding of knowledge creation in innovation systems, collaborative and open innovation strategies increase the relevance of research-based clusters as local nodes in global innovation networks (Section 1.4.1). Against this background, the specific characteristics of creative industries clusters acting in a world of open innovation are highlighted in Section 1.4.2.

### 1.4.1 Clusters as local nodes in global networks

Developments such as ICT-innovations, lowered transport costs, market liberalisation, global sourcing and open innovation processes etc. increased the global mobility of capital, labour and information dramatically. The fast-paced globalisation brought the New York Times columnist and author Thomas L. Friedman to the conclusion: "The World is Flat". However, this statement evoked numerous reactions indicating that in fact, the world is "spiky"[11] because both economic and innovative activities are still highly concentrated in a few regions (see Figure 5). Already in 1996, economics professor Ann Markusen pinpointed that clusters are "sticky places in slippery space". In particular, research-driven clusters represent outstanding "spikes" with international or even global impact.

[11] Cf. Florida (2005)

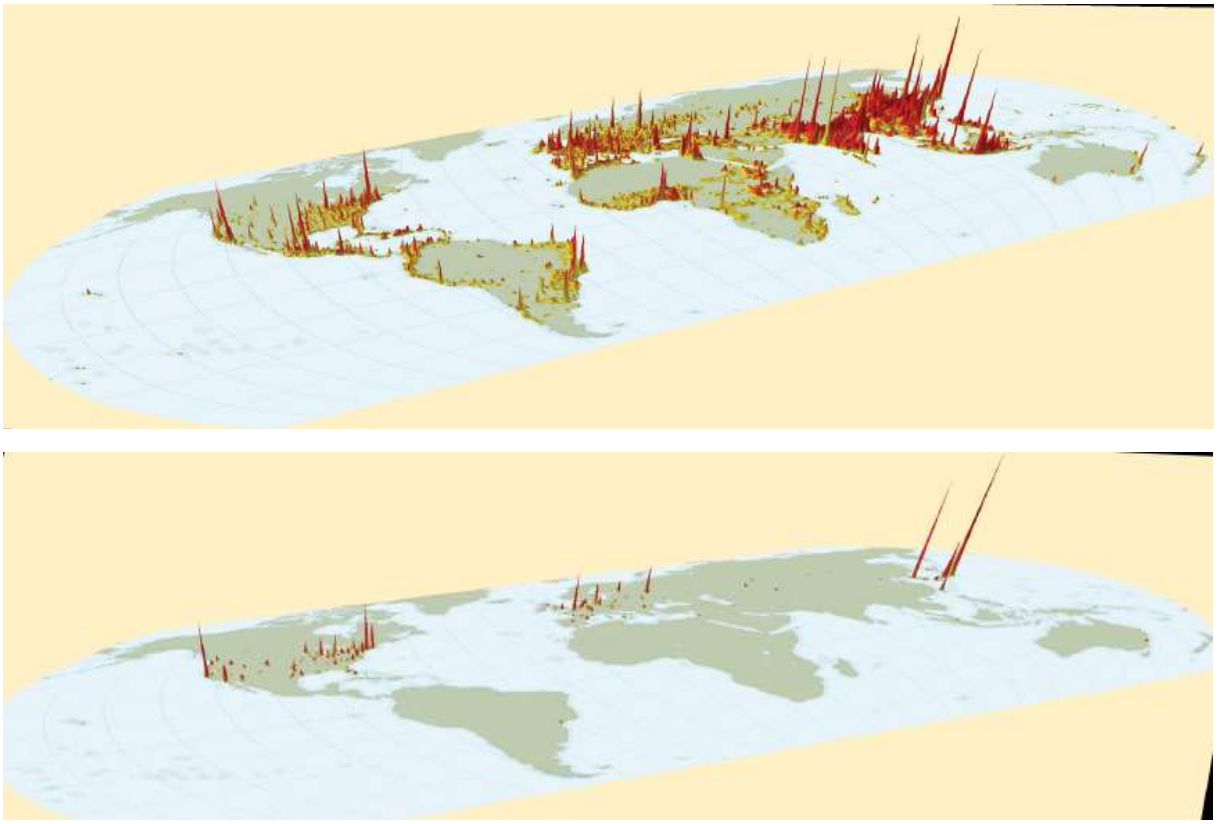


Figure 5: Global distribution of commercial innovation and scientific advance.
Source: WIPO: US patent and trademark office 2005 quoted in Evaluation of the Effectiveness of European ICT RTD and Innovation Systems[12]

Research-driven clusters are strongly influenced by research, technological development and innovation (RTDI) and thus depend on effective knowledge flows and science-industry collaboration facilitating specific learning processes and innovation activities (cf. knowledge-based clusters in Appendix C). As described in Section 1.3, both knowledge spillovers within clusters (e.g. local buzz) and strategic partnerships of inter-regional and international reach to access cutting-edge knowledge (global pipelines) are decisive to facilitate unique learning processes and boost innovation in clusters.

In a world of open innovation, research driven clusters compete and co-operate with each other on a global scale. These clusters can be seen as local nodes for global knowledge flows in international value chains and innovation networks, and hence are widely recognized as 'innovative hot spots' leading to competitiveness and prosperity for regional and national economies (Nauwelaers 2003).

In research-based clusters, specific organisations such as well-known public or private research organisations (e.g. laboratories of multinational companies), 'transceiving' (receiving and transmitting) intermediaries (cf. Cooke 2005) etc. play a vital role as 'knowledge hubs' between global and regional innovation networks. In this respect, it is worth mentioning that the role of multinational companies as important knowledge providers within clusters, transmitting internal knowledge and receiving external knowledge, is broadly underestimated.

[12] http://ec.europa.eu/dgs/information_society/evaluation/data/pdf/studies/network_studies_overview_compilation.pdf

Multinational companies are well integrated in international innovation networks[13] and thus could play – if they are embedded within the cluster – a vital role for the regional deployment and exploitation of international knowledge. The example of the Nokia-Cluster in Finland with its about 3.500 SMEs illustrates the importance of SMEs collaborating with multinationals. SMEs which cooperate with Nokia notably benefit from the linkages and transform new ideas into localised capabilities.

### 1.4.2 The case of Creative Industries clusters

**Creative Industries as a Key to Achieve the Lisbon Strategy for Growth and Jobs**

"Supporting creative industries through better IPR regulations and the development of world-class IT infrastructure must become a priority for the EU, at a time when China and India are catching up on research and scientific innovation", Slovenia's Minister for Growth postulated before the Spring European Summit 2008 chaired by EU Presidency holder Slovenia. Accordingly, the European Commission designated 2009 as the European Year of Creativity and Innovation.

Creative industries contribute to a growing part of economic value added and employment and hence are vital to meet the targets of the Lisbon agenda. The estimated turnover of the creative industries in 2003 was app. € 654 billion (compared to the automotive sector of € 201 billion).[14] Globally, creative industries are estimated to account for more than 7 per cent of the world's GDP[15] and are forecast to grow on average by 10 per cent yearly.[16] Already these industries represent a leading sector in the OECD economies, showing annual growth rates of 5 to 20 per cent.[17] In the United Kingdom, for example, creative industries already generate revenues of over £110 billion and employ 1.3 million people.[18] Several other countries, such as Australia, Canada, Ireland, New Zealand and Sweden, have also been successful in exploiting their foothold in these industries and are increasingly acknowledging their relevance as part of the new information economy.

**Definition of Creative Industries**

Whereas the economic impact of creative industries is clearly recognised, it is not so easy to come to a consistent understanding about what creative industries comprehend in detail. There are a number of different models and definitions for creative industries (cf. ICT background paper of Cassarino/Geuna 2008; UNCTAD 2008). For example, the differentiation between instrumental rationalities of "making money" and the non-instrumental rationalities of producing "symbolic meaning" of creative actors is subject of controversial debate. The

[13] Appendix F exemplifies their central role in the ICT-RTD networks in FP6
[14] The Economy of Culture in Europe (2006), http://www.keanet.eu/Ecoculture/Study%20new.pdf
[15] World Bank 2003
[16] PriceWaterhouseCoopers 2003
[17] EESC 2003
[18] UK Dept. for Culture, Media and Sports 2003

CReATE project however has a clear focus on RTDI thus it concentrates on the economic aspect of creative industries.

In the CReATE project the definition of creative industries is grounded on the widely-quoted definition of the UK Government Department for Cluster, Media and Sport (DCMS) and on the definition on creative industries following the concept of Queensland Government, Australia (cf. CMC 2008).

Creative industries are

- driven by individuals
- with creative skills and
- business goals and
- served by technology.

Within the scope of CReATE the four participating regions focus on the following interrelated fields of excellence & aspiration:[19]

- music, radio and audio
- film, television and video
- animation and computer games (entertainment software)
- writing, publishing and print media
- advertising, graphic design and marketing
- architecture, visual arts and design

**Creative Industries Cluster acting in a World of Open Innovation**

The so-called 'creative class'[20] in general and creative industries in particular are highly concentrated in a few regions of the world. This "spiky world" results from the fact, that creative activities have most force and are most sustainable if they occur in communities (clusters or cities) where people of varying interests and talents (but with a common concern for novelty) can meet face-to-face and in an institutional environment supporting diversity and freedom of expression (cf. Chapter 1.3).[21]

In this respect, cultural diversity is seen as a central source of innovation and change: it enhances creativity by enlarging the pool of ideas and perspectives from which actors obtain alternative solutions.[22] For cultural diversity to bear fruit, the institutional setting must be

[19] cf. CReATE Background Paper on ICT Innovations in Creative Industries
[20] Florida (2002) and Florida (2008)
[21] Cf. Cooke/Lazzeretti (2007), Lazzeretti et al. (2008) etc.
[22] Creativity, as the ability to bridge gaps between circumstances that are not obviously connected and logically related by creating new approaches using free association between known facts and playful theory-building, is a key element in the innovation process. Creativity in general implies that a wide range of knowledge and new ideas coming from a variety of domains can provide the basis for innovation. Diversity is the breeding ground of creativity.

tolerant of competition and rivalry – between people and between ideas. For example, in the case of the Hollywood film cluster, regional lock-in situations combined with global market pressures has reduced creativity, leading to a kind of blockbuster mentality that aims more at replicating past successes than producing novelty (De Propris/Hypponen 2007).

To harness diversity as breeding ground of creativity and innovation and to avoid regional lock-in situations, it's crucial to support the regional stakeholders in accessing complementary competencies and capabilities located in other regions and in joining forces to boost regional innovation. Creative industries clusters are often based on one competitive advantage ('localised capabilities') and depend very much on trans-regional cooperation. Global value chains, trans-regional exchange of know-how and competence and mutual fertilisations play a vital role in developing creative and highly innovative solutions. For example, animation sketches for computer games or Internet applications are designed e.g. in France, where highly skilled animation designers are located, and the actual process of creating the animation is done in e.g. Central European countries such as the Czech Republic or Poland who have long traditions in producing high quality animation in an effective way.

Acting in world of open innovation, (trans-regional) science-industry collaboration is a *sine qua non* for competitive Creative Industries clusters in Europe, because

- the market for creative industries products and services is fast changing and highly innovative and thus constantly demands for ICT research and innovation as a main driving force of the creative industries[23] and
- the sector primarily comprises SMEs which are limited in carrying out own R&D activities due to lack of resources.

However, few creative industries support initiatives have yet fully embraced the role of technological change and ICT-research. Thus, the overall goal of the CReATE project is to create a cross-regional Joint Research Agenda for ICT innovation in the creative industries clusters across Europe.

## 1.5 Success factors and common failures of cluster development

The variety of cluster types and the unique local framework conditions make clear, that there can be no ‚one size fits all' cluster development concept. Dedication to the specific needs of the cluster is a *sine qua non* of successful cluster development. However, there can be summarised some fundamental success factors of cluster development.

Thus, successful cluster development

- involves all relevant **stakeholders of the innovation system** - multiple levels of government and public agencies, companies, educational and research organisations etc. (triple helix) - and facilitates **personal relationships and mutual trust** as

[23] European Commission has just launched a project with the IPTS of the Joint Research Centre investigating the linkages between sector growth and ICT-research with a particular focus on the creative industries. For more details see: http://epis.jrc.es/Pages/Partners.html

fundamental precondition for joint actions addressing the whole **knowledge triangle**, i.e. interaction between research, education and innovation, which are key drivers of the knowledge-based economy;

- addresses **specific barriers** of companies (especially SMEs) face in a given market and focuses on the **capabilities of the stakeholders** as well as on most **promising international technology and market development perspectives**, develops and implements adequate and **concrete actions**, and thus provides a **clear value added for all stakeholders**, especially for the companies (cluster development is induced by the market and targets at the market);
- integrates a **broad range** of (European, national, and regional) public policies and private sector activities and mobilises **sustainable support from public AND private stakeholders** (real Private-Public Partnership);
- strengthens the **strategic capabilities of all regional actors** and thus, e.g. facilitates sustainable business development in line with the cluster strategy, adjusting **longer-term business models to emerging lead markets**
- facilitates **knowledge flows between actors** and thus enhances **unique learning processes** leading to 'localised capabilities' within the cluster AND facilitates **trans-regional knowledge flows and learning processes**
- is promoted by an experienced **facilitator/promoter** with professional and excellent social competences (human factor is key!) and shows **high transparency, clear communication and efficient and effective governance**;
- follows a **common vision and strategy**, which is shared by all stakeholders, and **combines** (often longer-term oriented) **co-operation AND** (more short-term oriented) **competition between companies** (co-opetition)[24].

On the contrary, cluster initiatives that don't take into account these success factors struggle substantially with sustainable cluster development. Empirical findings pinpoint following general failures and common mistakes in the field of cluster policies (cf. Section 1.2):

- Traditional and strong clusters **rely on the past success and disregard fundamental changes** in the technological, socio-economic and political environment. Several authors described the fatal consequences of structural, political and cognitive lock-ins due to excessive reliance on strong local contacts and tacit knowledge in combination with neglect of external linkages and lack of foresight activities e.g. for the steel sector in the Ruhr area or the engineering sector in Baden-Württemberg (e.g. Grabher 1993; Heidenreich/Krauss 1998). De Propris/Hypponen 2007 described a similar phenomena for the Hollywood film cluster where regional lock-in situations hindered needed

[24] Many policy-driven cluster initiatives merely focus on collaboration, but don't consider that sound competition could leverage innovation and therefore reinforce the competitiveness of the cluster even more.

adjustments to changing framework conditions and led to a rigid mentality that aimed more at replicating past successes than producing novelty.

- **Policy-driven cluster initiatives**, which are **chosen by governments as strategic relevant fields** for regional development **but don't take into account the regional capacities and needs**, are doomed to failure in the long-run. Cluster development can only be successful and sustainable if it involves and motivates the key regional stakeholders and their respective needs. Examples for the inefficient use of public money are the high numbers of struggling ICT and biotechnology cluster initiatives funded by so many governmental programmes all over Europe.
- Cluster initiatives with **strong reliance on public funds and poor orientation towards (future) market demands** struggle with sustainable cluster development in particular with regard to the aspect of self-financing. If the initiatives try to avoid competition between cluster actors they additionally disregard the value of competition as an important incentive for innovation in clusters. Thus, cluster initiatives neglecting the value of economic market conditions permanently depend on public subsidies.

# 2 Role of SPI tools for (trans-)regional decision-making

Regional and **trans-regional knowledge creation** processes are a fundamental success factor of strategic cluster development. This success depends on the ability

- to support *future-oriented,* strategic knowledge creation based on a synthesis of expert and stakeholder input and
- to involve and to mobilise the *commitment* and support *consensus-building* of all relevant stakeholders and decision-makers.

To facilitate the structured development of clusters with view to the above-mentioned abilities, it is indispensable to make use of **Strategic Intelligence**. Strategic Intelligence can be defined as "the set of actions to search, process, diffuse and protect information in order to make it available to the right person at the right time in order to make the right decision" (Tübke et al. 2001).

Strategic Intelligence is generated by applying Strategic Policy Intelligence and management **(SPI) tools**. These tools are used to provide both public and private decision-makers with comprehensive, objective, unbiased and, most importantly, forward-looking information (e.g. on long-term developments, global trends, opportunities and threats, drivers of change, success factors, own (dis)advantages compared to competitors, etc). They include innovation audits, benchmarking, evaluation, foresight, technology assessment and roadmapping. The tools most relevant for CReATE are dealt with in section 2.2 below.

The strength of the application of SPI tools derives from:

- **Participation**: the SPI methodology encourages the participation of all stakeholders involved in decision-making;
- **Evidence-base**: SPI makes decision-making more objective through the integration of empirical data and rigorous analyses;
- **Mediation and alignment**: the SPI methodology generates mutual learning and understanding among the stakeholders and facilitates consensus-building;
- **Decision support**: SPI tools not only facilitate decision-making but, very importantly, also facilitate the implementation of decisions taken.

SPI tools can be applied to facilitate basically any kind of decision-making processes or activities which aim to generate broad commitment and future-oriented knowledge, from the local to the national, transnational and international level, and from applications in the public sphere (governments, public organisations, public consultations etc) to the business sphere (SMEs, clusters, multinationals etc).

Thus, what is elaborated in this chapter will be applied to cluster development and the CReATE-project more specifically in chapter 3.

## 2.1 SPI tools along the whole decision-making process

SPI tools can be applied to support all stages of the decision-making process. Often the main obstacle to effective and efficient decision-making is the **distributed nature of knowledge** needed. SPI tools can help identify, select, structure and 'translate' this knowledge, thereby enabling the development of better decisions - more broadly based and consensual, more credible and implementable and, on average less risky and as optimal as possible.

Which SPI tools are applied at which stage of the decision-making process and why is outlined below and illustrated by figure 6:

1. A decision-making process aims **to shape the future state of a region, a society, a cluster etc** by addressing the challenges it faces. It starts by developing ideas and **defining visions** of how the future should - and could - look, making recommendations on how best to realise them, and **pointing to priorities** that could be set. This is the stage where foresight, as an SPI tool to look into the longer-term future, can bring stakeholders together, detect and develop possible options for action, agree on general priorities, and thus generate the commitment to act.

2. Once the preferred vision is defined, discussed and agreed upon, **lines of actions have to be prioritised**, **the implications of adopting particular options** have to be **assessed**, and an **agenda** detailing the steps to be taken to move towards the vision needs to be **worked out**. Agenda-setting means defining the policy objectives and setting the strategy for national, regional and sectoral levels. This is strongly influenced by different interest groups, but should be firmly based on results from the previous (i.e. the Foresight) phase to deliver implementable outcomes. This process can be supported by technology assessment and ex-ante evaluation.

3. **Detailing an agenda, e.g. a regional or cluster one**, covers the part of the decision-making process where the issues that have got onto the agenda are formulated into concrete regional/sectoral etc initiatives, programmes or policies to be implemented. A roadmapping exercise can be useful at this stage to develop an agreed perception of the technological options - available at present and which could be exploited in the future - together with concrete steps to best realise them, e.g. in the form of optimised projects or programs.

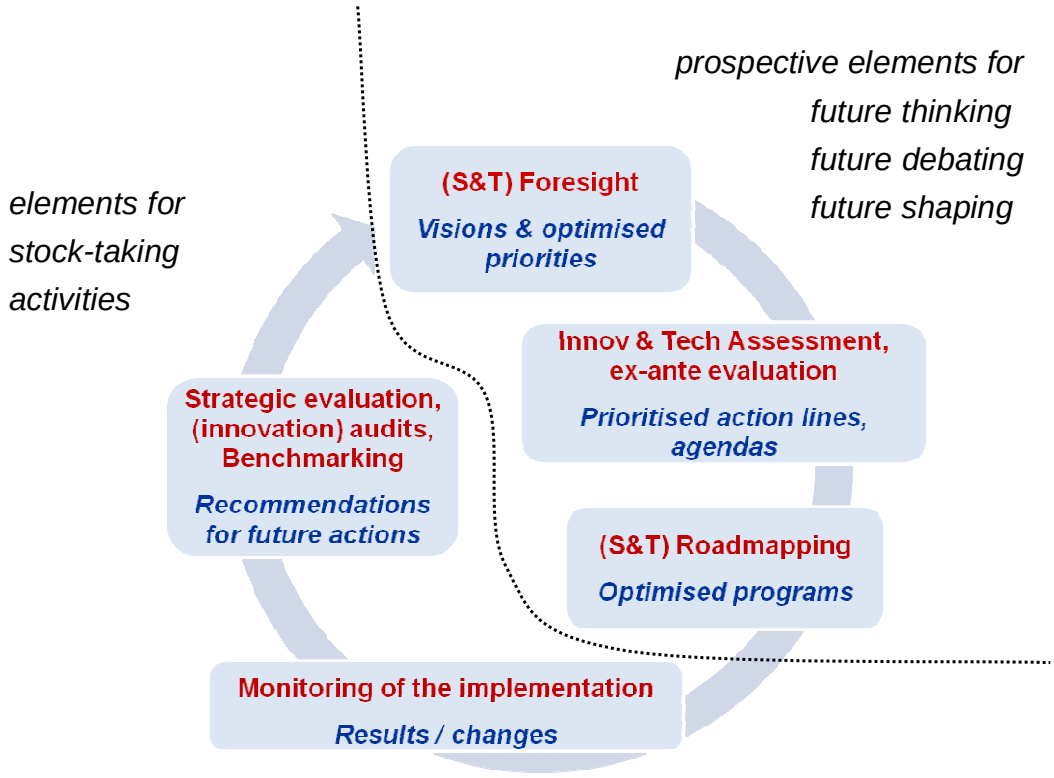
4. The **implementation and monitoring** part of the decision-making process refers to the application of the measures developed in the previous phase. It is often a different challenge to that of the design of the initiatives, due to political and practical trade-offs and changing contexts. Implementation should be accompanied by ongoing monitoring activities to ensure that the process is followed-up adequately, that appropriate actions are taken, and that the expected outcomes are achieved. This means continuous feedback and a willingness to modify the implementation process to optimise its outcomes.

5. Finally, the results of the process should be examined by means of **strategic evaluation and benchmarking**. Evaluation often refers to ex-post but may be conducted at an

interim stage or in tandem with the implementation. Benchmarking refers to comparison of outcomes with those of other relevant exercises/fields/territories. These evaluation and benchmarking exercises provide recommendations for improvements in the process or for further actions.

This phase should also include **policy learning**. This refers to all processes by which knowledge and understanding arise within decision-making processes through feed-back generated on the underlying causes and preconditions for policies and initiatives and their effects.

6. To close the circle, outcomes of this phase are used to provide new inputs for the future formulation of visions and the optimisation of identified priorities.




Source: adapted from Clar G. et al. (2008)

Figure 6: stages of the decision-making process

## 2.2 SPI tools to support (trans-)regional decision-making

Having outlined the general approach to generating SPI and applying SPI tools for decision-making, we now describe in some detail how the tools in question can be applied within (trans-)regional activities such as the CReATE project.[25]

[25] See Appendix G for background information drawn from the RegStrat Guide (Clar et al 2008a) on important aspects to implement SPI exercises successfully. Even more detailed information on the SPI tools and techniques dealt with in this section can be obtained from the RegStrat Compendium (Clar et al 2008b).

As we have seen in the previous section, different stages of the decision-making process require varying types of knowledge and thus rely on different SPI tools. In the following, we describe these tools, differentiated according to earlier (stock-taking activities) and later (forward-looking activities) stages of the process (see also figure 6 above):

Section 2.2.1: SPI tools supporting stock-taking activities – i.e. analysing, examining, comparing etc. situations in order to draw appropriate conclusions – such as Innovation Audit, Evaluation (Monitoring), Benchmarking etc. are relevant in particular at the very beginning or towards the end of a decision-making process, and

Section 2.2.2: SPI tools supporting forward-looking activities – i.e. thinking, debating and shaping future situations and developments – such as Foresight, Technology Assessment, Roadmapping etc. are relevant for the more prospective stages throughout the decision-making process.

Section 2.2.3 finally combines forward-looking approaches with business strategies of collaborative and open innovation, so-called outward-looking activities, pointing out that trans-regional SPI exercises can considerably enhance the development and coordination of innovation strategies and policies.

### 2.2.1 SPI tools supporting stock-taking activities

At the beginning of each cluster development process a regional **innovation audit** proves useful, analysing the regional strengths and weaknesses and indicating future challenges and threats. The regional audit can also include a mapping of competences (or so-called 'intellectual capital') of the regional stakeholders to identify the specific capabilities of the relevant players within the region and their abilities to influence the outcomes and implementation of clusters and cluster policies.

Following an innovation audit, **evaluation** and **benchmarking** are crucial to assess and adjust policies, programmes and projects, and their impact. Evaluation should be viewed as an accompanying process, encompassing ex ante evaluations, monitoring of ongoing activities and ex post assessments of impacts and outcomes. Benchmarking will be applied either in the beginning or towards the end of an exercise to assess the competitive position of a region, cluster, enterprise etc, either before or after an intervention has taken place.

#### 1) Innovation Audits

At the micro-level, an Innovation Audit is a method of investigation which aims at evaluating the technological capacity and technology needs of a firm or an organisation, and at assessing related non-technological innovations in organisational processes. At the regional level, an Innovation Audit profiles the strengths and weaknesses of the regional innovation system – taking a holistic perspective – and thus helps decision-makers to identify and deal with the issues of competitiveness pertinent to their region: technological capacity, research and

development capabilities, innovation potential and organisational change. An Audit is action-oriented and forms the basis for a strategic development plan.

An Innovation Audit also includes identifying and mapping all relevant actors from business, academia and public administration, and their respective capabilities and competencies. This can be done by a competence mapping or intellectual capital reporting where the intangible assets of an organisation, region etc are analysed and assessed in a structured way.[26] All regional actors can make use of the outcomes of an Innovation Audit:

Public policy-makers benefit from

- The identification of the strengths and weaknesses of the regional innovation system, a quantification of the performance of the 'triple helix' and an insight into the drivers of technological and economic development;
- The assessment of the effectiveness of existing RTDI policies and empirical evidence to guide the formulation of new RTDI policies and goals;

Firms and research organisations benefit from

- The identification of sources of knowledge and support, and of potential partners and markets;
- Information about best practice in incubation strategies to support the successful development of new products/processes and technology transfer to enterprise;
- Greater visibility of existing expertise and capabilities.

In general, the main steps of an Innovation Audit involve:

- definition and design of the exercise;
- collection of information on the principal assets of the region's innovation system (cf. Figure 2 in Section 1.1.1): firms, education, research centres and technology transfer units, supportive public policies, and linkages between them;
- diagnosis of the strengths of these actors and their linkages. Based on the data assembled in the previous step, performance indicators can be developed to make an assessment of capabilities;
- developing an action plan for the region, including measures to enhance performance and overcome weaknesses, and then producing a comprehensive and readable report of the Audit's findings;
- presentation of the report and findings to the regional actors who were involved and will implement the audit's findings.

For the elaboration and the presentation of the Innovation Audit, it's useful to visualise main findings of the exercise, e.g. in a **cluster map** illustrating the specialisation of the cluster, the major actors (and competencies) along the value chain.[27]

[26] For more information, see Appendices H and I
[27] Cf. Appendix J

In **CReATE**, an Innovation Audit should be used to identify the most relevant information characterising the cluster and to mobilise a critical mass of the relevant region's principal stakeholders in business, academia and government. This builds the basis for the identification of regional and trans-regional research priorities in the field of ICT for Creative Industries and the subsequent cross-regional, cross-cluster cooperation.

## 2) Benchmarking and Evaluation

In practical terms of cluster development, innovation auditing, benchmarking and evaluation are tightly connected and interwoven. **Benchmarking** provides practical learning through comparing performance of policies or outcomes across nations, regions, sectors, clusters, industries, institutions, products or services. The essence of benchmarking is identifying the highest standards of excellence and then making the improvements necessary to come closer to or reach those standards.

In general, benchmarking is an improvement process in which a company, organisation or any other (multi-organisational) system carries out three activities. It:

1) compares its performance against best-in-class external systems;
2) researches how these systems have achieved their superior performance;
3) uses the collected information to improve its own performance.

An intrinsic benefit of benchmarking is the opportunity to collaborate with other regions and build trans-regional partnerships. The choice of comparator partners depends on the scope and objective of the benchmarking exercise. If the scope is a holistic innovation system perspective then targets with disparate profiles may be useful. Where the objective is a more focused benchmarking exercise then a comparison of regions with similar profiles may prove more instructive.

**Evaluation** is a systematic and objective process that assesses the relevance, efficiency and effectiveness of projects, programmes and policies in attaining their originally stated objectives. Its results feed back into the decision-making process so that it is part of a continuous learning process. This helps (re)formulate and assess decision rationales and gives transparency and accountability to the decision-making process. In general, evaluation should be viewed as an accompanying process, encompassing ex ante evaluations, monitoring of ongoing programmes and ex post assessments.

The task of an evaluation is to address three issues:

1. Do the decision-makers the right thing (appropriateness)?
2. What are the results of their actions (impacts)?
3. Could they do it better (effectiveness)?

The **techniques used for evaluation and benchmarking** comprises a mix of quantitative and qualitative approaches (using databases, surveys, interviews, workshops etc.). In addition, illustrating (maps, diagrams etc.) the gathered information proves useful.

Quantitative methods provide good estimates of current performance, success factors and the economic impacts of decisions and investments, and thus give the information and analysis necessary for greater transparency and participation in public decisions. Decision-makers can make use of these estimates to legitimise intervention or to assist in the allocation of budgetary resources.

Qualitative methods may offer more detailed insights into the multiple effects of policy intervention which might help refine the processes and instruments of strategic decision-making. Hence, evaluation can be the vital element in the process of policy learning because it offers a means for decision-makers to gain better understanding of the innovation system that they are trying to influence, and of the ways in which interventions of different kinds, at different times, can affect this system.

The **evaluation and benchmarking of clusters** in the context of European cluster mapping studies has recently attracted considerable attention.[28] It predominantly focuses on measuring[29]

- current performance of the cluster / cluster initiative,
- the success factors (framework conditions) leading to the current performance and
- the economic impact of the cluster / cluster initiative.

One of the most important motivations for cluster benchmarking is to raise awareness among the regional stakeholders of the competitive ranking of the cluster compared with other clusters nationally and internationally. In the case of a 'lagging' cluster the expectation is that the empirical demonstration of its low ranking will galvanise the regional actors into action to increase productivity. In the case of successful regions benchmarking can be used as a marketing tool to promote the region as a leader in certain fields of enterprise, infrastructure or policy-making.

In the **CReATE** context, no specific evaluation and benchmarking exercise will be addressed. However, the common CReATE approach facilitates the trans-regional comparison of the outcomes of the regional analyses. The cross-regional matching of the identified regional assets, needs and research priorities in the field of ICT for Creative Industries reveals the opportunities of trans-regional, trans-cluster collaboration and cross-fertilisation, e.g. by showing complementary competencies and capabilities, which is conducive especially for creative industries. In this respect, the strong interactive exchange of all regional partners in line with the common methodological framework promotes the concerted development of the cross-regional, cross-cluster joint research agenda.

[28] E.g. OECD (2001); European Commission (2002); Sölvell et al (2003); Ketels/Sölvell (2006); further activities reported under www.clusterobservatory.eu

[29] Andersson,T. et al (2006)

### 2.2.2 SPI tools supporting forward-looking activities

Building the relevant regional knowledge base as described in the previous section is necessary to get a profound picture of the current situation of a region, cluster or single organisation and is a vital precondition for the subsequent elaboration and implementation of future-oriented, innovative strategies by way of forward-looking activities.

A typical process where forward-looking activities are applied can be visualised by the following three phases (cf. figure 7):

1. A phase to explore what can happen (**thinking the future**): detecting internal and global factors and driving forces of change, and understanding their implications thus identifying the key challenges to be faced and elaborating possible futures.

2. A phase to discuss in a broad stakeholder dialogue (**debating the future**) the future developments identified in order to agree on a shared vision of a desirable future

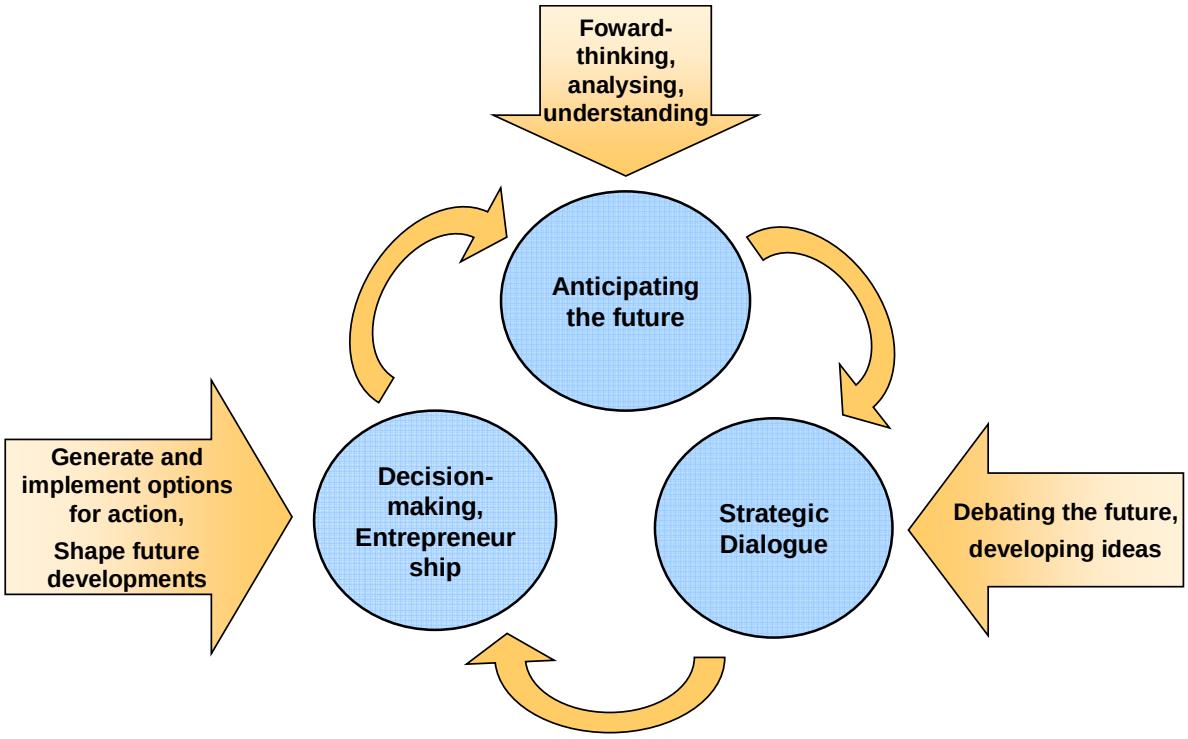



Figure 7: Forward-looking activities

3. A phase to develop recommendations and options for action (**shaping the future**): elaboration of a common implementation strategy and concrete actions to achieve the goals set, and subsequent implementation of these activities.

SPI tools such as **Foresight, Technology Assessment (TA) and Roadmapping** are applied to conduct forward-looking activities and help to

- identify, analyse and understand global trends – technological, social, political, environmental, etc. - which could affect the further development,
- bring stakeholders together to debate the future and develop new ideas, to agree on a shared vision and possible options for action, and thus generate the commitment to act,
- assess the implications of adopting particular options and agree on concrete actions in order to shape the future development in line with the shared vision.

Foresight exercises are an important tool to support future thinking and debating, and thus to set the basis for shaping the future. Technology Assessment and Roadmapping focus more on the latter aspect of shaping the future by prioritising options for actions and detailing policies, strategies and programmes by developing concrete steps to best realise the aspired future.

In **CReATE**, foresight is in the centre of the activities enriched with TA and Roadmapping elements to identify a set of potential regional research priorities in the field of ICT for Creative Industries and to develop a cross-regional, cross-cluster joint research agenda. In the following, the three SPI tools will be described in more detail.

### 1) Foresight

According to one of the most cited definitions of Foresight, it can be described as "the process involved in systematically attempting to look into the longer-term future of science, technology, the economy and society, with the aim of identifying the areas of strategic research and the emerging generic technologies likely to yield the greatest economic and social benefits."[30] Thus, the goal of foresight is not to predict the future but to understand how the future is shaped and on that basis to explore a range of possible futures with a view to selecting one that is desirable and attainable.[31]

The need for Foresight stems from the growing realisation in all areas of life that the future is becoming more and more difficult to anticipate. Moreover, the idea that the future can be shaped or created, and that public bodies and private actors should be empowered to do so, has gained currency since the 1980s. By trying to make things happen rather than trying to forecast what might happen, private and public decision-makers have learned to embrace uncertainty and to deal with it by continually evolving a wide-range of new business and policy options.

All over Europe, foresight exercises have been used successfully as policy tools, both because of their intrinsic value in providing difficult-to-acquire strategic information for decision-making, and as a socio-economic mobilisation tool to raise awareness and to create consensus around promising ways to exploit the opportunities and diminish the risks associated with new science, technology and innovation developments.

[30] Ben Martin, SPRU
[31] Cf. Blueprints for Foresight Actions in the Regions (European Commission 2004)

Implementing a foresight exercise can bring a number of benefits:

- Foresight can be usefully provocative. In the face of complexities and high uncertainties it may be pertinent to purposely solicit diverging and individualist viewpoints which help to broaden the debate by injecting critical and surprising reflections;
- Through the exploration of the possible futures facing a region, the major challenges ahead can be identified, and a common understanding and collective awareness of these challenges can be obtained;
- Foresight allows the stakeholders to collectively reach a consensus on where to go, to share a common view of a desirable future (vision, project) and to join their forces to reach the defined common goals;
- The involvement of key stakeholders in a foresight exercise can deepen linkages between them and lead to a better mutual understanding between science and other parts of society;
- There is evidence to suggest that foresight can result in improved policy design and implementation in all policy fields and in the design of innovation-friendly regulations.

**Cluster foresight**

A shared vision and a common long-term strategy are key success factors of strategic cluster development. Especially in today's fast changing and uncertain market environment, long-term commitment and visionary thinking are more important than ever. However, due to the (latent) competition and varying interests in many clusters, it is a challenging task to engage all the relevant stakeholders in joint initiatives. As this is usually easier when longer-term technological and more general regional issues (relevant for all stakeholders) are discussed, foresight elements are especially useful to show the advantages of cooperation, and building trust and understanding between competitors.

Therefore, organising a foresight-type exercise in a participatory manner helps to

- bring together all relevant decision-makers who have to be engaged in the development of and the interactions in the cluster,
- gather knowledge from, and reflect on the insights and special interests of all stakeholders,
- facilitate commitment and engagement among the actors,
- develop anticipatory intelligence, i.e. provide key information for strategic decisions, and thus
- build a creative atmosphere that is more robust to changing circumstances and allows for anticipating and preparing for changes in context and environment.

In addition, specific foresight activities for regional clusters can profit from different experiences made in corporate and regional foresight exercises:

**Corporate foresight** aims at supporting strategic decision-making and securing the competitiveness of an enterprise in the long-term as well as strengthening the learning and innovation capability of the company. It provides the basis for creating mid- to long-term strategies in a company. It is a participation and communication process that enables the company to identify its success factors at an early stage and to set the direction for future developments involving all people relevant for the subsequent implementation and affected by the decisions. Thus, foresight can identify future internal weaknesses, market opportunities, future technological developments, clients' expectations, impacts of the company's activities on its environment as well as the general needs and concerns of the society related to present or future company activities.

**Regional foresight** is a key element in the creation of future- oriented visions and strategies in regions, municipalities and local communities. It is a means for those who share a common territory to better shape and control their future development as it involves: "the implementation of anticipation, participation, networking, vision, and action at a reduced territorial scale, where proximity factors become determinant."[32]

### Techniques to conduct a foresight exercise

Dialogue-oriented foresight exercises as described above are usually implemented by interactive workshop concepts and stakeholder panels. In a number of foresight workshops the stakeholders discuss and debate in a structured way global trends and potential impacts, arising opportunities and challenges, possible and favoured futures and finally elaborate a shared vision and joint long-term strategy. The techniques used in such a foresight exercise include

- **Brainstorming and Mindmapping** to elicit and structure new ideas and creative thoughts in a transparent and effective way
- **SWOT and STEEPV analyses** to identify and classify 1) internal factors which relate to available (strengths) or missing (weaknesses) resources and capabilities and 2) external factors which influence future developments concerning technological change, legislation, socio-cultural changes, changes in marketplace, etc. positively (opportunities) and/or negatively (challenges). In comparison to SWOT analyses, STEEPV is more future-oriented, considers possible factors of change and developments in a broader thematic context, and allows also for highlighting cross-impacts often overlooked by other techniques. Thus, completing this analysis can be helpful to identify SWOT factors. The regional stakeholder workshops conducted in CReATe will mainly build on these two techniques.
- **Scenario Building** to display visions of future states and possible development paths, e.g. in a discursive and narrative way like a newspaper story containing fictive characters and

[32] Blueprints for Foresight Actions in the Regions. European Commission 2004

illustrated with pictures useful for envisaging implications of uncertain developments and examining the scope for action.

## 2) Technology Assessment

Technology Assessment (TA) has been described as a "systematic, multi-disciplinary research and structured communication process which integrates stakeholder opinion and expert knowledge (national and international) regarding the potential long-term applications and socioeconomic impacts of emerging technologies, and outlines development pathways on which public and private investment decisions can be made."[33]

In general, TA has three core elements:

- Accessing and assessing all available knowledge on a relevant technological area or technology-related development;
- Systematically identifying and evaluating the likely impacts in terms of advantages and disadvantages from the perspective of the stakeholders;
- Developing a series of concrete options and actions for governments, agencies, companies or other actors based on the foregoing analysis.

TA can be perceived as a 'bridge' between technology foresight and the development of client-focused investment strategies in the public and private sector. One might first carry out a Foresight exercise to establish 'strategic direction setting' i.e. to identify possible future options. A TA process could then be conducted to assess the expected impacts of technologies driving or associated with these future options and to identify which of the options should be turned into specific opportunities and activities. The TA exercise would be expected to "set agendas" in the form of prioritised action lines to exploited the opportunities envisaged and to produce the optimum benefits for all concerned.

TA allows the decision-makers to analyse in detail the range of possible social, economic, legal, political, cultural and ecological effects of a technology application, and to identify market opportunities and technology-induced risks early on. It has the potential to increase the return on public and private RTDI investments because it leads to a more coherent decision-making, guiding public and private organisations towards promising fields of activity and markets. By bringing all actors together it helps to minimise duplication and therefore directly saves on public expenditure.

Technology Assessment identifies the opportunities and challenges facing the region's participation in certain aspects of a new technology or issue. It also elicits recommendations for actor-specific agendas including an appropriate portfolio of policy supports needed to make the opportunities happen, and to start implementing the prioritised action lines.

[33] Clar/Fitzpatrick (2004)

In the last decades there has been a development towards a highly policy- and problem-oriented approach aimed at identifying economic and social goals to which emerging technologies can make important contributions.

### 3) Roadmapping

(Technology) Roadmapping is applied by various organisations to support the process of strategy development and investment planning with regard to the future development and use of technologies and respective applications. The final product of such a process is called a 'roadmap'. Roadmaps display concrete options, alternatives and stages to reach a future situation.

The main characteristics of successful roadmaps are the clarity of the information displayed, their synthetic view and their immediate relevance. They provide assistance to decision-makers under information overload and time pressure to grasp effectively the most important elements and relations within a complex system of scientific and technological, but also relevant economic, political and social dimensions. Thus, roadmaps are an effective way to demonstrate actual and possible causal and temporal relations between successive or parallel development options.

The Roadmapping process usually follows a workshop-approach engaging relevant stakeholders and experts, and principally addresses the following issues:

- Analysis of the current state of affairs,
- Development and formulation one or several attainable/feasible/desirable future situation(s),
- Identification of the stages and possibilities for achieving this/these future situation(s) and their feasibility,
- Identification of the possible obstacles to implementation as well as prognosis of the time frame and the efforts associated with achieving it,
- Development of strategies to reach the future situation.

Two aspects are central to the Roadmapping process:

- **Roadmapping is a prospective approach** structuring information about future trends. The output of a Roadmapping process usually includes graphical presentations - so-called Roadmaps -, in which 'nodes' (past, present or future states of development of science and technology) are connected by 'links' (causal or temporal relations) showing the nature, rate and direction of potential developments from or towards those nodes.
- **Roadmapping is also a 'planning tool'** as the representation of the Roadmap is put to practical use in negotiating the way forward and in informing decisions about possible future options. The Roadmapping process generally starts with the end-point or the vision clearly in mind and then traces the alternative technology paths to achieve it.

### 2.2.3 Linking forward- and outward-looking approaches

As we have seen in Section 1.4, innovation processes are changing substantially in a globalising knowledge economy. More and more enterprises develop and implement a collaborative and open innovation strategy and thus benefit from collaborating with external partners. In this context, the ability of the firms to develop and coordinate effective strategic alliances and networks sharing a common vision about future market and technological developments and joining their forces is decisive for success or failure of the knowledge generation and its transfer into new products and services.

The evolvement of business strategies of collaborative and open innovation at the micro level (also called outward-looking strategies) also poses considerable challenges for macro level innovation policy. New complex interactions and relationships emerge and continue to evolve between public administration, research organisations and industry, which in turn lead to new ways of governing, organising and managing RTDI by all stakeholders in an innovation system. In this environment, new organisational and institutional arrangements emerge, at regional, national, European and global levels, which are more open and international in nature. Thus, horizontal and vertical coordination of policies and support of cross-sectional linkages and networks become imperative in RTDI policy-making.

As forward-looking approaches (as described in the previous section) include the collaborative development of joint future-oriented visions and strategies, these approaches can provide a genuine value added for generating and coordinating innovation policies, strategies and programmes on both regional and business levels.

Thus, linking forward-looking with outward-looking approaches means incorporating explicitly the broader (socio-economic-political) environment into collaborative, strategic decision-making processes to enable better innovation and development strategies at the business and regional level.

Applying both forward- and outward-looking approaches to strategic cluster development boosts innovation and competitiveness of both individual companies and whole regions by

- promoting knowledge exchange and strategic learning processes between cluster stakeholders in order to create a localised and unique knowledge stock (internal knowledge creation) and
- facilitating trans-regional and trans-national knowledge flows and collaboration to enrich and refresh the local knowledge pool with external impulses (external integration in innovation networks).
- focussing on common future threats and opportunities going beyond short-term competitive business activities and thus allowing longer-term strategic cooperation and, at the same time, competition on short-term issues (principle of ‘coopetition’).

# 3 Conclusions & proposal for a common CReATE methodology

## 3.1 Conclusions for strategic cluster development in general

As we have seen in Chapter 2, the application of SPI tools provides strategic cluster development with genuine value added as it supports future-oriented, strategic knowledge creation along the whole decision-making process mobilising the commitment and supporting consensus-building of all relevant stakeholders. Thus, the success factors of cluster development described in Section 1.5 can be considerably supported by the application of SPI:

- The **multi-actor, multi-level and multi-disciplinary SPI approach** takes into account the needs and facilitates coherence between activities from all decision-making levels (European, national, regional, private), and thus **integrates a broad range of cluster-related activities**.
- The **dialog-oriented approach involves all relevant stakeholders of the innovation system** and thus facilitates (but don't forces) **consensus-building based on personal relationships, clear communication and mutual trust** as fundamental precondition for commitment and joint actions.
- The long-term orientation and the relative distance to highly competitive business activities allows the **creation of a common vision and strategy**, which are shared by all relevant stakeholders and enable longer-term strategic cooperation **not neglecting different short-term interests** (principle of 'co-opetition')
- The **focus on specific needs and capabilities** of the stakeholders (internal strengths and weaknesses) as well as **on most promising international technology and market development perspectives** (external opportunities and challenges) facilitates the development and implementation of tailored actions, which provide the cluster actors and in particular the companies **with a clear value added**.
- The application of SPI tools generally raises awareness and sensitises the stakeholders for the relevance of forward- and outward-looking activities, and thus **strengthens the strategic capabilities of all regional actors involved**, e.g. facilitating sustainable business development in line with the cluster strategy, adjusting longer-term business models to emerging lead markets.
- The combination of forward- and outward- looking perspectives facilitates **trans-regional knowledge flows and learning processes** at business, science and policy level and provides the actors with strategic and creative guidance 're-wiring' and upgrading the cluster and thus contributing to avoid the pitfalls described in Section 1.2.

## 3.2 Proposal for common CReATE methodology

SPI tools can provide strategic guidance for the whole strategic cluster development process. This Section however focuses on specific decision-making aspects (e.g. priority setting, trans-regional and inter-cluster collaboration) which are necessary to achieve the overall goal of the CReATE project:

> To develop a cross-regional, cross-cluster Joint Research Agenda for boosting ICT-innovations in Creative Industries which
>
> - is based on regional needs and capabilities,
> - facilitates interdisciplinary cross-regional collaborations between the relevant stakeholders from research, industry and public-administrations ('triple helix') and thus
> - contributes to sustainable regional development.

This background paper at hand is (together with the ICT innovation background paper) specifically designated to provide a common basis for the regional analysis and the development of regional research priority areas in the field of ICT for Creative Industries in WP2. Nevertheless, the proposed common methodological framework (also used as basis for the template for regional analysis) affects the decision-making process accompanying the entire CReATE project and thus contributes to the sustainable success of the whole project. It specifically **enables the coordinated linkage of regional and trans-regional activities**[34] (see Figure 8) as it contains:

- the regional analysis and identification of regional research priority areas in the field of ICT for Creative Industries (WP2),
- the trans-regional ('inter-cluster') matching of these research priority areas (WP3) and based on this, the drafting of a Joint Research Agenda (WP4)
- the advanced regional feedback to and support of the Joint Research Agenda, based on the commitment of the relevant regional stakeholders developed in WP2 (WP4)
- the common development of the cross-regional ('inter-cluster') Joint Research Agenda (WP4)
- the regional and cross-regional validation and project development (WP4)

The European outreach of the project will be achieved by transforming the project methodology into an easy-to-use toolkit for all European actors, and by designing and

[34] In general, the proposed common CReATE methodology uses the terms provided in the application documents. At this point it is important to note that CReATE as a Regions-of-Knowledge project and thus the proposed CReATE methodology doesn't follow a (trans-) regional approach per se. It rather has a specific market and technological focus within and across the regions (i.e. regional and cross-regional value chains; cf. definition of cluster in Section 1.1.1), and thus follows a cluster-related approach. Thus, the described regional and trans-regional activities refer to **regional cluster activities** and the **cross-regional collaboration between the specific clusters** (inter-cluster collaboration).

implementing related training courses for a number of interested regions and other clusters (WP5).

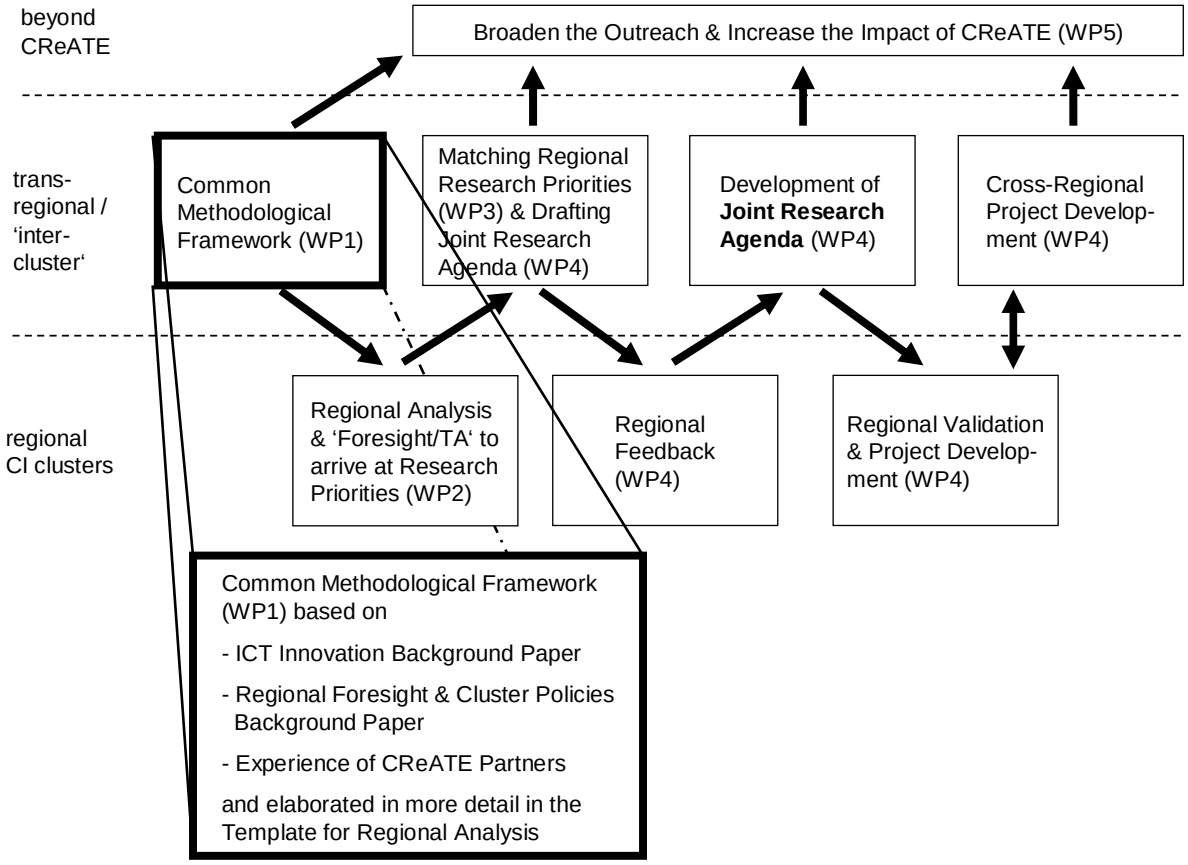



Figure 8: Common methodological framework accompanying the CReATE project

Preconditions for the development of a cross-regional, cross-cluster Joint Research Agenda which reflects regional needs and capabilities as well as future technological and market developments are

- a sound analysis of the current situation and dynamics of the Creative Industries clusters and
- a common understanding of the future opportunities and challenges of the Creative Industries clusters and the possibilities arising from ICT research and innovation for the field leading to a set of potential future research priorities for each region.

Therefore, to fulfil these requirements and thus to achieve the objectives of WP2, the proposed CReATE methodology suggests the following steps, which are described in more detail in the next Sections:

1. Step: Build the relevant regional knowledge base on ICT for Creative Industries (based on SPI tools supporting stock-taking activities, cf. Section 2.2.1)

2. Step: Identify regional research priority areas in the field of ICT for Creative Industries (based on SPI tools supporting forward-looking activities, cf. Section 2.2.2)

### 3.2.1 Build the relevant regional knowledge base on ICT for Creative Industries

To build the relevant knowledge base and to analyse the regional conditions regarding ICT-research enhancing innovations in the Creative Industries the first step can be realised by an ICT- and Creative Industries focused Regional Innovation Audit. The Innovation Audit is an appropriate SPI tool to map the relevant key stakeholder groups including their respective competencies and to produce an outline of the regional, cluster-relevant strengths and weaknesses (cf. Section 2.2.1). This stock-taking activity is prerequisite to develop regional research priority areas which are tailored to the regional ICT capacities and creative industries needs.

Specifically, the Innovation Audit uses methods and tools such as desk research, compilation of data and interviews with cluster stakeholders

- to identify and map the relevant **key stakeholder groups** and their **specific competencies** in the regional Creative Industries and ICT research,
- to analyse the main elements of the regional innovation system (cf. Section 1.1.1), with specific focus on
    - Creative Industries **companies needs** with regard to ICT-innovation
    - **ICT-R&D capacities** relevant to the creative industries and
    - **related policy and funding initiatives** in the region, and
- to **mobilise a critical mass of principal stakeholders for the proceeding activities**.

The results of the mapping process can be presented by way of a **cluster map** visualising the specialisation of the cluster, the major actors (and competencies) and their interrelatedness along the value chain.[35]

The correlation of the identified needs, capacities and related initiatives (internal factors) produces a picture of the **strengths** and **weaknesses** of the regional innovation system with regard to ICT-innovation in creative industries. An analysis of the global environment (deepened in the regional stakeholder workshops later-on) supplements this information with a list of external factors, which indicate **opportunities** and **challenges (threats)** for the future regional development. The result of this **SWOT analysis** are summarised in a 2x2 matrix, presenting an overview of significant internal and external factors influencing cluster strategies (or possible futures) in positive or negative ways (cf. Figure 9).

[35] Cf. Figure 1 in Section 1.1.1 as well as Appendices J and K

| | Positive Factors | Negative Factors |
|---|---|---|
| **Internal Factors** | **STRENGTHS**<br>Competencies and capabilities to mobilise these effectively<br>• …<br>• … | **WEAKNESSES**<br>Lack of competencies or of capabilities to mobilise these effectively<br>• …<br>• … |
| **External Factors** | **OPPORTUNITIES**<br>Circumstances where positive initiatives can be taken to considerably improve one's situation<br>• …<br>• … | **THREATS**<br>Circumstances which will lead to considerable deterioration in one's situation unless initiatives to deal with these are undertaken<br>• …<br>• … |

Figure 9: SWOT matrix
Source: Clar et al. (2008b)

### 3.2.2 Identify regional research priority areas in the field of ICT for Creative Industries

Based on the stock-taking activities described in the previous section, the CReATE methodology continues, using a forward-looking activity to agree on regional research areas in the field of ICT for Creative Industries, which is tailored to regional characteristics and focused on future market and technological developments. Utilising SPI tools supporting forward-looking activities (Foresight, TA, Roadmapping) in the sense of "thinking, debating and shaping futures" (cf. Section 2.2.2), the proposed **Cluster-Foresight** exercise follows a dialog-oriented approach, which aims at

1. outlining **the current strengths and weaknesses** of the cluster (based on the outcomes of the regional innovation audit in step 1),
2. elaborating a **well-founded perception of trends and drivers of possible future developments** indicating **key opportunities and challenges to be faced** (in particular based on the ICT-background paper),
3. developing a **shared understanding of the possibilities arising from ICT research and innovation for Creative Industries** in the region,
4. identifying a **set of regional research priority areas** to boost ICT-innovation in Creative Industries.

This approach aims at utilising the strategic knowledge

- from **external experts,** in particular by accessing the outcomes of the ICT background paper, and
- from **cluster stakeholders** by bringing them together in two regional interactive stakeholder workshops.

The whole Cluster Foresight process can be divided into **5 phases:** the two regional cluster stakeholder workshops accompanied by detailed preparation, intermediary and processing phases (cf. Figure 10).

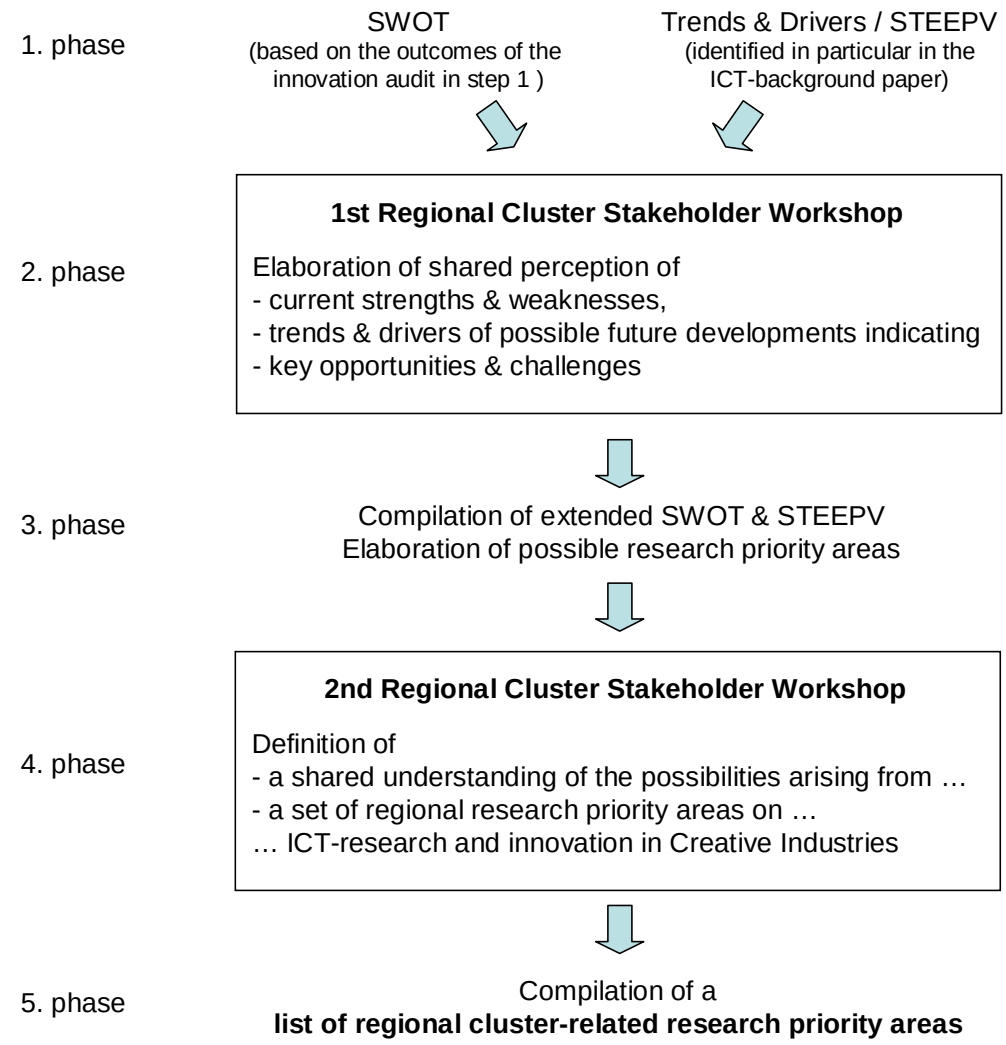



Figure 10: Proposed Cluster Foresight process to identify regional research priority areas

**Preparation phase (1. phase)**

The first phase encompasses the detailed preparation of the first regional cluster stakeholder workshop, including

- invitation of the relevant stakeholders identified in the previous stock-taking step,
- elaboration of a comprehensive SWOT matrix based on the outcomes of the ICT- and Creative Industries focused regional innovation audit,
- preparation of trends and drivers, identified in particular in the ICT-background paper (with regard to STEEPV analysis), and from additional region-specific sources, etc.

### 1st Regional Cluster Stakeholder Workshop (2. phase)

To broaden the scope of the SWOT analysis and to debate, in a structured way, additional external factors having direct or indirect impact on the current and possible future development of the creative industries cluster it's helpful to follow in the first regional cluster stakeholder workshop an interactive STEEPV approach. During a brainstorming, the stakeholders use the following six perspectives to think and debate about external trends and drivers of possible future developments:

- **Societal**: e.g., health consciousness, population growth rate, age distribution, career attitudes, gender roles, quality of life, attitudes to consumption, lifestyle, etc.
- **Technological/ Scientific**: e.g., government spending on R&D, the rate of technological change, impacts of new technologies (in particular ICT), intellectual property rights protection, etc.
- **Economic**: e.g., economic growth, interest rates, exchange rates, inflation rate, new markets or loss (shrinking) of markets, unemployment, wage rates, etc.
- **Environmental/ Ecological**: 'ecology' is considered a broad concept, including 'typically' environmental factors (e.g. climate change, natural disasters and alternative energy sources), as well as factors influencing the general relation between an organisation / region and its 'environment'.
- **Political**: e.g., changes in the regulatory environment (tax policy, employment laws and environmental regulations), trade restrictions and tariffs, political (in)stability and acceptability, wars, political unions, etc.
- **Values**: e.g., changes of attitudes to family, common culture, ethics, attitudes such as materialism or altruism, etc.

Trends and drivers which have already been identified in advance (e.g. in the ICT-background paper) and other findings, e.g. from the preparation phase, are brought into the discussion by the workshop moderator and serve as valuable stimulus for this interactive brainstorming part of the workshop.

To be effective, the STEEPV analysis should not only identify the key factors but also **rank the outcomes of these classification** according

- to the **likelihood of the most relevant effects expected to materialise** and in particular
- to the **importance/needs of these factors for ICT-research and innovation in the region**.

### Intermediary Phase (3. phase)

Between the first and the second regional cluster stakeholder workshop, a working group has to compile the results of the first workshop in form of an extended SWOT matrix and

STEEPV table. Based on the SWOT and STEEPV analyses and in comparison with external expert knowledge (deriving from the ICT-background paper and other external sources such as the Strategic Research Agendas from relevant European Technology platforms etc.), the working group has also to identify, pre-assess and pre-prioritise potential strategic research areas. The quality of the elaborated list strongly affects the success of the structured debate in and the outcome of the second stakeholder workshop.

### 2nd Regional Cluster Stakeholder Workshop (4. phase)

In the second workshop, the stakeholders pick up the discussion of the first workshop and debate and arrive at a common understanding – on the basis of the outcomes compiled in the intermediary phase – of **possibilities arising from ICT research and innovation for Creative Industries** in the region. The shared understanding of these possibilities serves as foundation to derive an agreed-upon **set of strategic research priority areas to boost ICT-innovation in the Creative Industries cluster**.

To illustrate the socio-economic relevance and to **assess the potential impact** of these strategic research priority areas it is helpful to also discuss their influence on potential:

- future market perspectives,
- future business models (products, services)
- future innovation and value creation processes
- future requirements with regard to human resources (qualifications, skills etc.)
- …

Based on this assessment, the identified strategic research priority areas are **ranked** with reference to the previous SWOT and STEEPV analyses, especially taking into account

- the relevance for the regional companies **needs** and the ICT-R&D **capacities** (indicating on high regional mobilisation),
- the relevance for regional ICT-R&D **policy design and implementation**, and
- the specific **time-horizon**.

### Processing phase (5. phase)

In the processing phase, the results of the structured debate in the second regional cluster stakeholder workshop are compiled and elaborated in a list of **regional research priority areas** which includes,

- specific research priority areas relevant for boosting ICT-innovation in the regional Creative Industries cluster,
- potential impacts of the research priority areas identified (related in particular to the regional companies needs, the ICT-R&D capacities, strategic goals etc.),

- regional stakeholders and policies involved in these research areas,
- time-horizon,
- …

### 3.2.3 Further steps

The two steps depicted above are implemented in WP2 and are complemented by the following steps in the further progress of the CReATE project. In these three steps described below, all regional research priority areas identified in the CReATE regions are matched, integrated (after a regional feedback loop) into a cross-regional, cross-cluster Joint Research Area and concretised by formulating specific project ideas. The trans-regional matching of the identified regional assets, needs and research priority areas reveals the opportunities of cross-regional, cross-cluster collaboration and cross-fertilisation, e.g. by showing complementary competencies and capabilities.

3. Step: Matching regional research priorities

→ Elaboration of a matrix allowing to **compare the ICT-research capacities, the creative industries needs and the defined research priorities** across the CReATE consortium

→ Discussion of the outcome with relevant stakeholders from further European regions and European Commission to identify synergies and funding streams (International CReATE conference in Torino)

4. Step: Developing a Joint Research Agenda

→ Elaboration of a **Joint Research Agenda** based on the outcomes of the international conference and the input and feedback from regional stakeholders (industry, research communities and public administration) including development perspectives, strategic goals and action lines to be pursued by the regions in the future.

5. Step: Cross-regional, cross-cluster project development

→ Formulation of **specific cross-regional, cross-cluster project ideas and concepts** in line with the Joint Research Area and based on concrete cross-border study visits and knowledge exchange

→ Discussion of the **feasibility and funding opportunities of the project ideas** with regional, national and EU funding administrators

The subsequent step, the **implementation of the project ideas and concepts** which have been developed, is not part of the CReATE project. However, it plays a vital role for the sustainable impact of the whole process.

### 3.2.4 Conclusions for strategic cluster development

Taking stock of SPI within the CReATE methodology contributes to a successful strategic cluster development (cf. Sections 1.5 and 3.1), and thus has the potential to affect the cluster development in the respective regions beyond the project:

- The CReATE methodology follows a multi-actor, multi-level and multi-disciplinary approach and aims at **integrating a broad range of cluster-related activities**, in particular with regard to regional, national and EU policies and funding streams. General aim is to promote **synergies between regional, national and EU RTDI policies**. Similar to the 'Strategic Research Agendas' of the European Technology Platforms , the Joint Research Agenda can contribute to raising European, national, regional and private RTDI investment and to improve its impact through **concentrating efforts and resources and avoiding fragmentation**.
- The cross-regional Joint Research Agenda relies on identified specific regional needs and capabilities as well as on most promising international technology and market development perspectives. It provides the **basis for adequate and concrete actions generating a clear value added for the region**. It enables every regional actor (from public to private sphere) to **rethink and eventually to adjust the focus, effectiveness and efficiency of his 'policies' and (business) strategies** (strategic capacity building) and to **reach higher mobilisation of RTDI investments for their implementation**.
- The dialog-oriented CReATE methodology involves all relevant regional stakeholders of the 'triple helix' (e.g. in the regional stakeholder workshops) and thus facilitates **consensus-building based on personal relationships and mutual trust**. In this respect, the CReATE activities could serve as **starting point for a comprehensive Cluster Foresight exercise** to define a common vision and strategy for a broader spectrum of sustainable cluster development activities.
- The CReATE methodology facilitates **trans-regional and cross-cluster knowledge flows and learning processes** across and beyond the CReATE regions (International CReATE Conference in Torino, Trainings Workshops for other European regions) and fosters the integration of the CReATE regions into international innovation networks. In this context, **broadening and deepening the cross-regional activities beyond the CReATE project** (e.g. in the European Interest Group on Creativity and Innovation, steps towards a European Technology Platform, etc.) is valuable to fully capitalise on the value added provided by the CReATE methodology.

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# Appendices

# Appendix A – Cluster Approaches in the CReATE regions[36]

## Baden-Württemberg

According to the definition of PORTER, **clusters** are defined as

- geographic concentrations
- of interconnected companies, specialised suppliers, service providers, firms in related industries and associated institutions (particularly research and educational institutions)
- in particular fields
- that compete but also cooperate.

A complete regional cluster contains every step in the value chain of the development and production of a service field or product group, starting at R&D and ending at Marketing and Sales.

## Piemonte

**Innovation Poles** are devoted to stimulate the innovation activity encouraging interaction, use of common facilities and exchange of best practices in order to boost the knowledge transfer and the networking of enterprises constituting the Pole.

## Rhône-Alpes

For a given local area, a **competitiveness cluster** is defined as

- an association of companies, research centres and educational institutions,
- working in partnership (under a common development strategy),
- to generate synergies in the execution of innovative projects in the interest of one or more given markets.

## West Midlands

**Cluster** is a vertical group of all relevant businesses, freelances, organisations, associations within a sector.

[36] Definitions given from regional CReATE partners in the context of the initial CReATE survey.

## Appendix B – Cluster Types according to Enright (2000)

- **Working clusters** are those in which a critical mass of local knowledge, expertise, personnel, and resources create agglomeration economies. Working clusters tend to have dense patterns of interactions among local firms and complex patterns of competition and co-operation. Even if participants do not call themselves a "cluster" there tends to be knowledge of the interdependence of local competitors, suppliers, customers, and institutions.

- **Latent clusters** have a critical mass of firms in related industries sufficient to reap the benefits of clustering but have not developed the level of interaction and information flows necessary to truly benefit from co-location. Such groups of firms do not think of themselves as a cluster and, as a result, do not think of exploring the potential benefits of closer relationships with other local organizations.

- **Potential clusters** are those that have some of the elements necessary for the development of successful clusters, but they must be deepened and broadened to benefit from agglomeration. Often there are important gaps in inputs, services, or information flows that support cluster development.

- **Policy driven clusters** are those chosen by governments for support but lack a critical mass of firms or favourable conditions for organic development. Many electronics and biotechnology "clusters" found in government programs are examples. They tend to rely on the notion that policy can create clusters from a relatively unfavourable base.

- **“Wishful thinking” clusters** are policy driven clusters that lack, not only a critical mass but any particular source of advantage than might promote organic development.

## Appendix C – A simple typology of clusters according to Nauwelaers (2003)

| | "Mega cluster" | "Local network" | "Knowledge-based" |
|---|---|---|---|
| **Level** | Macro<br>Meso | Micro | Micro<br>Meso |
| **Driving force** | Competitiveness of the area (country, region) | Competitiveness of enterprises | Technological development, innovation |
| **Origin** | Mapping studies, Strategic analyses | Enterprises dynamics | Knowledge flows science-industry |
| **Main components** | Sectors, value-chain, "filière", firms and other organisations | SMEs (other firms) | Enterprises and research centres |
| **Success factors** | Critical mass, presence of complete "filières", factor conditions, demand, adapted labour market, …. | Geographic proximity, entrepreneurship, social capital, communication, vision, leadership, co-opetition, competence base,… | Adequate regulatory and institutional framework, efficient intermediaries, match in specialisations, scale economies, knowledge flows… |
| **Examples**[*)] | Danish "resource areas" and Dutch "mega-clusters", Finnish clusters, Scottish clusters, Austrian clusters, Basque country clusters, … | Italian industrial districts, French SPL, Greek clusters, Danish networks of competence, Norway SME development policy, Welsh supply-chains,… | Flemish "VIS", Walloon and Luxembourg technology clusters, Dutch R&D partnerships, German Bioregions, Finnish centres of expertise, Swedish and Austrian competence centres, Norwegian Reginn regions… |

*) Many of these real-life examples posses characteristics from several types, however.

## Appendix D – Ideal-typical model of cluster life cycles

According to ideal-typical models of cluster life cycles, any cluster passes through a number of stages, from emergence via growth and sustaining (mature cluster) to decline or transformation.

In most cases, clusters emerge 'by accident' often somewhere in the periphery of dominant locales in traditional sectors. However, the emerging clusters can often be traced back to a history of events that led to the 'sudden' rise of clusters. The emergence is often set off by some explicit location factors, in particular long-term development of specific knowledge (often coming from different technological fields) that may be combined in a new way and turned into new productive use. The first stage in cluster development often involves new firm spin-offs leading to a geographical concentration of firms in nearly the same production stage.

In the growth stage the geographical concentration of new firms creates progressively more external economies, forming a cumulative process and leading to a specific path-dependent cluster development. Thus, clusters create a set of specialised suppliers, workers, public and private service organisations etc. in a specific field, which enhance new firm formations (cf. Binder/Sautter 2006) and attracts firms and workers from outside. The mutual learning process within the cluster creates unique 'localised capabilities', i.e. special knowledge specific to the region. This knowledge creation process generates on the one hand competitive advantages through specialisation on the other hand reduces the heterogeneity of knowledge provided in the cluster and thus increases the risk of vulnerability.

In mature clusters, the number of firms reaches a critical mass and thus, competition becomes fierce. In this context, businesses often try to open up new markets and to develop linkages to strategic partners outside of the cluster. Mature clusters are principally at risk in showing political, functional and mental lock-ins.

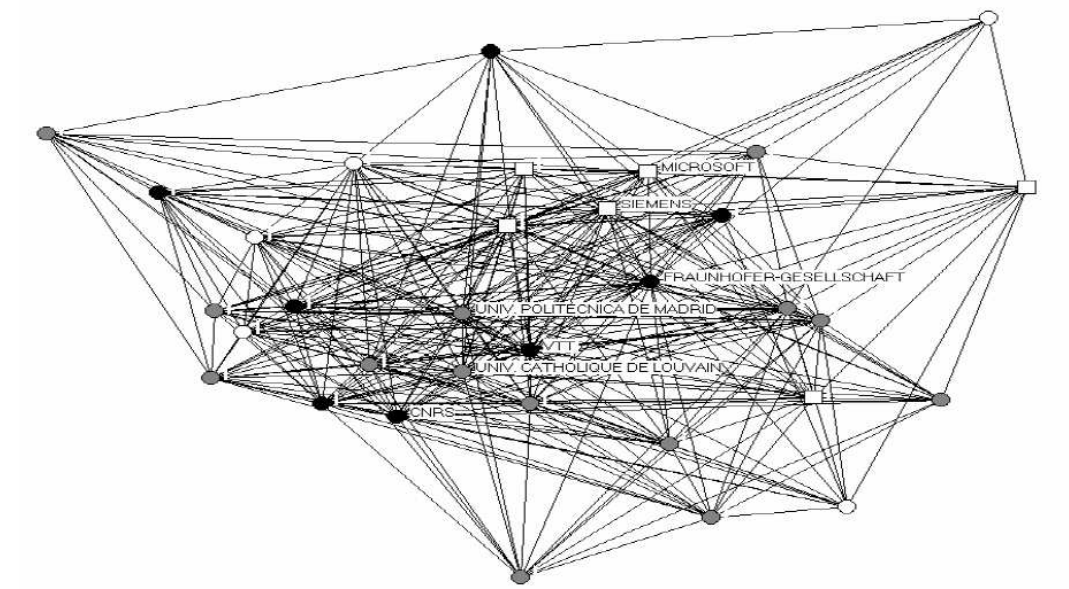
In declining clusters, firms loose their innovativeness and competitiveness due to long established structures and networks and an excessive reliance on local contacts and tacit knowledge in combination with neglect of external linkages and lack of long-term and out-of-the-box thinking. Used to past successes, regional stakeholders become complacent and fail to recognise changing trends (self-sufficiency syndrome), or, more seriously, hinder the necessary adjustments of current thinking and behaviour.

In transforming clusters, cluster stakeholders successfully break up the lock-ins and restricted thinking. At this stage, it is important to create a visionary atmosphere providing the basis for adapting to new markets, technologies and/or processes.

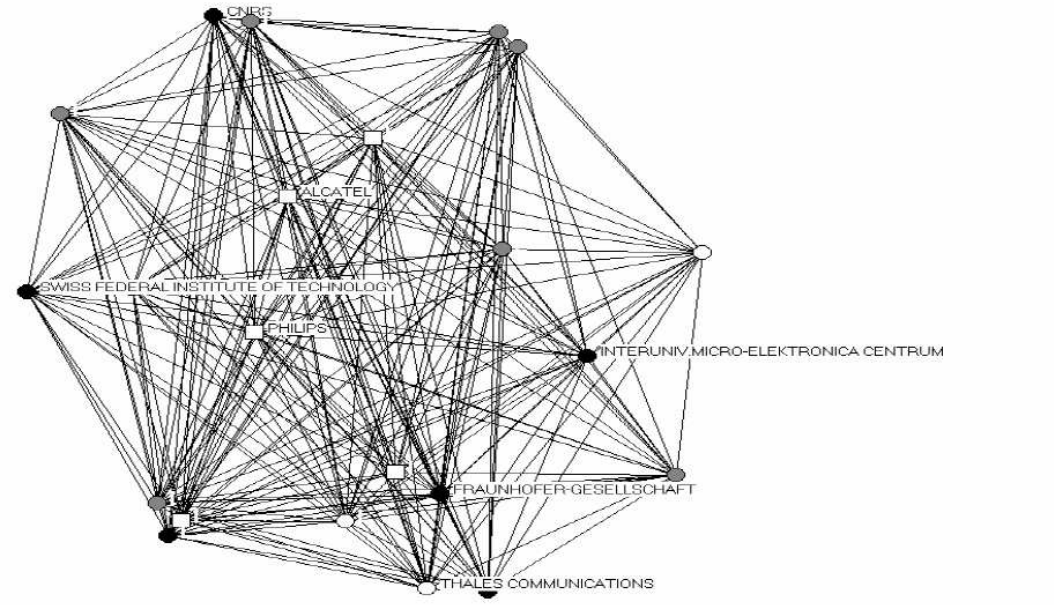
## Appendix E – Possible cluster actions according to the Policy Whitebook (2004)

| Improve Cluster Dynamics | | | Improve Cluster Environment | |
|---|---|---|---|---|
| New Technology & Firm Growth | Inter-Actor Network Creation | Cluster Formation | Factor Markets | Cluster Basis |
| *New Technology.*<br>- Organise seminars, meetings, workshops to facilitate the diffusion of technology within the cluster<br>- Establish centres to develop and test new production technologies and processses<br>- Create an observatory of technical trends<br>- Establish hubs for technology transfer<br><br>*Firm Growth*<br>- Support cluster-based incubators<br>- Encourage entrepreneur networks<br>- Provide business assistance<br>- Launch marketing and image campaigns to attract new firms<br>- Improve FDI incentives<br>- Improve financing conditions for spin-offs through regulatory changes or the set-up of special financeing mechanisms or investment funds | *Networking*<br>- Form cross-agency cluster teams<br>- Foster firm networks<br>- Foster the sharing of personal networks<br>- Facilitate external connections<br><br>*Commercial Cooperation*<br>- Form export networks<br>- Compile market intelligence<br>- Coordinate purchasing<br>- Establish technical standards<br><br>*Joint R&D Projects* | *Cluster Analysis*<br>- Conduct a competence audit<br>- Undertake a strategic study & analysis<br>- Model and amplify systematic relationships<br>- Conduct benchmarking analysis<br>- Organise and disseminate information in the cluster<br><br>*Actions for Engagement and Service Delivery*<br>- Create or formalise IFC and communication channels<br>- Improve firms' cluster awareness<br>- Facilitate interaction between different areas of government and cluster actors<br><br>*Cluster Marketing*<br>- Create brand for region<br>- Actively promote cluster<br>- Target inward investment | *Specialised Labour Supply*<br>- Provide management & technical training<br>- Use clusters as context for learning<br>- Establish cluster skill centres<br>- Support regional skills alliances<br>- Attract talent to region<br><br>*Specialised Capital Markets*<br>- Prioritise investments in cluster projects<br>- Give incentives or set aside funds for multi-firm projects.<br>- Promote joint financing, the creation of special investment funds, or the provision of credit guarantees<br>- Encouage mutualisation of risk across cluster actors<br>- Improve access to and usage of natural resources | *Legal Framework*<br>- Improve framework conditions<br>- Evaluate competition policy<br><br>*Infrastructure*<br>- Develop new or existing infrastructure through joint actions and new financing models<br>- Conduct private infrastructure projects<br><br>*Social Capital*<br>- Foster the expansion of personal networks<br>- Foster inter-firm communications and networks<br><br>*S&T, R&D Framework*<br>- Mutualise the realisation or financing of research and development projects |

## Appendix F – Hub organisations in the IST-RTD networks in the 6th Framework Programme for Research and Technological Development




**"Hub" organisations for application development in IST-RTD in the 6th FP: White – Industry; Grey – Universities; Black –Public research institutes. Circles – EU IST-RTD "hubs"; Squares – Global innovation "hubs"**




**"Hub" organisations for Technology development in IST-RTD in the 6th FP: White – Industry; Grey – Universities; Black –Public research institutes. Circles – EU IST-RTD "hubs"; Squares – Global innovation "hubs"**

Source: Malerba et al. (2006) quoted in evaluating the effectiveness of European ICT RTD and Innovation System

## Appendix G – Key issues for implementing SPI exercises successfully according to the RegStrat Guide (2008)

When designing and conducting a SPI exercise, consideration should be given to the following aspects to ensure a successful exercise and tailored outcomes:

- **Appropriate Content/Issue/Technological Expertise**: this is THE necessary, but not sufficient, condition for a meaningful SPI exercise; ensure that all expert knowledge related to the essential goals of the exercise is generated or made available, and incorporated into the deliberations in an appropriate form and at the appropriate time;
- **Appropriate Process Expertise**: the know-how to select appropriate techniques and to guide and facilitate the process brings confidence and credibility to the exercise and ensures the robustness of its outcomes;
- **Appropriate Selection of Techniques**: different techniques generate different types of knowledge. They should be selected and combined with regard to context, the issues, aims and objectives. This facilitates the transformation of the recommendations into implementable decisions bringing long-term benefits to the territories and actors concerned;
- **Appropriate Resources**: allow for enough personnel and financial resources to adequately implement the techniques chosen; only then can the techniques generate the necessary knowledge, the desired outcomes and meet the expectations;
- **Transparency**: make the process of choosing the techniques easy to understand and as transparent as possible, thereby keeping expectations of outcomes realistic and making the subsequent decision-making process more objective;
- **Participation**: choose techniques which will incorporate all relevant perspectives into the process;
- **Mediation**: apply techniques to optimally support mutual learning and understanding by the stakeholders involved, which in turn will facilitate consensus-building;
- **Stakeholders' 'know-how'**: when implementing the chosen techniques, take account of stakeholders' backgrounds and levels of expertise, and facilitate the exercise accordingly;
- Information: Finally, keep the decision-makers and the stakeholders informed during the whole exercise to raise their understanding of and commitment to the process.

## Appendix H – Matrix for Cluster Competence Mapping Exercises according to IKED quoted in the Cluster Policies Whitebook (Andersson et al. 2006)

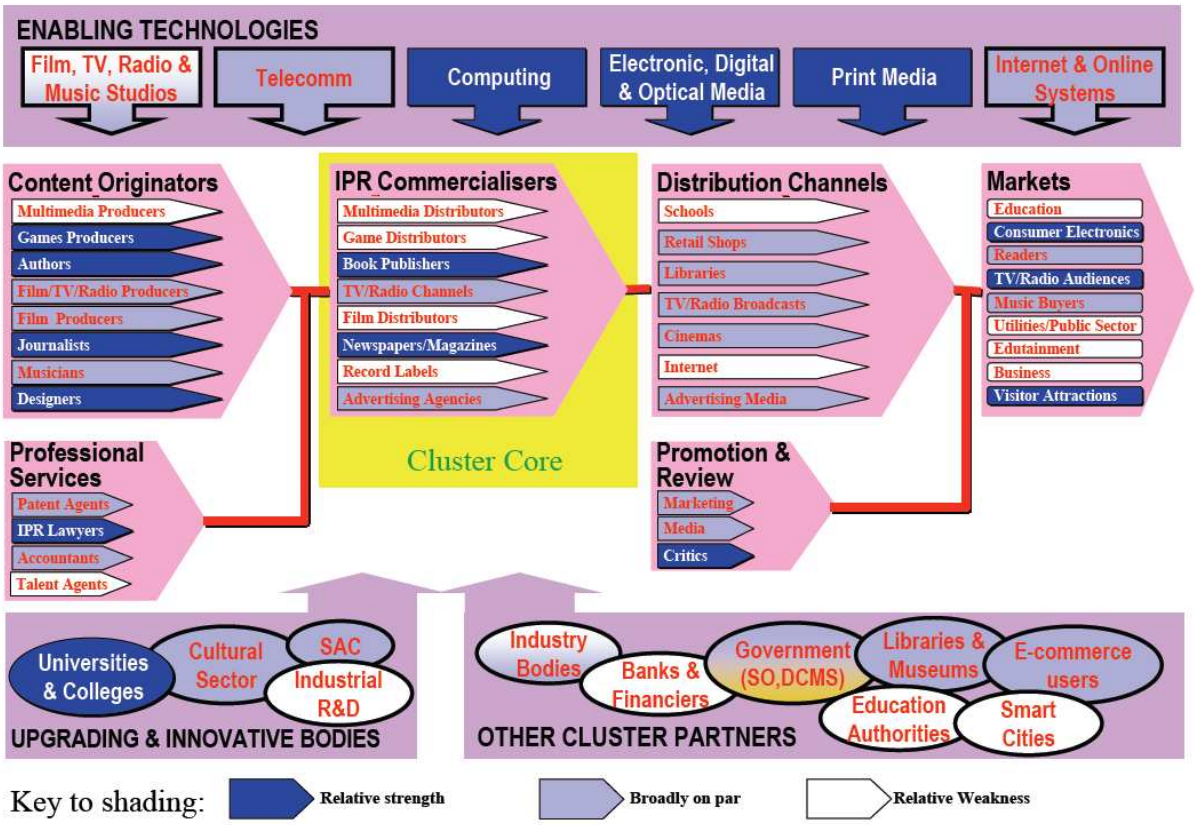
| | Firms | | Government/Policymakers | | | Academia | Financial Sector | |
|---|---|---|---|---|---|---|---|---|
| | Large Firms | SMEs | International | National | Regional | Universities | Venture Capitalists | Other Fin. Insti. |
| **Leadership** | | | | | | | | |
| Accepted leader | | ■ | | ■ | ■ | | | |
| "Naturally" legitimate | ■ | | | | ■ | | | ■ |
| Knowledge of Local culture | | ■ | | | ■ | | | ■ |
| **Independence and Neutrality** | | | | | | | | |
| Independent | | | ■ | ■ | ■ | ■ | ■ | |
| Neutral - not having vested interests | | | ■ | | | | | |
| **Enabling Capabilities** | | | | | | | | |
| Facilitative Skills | | | | | | | | |
| Ability to generate consensus | | | ■ | ■ | ■ | | | |
| Negotiation capabilities | ■ | ■ | ■ | ■ | ■ | | ■ | ■ |
| Communication capabilities | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| **Interpersonal Skills** | | | | | | | | |
| Devotion or sense of service | | | ■ | ■ | ■ | | | |
| Social | | ■ | | ■ | ■ | | ■ | ■ |
| Inclusive | | | ■ | | | | | ■ |
| Patient | | | | | | | | |
| Respectful of hierarchy | ■ | | ■ | | | | | ■ |
| **Knowledge & Vision** | | | | | | | | |
| Technical Knowledge | ■ | ■ | | | | ■ | ■ | |
| Business Knowledge | ■ | ■ | | | | ■ | ■ | ■ |
| Market Knowledge | | | | | ■ | | | |
| Visionary | | | ■ | ■ | | | | |
| **Management** | | | | | | | | |
| Will/bulldozer | ■ | | ■ | ■ | ■ | | ■ | ■ |
| Ability to challenge hierarchy | | | | | | | | ■ |
| Power | ■ | | | ■ | ■ | ■ | ■ | ■ |
| Thick-skinned | ■ | | ■ | | | | | ■ |
| Pro-activeness | | | | ■ | ■ | | | |
| **Analytical Skills** | | | | | | | | |
| Analysis/reflection | | | | | | ■ | ■ | ■ |
| Flexibility or capacity to re-evaluate | ■ | ■ | ■ | ■ | ■ | | ■ | |
| **Resources** | | | | | | | | |
| Ability to secure funds | ■ | | ■ | ■ | ■ | ■ | ■ | ■ |
| Time | | | | ■ | ■ | ■ | | ■ |

■ Competencies generally held by actor

## Appendix I – Examples of Intellectual Capital of Networks according to the RICARDA manual (RICARDA 2007)

| Dimension of intellectual capital | Asset | Definition |
|---|---|---|
| **Human capital** | **Knowledge base** | Profile of network member organisations and its employees (in general and those involved in network activities) |
| | **New capabilities and training opportunities** | Institutionalised learning capacities for employees of network's member organisations provided by network management |
| | **Innovation capacity** | R&D and innovation activities of network member organisations |
| **Structural capital** | **Interorganisational learning** | Learning of network member organisation's employees in joint activities of network member organisations |
| | **Interrelations and partnerships** | Interrelations and partnerships between network member organisations |
| | **Common ties, norms and mutual trust ("social capital")** | Common ties, norms and mutual trust ("social capital") between network member organisations. |
| | **Common infrastructure and services** | Infrastructure and services available for network members only ("club goods") |
| | **Management capacity and institutionalization** | Network management activities and procedures |
| **Relational capital** | **Sound embedding in regional and national innovation system** | Links to relevant innovation policy stakeholders outside the network |
| | **Cooperation with other networks, clusters or single organisations** | Links to relevant external stakeholders in the field of work of the network |

## Appendix J – Map of Scotland's Creative Media Industries Cluster according to the Scottish Enterprise Creative Industries Team (1999)



## Appendix K – Relational Landscape of Zurich's Creative Industries according to Held et al. (2005)