



Knowledge and Innovation for Regional Growth

Policy Recommendations based on European Good Practices

ERIK (European Regions Knowledge based Innovation Network)

2006 - 2007



Knowledge and Innovation for Regional Growth
Policy Recommendations based on European Good Practices

Knowledge and Innovation for Regional Growth
Policy Recommendations based on European Good Practices

*Edited by Jessica Huntingford and Paolo Frosini
with the support of Etruria Innovazione SCpA, Siena, IT (www.etinnova.it)*

ERIK (European Regions Knowledge based Innovation Network) 2006-2007



REGIONE TOSCANA
Giunta Regionale

Regione Toscana – Regional Policies for Innovation and Technology Transfer
Via San Gallo, 34/A – Florence 50129



Regione Emilia Romagna - Productive Activities, Economic Development and Telematic Plan
Viale Aldo Moro, 44 – Bologna 40127



Department for economy, tourism and technology of the Federal Government of Lower Austria
3109 St. Pölten, Landhausplatz 1, Haus 14, Austria



Coventry University Enterprises Ltd
the Technocentre, Puma Way, Coventry CV1 2TT



Småland med öarna - Regional Council in Kalmar County
Box 762, S-39127 Kalmar



**PROJECT PART-FINANCED
BY THE EUROPEAN UNION**
DG Regional Policy

PRINTED IN ITALY, APRIL 2007

Foreword

The objective of regional policy is to promote sustainable growth, competitiveness and employment. It aims to do this by improving the attractiveness of regions, by encouraging entrepreneurship and the growth of the knowledge economy and by creating more and better jobs. Innovation is at the heart of this agenda.

Innovation is an on-going process. To innovate, regions need knowledge and a capacity and desire to share this knowledge among enterprises and research institutes in order to transform it into new marketable products or services. The role of public authorities is to act as catalyst to provide the right environment and to bring together the key actors in innovation: enterprises, research institutes, universities, economic and social partners, etc.

A good way for public authorities to demonstrate how innovation can contribute to more jobs and growth is to showcase successful policies and projects. This is the objective of this document which has been prepared by the ERIK+ network. It provides guidelines and highlights good practice from public innovation policies in four important areas: Clusters and business networks, Industry-Science Relations, Innovation Finance and Start-ups & Spin-offs. Each area is illustrated by two examples of successful projects.

To assist regions to innovate, I am currently working on new initiatives which will help regional authorities and stakeholders to improve their understanding of innovation processes. One of them is called "Regions for Economic Change". The aim of this initiative is to strengthen networking and mutual learning between regions and cities. This initiative will boost the dissemination of best practice in economic modernisation across the Union. As part of the enhanced communication proposed in the "Regions for Economic Change" initiative, a yearly competition ('RegioStars') is being organised to award prizes to the most innovative projects. My services will also publish project case studies and guidance material on innovation.

Danuta Hübner, European Commissioner for Regional Policy

Contents

1 THE ERIK NETWORK: PAST, PRESENT AND FUTURE	1
2 REGIONAL POLICIES FOR INNOVATION THROUGH THE KNOWLEDGE-BASED SOCIETY	5
3 THEMATIC WORKING GROUP: INDUSTRY SCIENCE RELATIONS	21
Introduction and Policy Recommendations	21
Case Study: OPTOMED - Innovative Technologies in Ophthalmology - Tuscany	33
Case Study: SIDEUM: Clusters and Innovation in Southern Småland	44
4 THEMATIC WORKING GROUP: CLUSTERS AND BUSINESS NETWORKS	53
Introduction and Policy Recommendations	53
Case Study: Azione 7.1 E-cluster – Regione Veneto	61
Case Study: Knowledge Alliance, Knowledge to the Market - Zuid Holland	71
5 THEMATIC WORKING GROUP: SERVICES AND SUPPORT TO START-UPS AND SPIN-OFFS	81
Introduction and Policy Recommendations	81
Case Study: Pre-seed Fund NÖ – Lower Austria	92
Case Study: Idea and Seed Fund - City of Hamburg:	100
6 THEMATIC WORKING GROUP: INNOVATION FINANCE	109
Introduction and Policy Recommendations	109
Case Study: TRENFI “Promote new mechanisms for financing innovation” - Mellersta Norrland, Jämtland and Västernorrland County	116
Case Study: Efficient Promotion of Private Financing – Epirus	126
7 ANNEXE: ERIK NETWORK PARTNERS	135

1

The ERIK Network: past, present and future

Simone Sorbi, Head of Sector, Regional Policies for Innovation and Technology Transfer, Regione Toscana

The Regional Programme of Innovative Actions

In the period between 2000 and 2006 the Regional Programmes of Innovative Actions (RPIA) of the European Fund for Regional Development (ERDF) played the role of “laboratories of ideas” for European regions and allowed regional actors to take risks while testing out new ideas which help to respond to the challenges of the new global economy.

The programmes were drawn up at regional level within a partnership of regional actors who worked together to build up a strategy to address one of the following three themes:

- *Regional economies based on knowledge and technological innovation:* This theme encouraged co-operation between the public sector, research bodies and businesses. It worked towards stimulating the demand for innovation within SMEs and promoting new technology transfer mechanisms, with the ultimate aim of creating more efficient and competitive regional innovation systems.
- *e-EuropeRegio - the information society at the service of regional development:* This theme encouraged networking within the “net-economy” and taking advantage of opportunities offered by the growth of ICT, technology which helps European regions to reduce their handicaps and develop their assets by reinforcing competitiveness.
- *Sustainable Development and Regional Identity:* In this theme regions were encouraged to build on their assets to develop a sustainable and competitive economy, thus integrating economic, social and environmental dimensions of regional planning.

From the Innovative Actions budget (0.4% of the ERDF) 181 regional programmes were financed in 156 eligible regions. In addition, 3 thematic networks were co-financed for experience exchange at interregional level. One of these was ERIK - European Regions Knowledge based Innovation Network, financed on “Regional economies based on knowledge and technological innovation”.

The ERIK Network

The first phase of the ERIK network was approved by the European Commission in 2003 and saw 13 partner regions and 26 associate regions, jointly lead by the regions of Tuscany and Emilia-Romagna, cooperating on the theme of innovation and the knowledge based economy.

As recently stated by Commissioner Danuta Hübner, it is increasingly evident that the key drivers of economic growth, including innovation and technology transfer, are active at sub-

national level, where most businesses, especially SMEs, interact with one another and with centres of learning and technology. Thus, economic growth requires macro strategies complemented with tailored local and regional solutions. Furthermore, regional policies on innovation and research have their own specificities and, in this, are complementary to national and European initiatives. Regional policies increase the effectiveness of research and innovation and can play a real part in facilitating the achievement of the renewed Lisbon agenda.

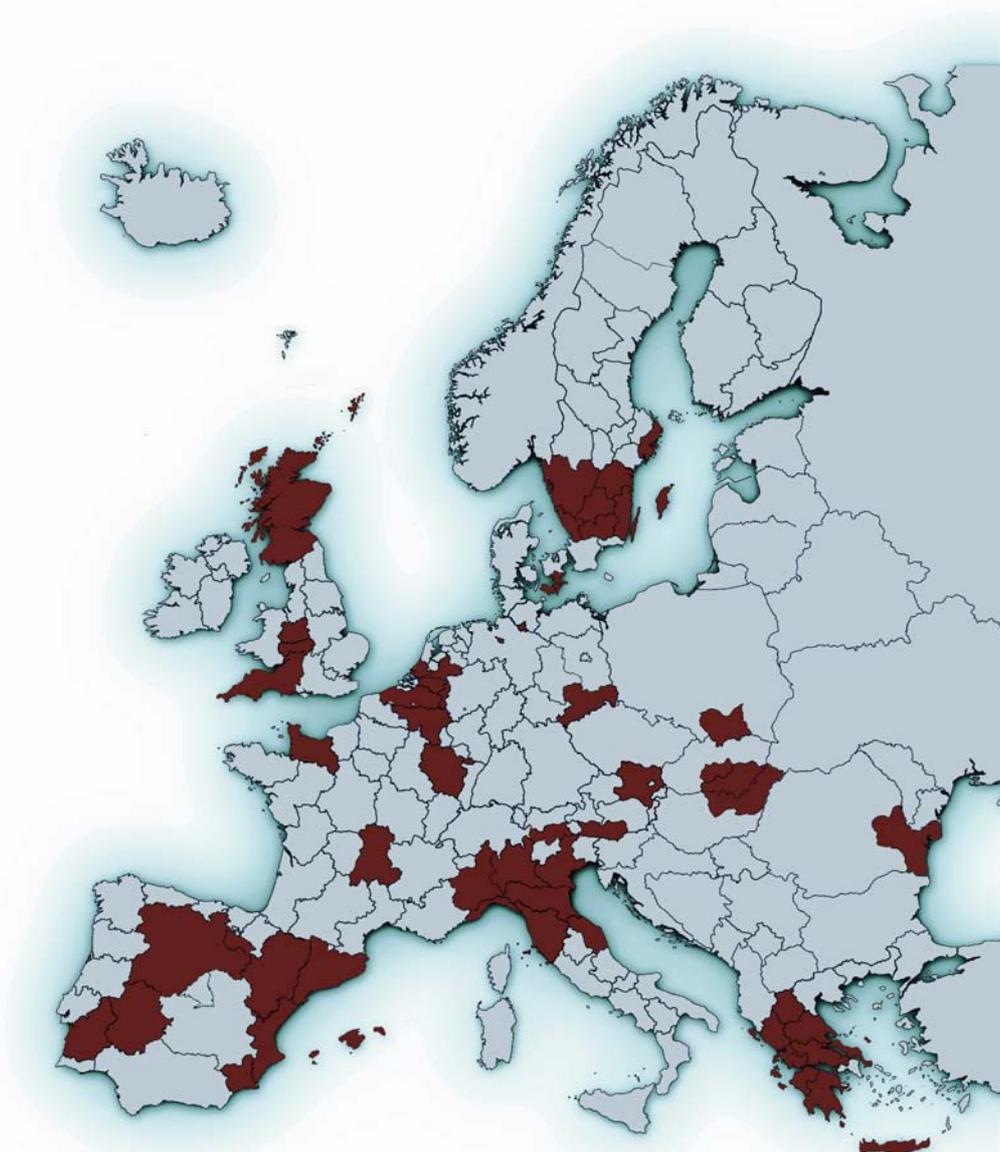


Figure 1.1: ERIK Network regions

ERIK was created within a context in which this recognition of regional importance in the European framework for innovation and knowledge was becoming ever clearer. And what better way to address the issues that European regions face in innovating and building a knowledge-based society, than through an extensive network of regions bringing practitioners together and exchanging knowledge? The ERIK Network aimed to do just that. The network was founded on the philosophy that interregional networking and support to regions in the implementation of RPIAs, particularly concerning knowledge and technological innovation, could help us all to learn and to identify effective solutions and measures. By working together and sharing our

experiences, regions can help themselves and each other, we can learn from the innovation masters, boost our common knowledge and help to reduce the disparities that exist between regions in the field of innovation.

Throughout the first two years of activities ERIK regions worked towards the creation of such a European network and to strengthening it through exchange and collaboration. The participating regions benefited from the organisation of two international conference held in Florence (Italy) and Krakow (Poland), 6 study visits and 4 workshops held in different European regions, numerous publications and newsletters, dissemination activities and experience exchange. Furthermore, the 4 thematic working groups contributed to the development of a methodology for the analysis and comparison of regional and European policies on innovation.

On the 29th of December 2005, the European Commission approved ERIK+, the second phase of the network, which has continued these activities and reinforced the foundations constructed during the first phase. The second phase saw work based around 4 thematic working groups (TWG), 3 of which continued the first phase:

- Industry Science Relations led by Regione Emilia Romagna (Italy)
- Support for Start-Ups and Spin-offs led by Niederösterreich (Austria)
- Clusters and Business Networks led by West Midlands (England)

On the basis of interest expressed by a number of the ERIK regions, the fourth TWG, led by Småland med öarna (Sweden), focused on a new issue, that of Innovation Finance.

One important ERIK activity saw the collection, evaluation and dissemination of good practices related in particular to these TWGs. Two European wide calls for good practices were launched and were followed by evaluation sessions which were well attended by ERIK members who participated actively in what can be considered an excellent example of active networking. As a result of these initiatives over 50 good practices were inserted into the ERIK database and evaluated, the locations of 4 study visits were decided (Alentejo – Portugal, Flanders – Belgium, Småland med öarna – Sweden and Veneto – Italy) and the 8 case studies included in the present publication were selected.

The ERIK database is now freely accessible on line¹. The structure and content have been developed throughout both network phases and it now represents a lasting and important tool for regional policy making. In addition to regional data and information on a number of successful RPIA, the database includes the above mentioned good practices both from RPIA and other regional strategies. The good practices are presented as a critical analysis of the work carried out at regional level including vital factors such as regional participation, levels of innovation, sustainability and transferability, and selected indicators to measure the impact of the practice. This tool gives regional practitioners the opportunity to learn from the experience of others when making decisions on strategies and initiatives.

In addition to numerous activities promoting exchange, dissemination and learning among ERIK+ members, the network also worked hard to involve an ever greater number of regions. A network can only be considered “European” if its members come from different regions and territorial realities, from all over the Union. Only in this way can the added value of common exchange and learning be assured. The first year of ERIK+ saw good levels of adhesion from all over the EU25. At the time of writing the network is formed of 13 partners², 33 associate members (regions who have had / have a RPIA) and 5 Observer regions (regions that have not had a RPIA). These regions saw the benefits of participating in an active network of regions for innovation and knowledge. A network with such a significant level of participation not only allows vast exchange of knowledge and experience, but also has legitimate basis for influencing policy making at European level.

¹ See: www.eriknetwork.net for the database and further information on the ERIK Network

² See Appendix 1 for a full description of ERIK+ partners

The future of ERIK and its role in regional policy making

For the period 2007-2013, RPIA will no longer exist in their present form, co-financed by the structural funds as distinct from operative programmes. Instead, the Commission invites regions and member states to integrate the experimentation of innovative approaches into their operative programmes. One Commission initiative promoting such strategies is that of “Regions of Economic Change”, described in the foreword of the present publication.

The ERIK Network concludes its second phase in 2007. However, the work that has gone into making a successful, European-wide network will not be wasted. European institutions continue to highlight the important role that regions play in the European game, the importance of networks and the vital nature of the theme on which the ERIK work is based. ERIK Network has to adapt to changing circumstances and to corresponding changes in the needs and interests of its members and of potential members, and to provide tailored network solutions to these changes.

The present publication fits into this context. In addition to presenting the network and continuing the work of experience exchange through the presentation of 8 in-depth case studies, it provides an informed contribution to the policy debate regarding regional policy on innovation and the knowledge based economy. The 4 TWGs provide specific input on what is necessary to ensure successful cooperation between the world of research and the world of industry, creation of innovative enterprises, creation and support of clusters and networks and funding for innovation at regional level. The overall ERIK themes are also addressed, not only bringing together the work from the thematic working groups but also taking the debate on innovation policy wider.

These policy recommendations are based on years of experience in the field and specifically on the work which has been carried out within the ERIK Network. They serve to give input to, for example, what strategy the new “Regions for Economic Change” networks should adopt, how regions can help to achieve the Lisbon goals, how regions should work together and how policy can be adapted to specific regional needs.

With this publication the ERIK Network hopes to share the benefits of its experience at European level, to establish the network as a source of knowledge and information and, most importantly, to help ensure that European policy on regions really addresses the specific characteristics of regions and their own special added value in the creation of a knowledge based society as fundamental pillar for achieving the Lisbon goals and the continued experimentation and adoption of innovation process, products and services.



Figure 1.2: The word innovate

2

Regional Policies for Innovation through the Knowledge-Based Society

Professor Stratos Pistikopoulos and Dr. Dimitrios Gerogiorgis - Centre for Process Systems Engineering (CPSE), Department of Chemical Engineering, Imperial College London

Introduction

Innovation in today's rapidly globalising knowledge-based society is not just a natural feature, but a ubiquitous necessity that has multiple and synergistic effects in all realms of human, corporate and social life¹. It affects *personal welfare* and standards of living through modern consumer products and services; *education* and intellectual development through advanced computer and network technologies; *communication*, transportation, information exchange and entertainment through vast and complicated networks; *employment* and mobility through the proliferation of research centres of excellence, agile companies and clusters which invest state-of-the-art capital and human resources to develop new knowledge, products and services; *regional development* through the formation of spin-off companies and the rejuvenation of established manufacturing corporations; the *national economy* through creating and expanding supply chains and infrastructure networks achieved by licensing patented technology to private organisations in other countries².

One main objectives of the ERIK Network was to identify, evaluate, analyse and spread effective policies for efficient and sustainable research and development of products, but also to promote knowledge-based innovation in a meaningful and financially relevant fashion³. The policy recommendations derived from numerous ERIK Network activities not only help to ensure the rapid economic development of the European Union and its member countries (especially after the recent enlargement), but also work towards the Lisbon objective of creating the largest, most vibrant knowledge-based economy in the world by the year 2010⁸⁻¹⁰.

This publication summarises the expertise and good practices gathered in the course of the Network actions and provides practical policy recommendations¹¹ that can be used by relevant parties involved in the policy debate and in programming of EU Structural Funds at regional, national and EU level. The discussion takes into consideration work carried out in the ERIK member regions, as well as interesting innovation strategies in other regions. The importance of the knowledge based economy as a key for regional development is highlighted. This chapter is based to some extent on this work. However, it goes further than this, using also the authors' personal experience, to highlight a number of more general policy recommendations related to networks in the new programming period and to policies for the promotion of innovation and the

knowledge-based society in general. The author's personal input is of interest and relevance to this theme as they have been involved in the creation of spin-off companies which were created to implement novel academic knowledge. Furthermore, they have observed intelligent environments supporting innovation in various countries (USA, UK and Greece).

Regional Innovation: RPIA and the ERIK Network

Regional needs in the field of innovation and knowledge are numerous: a major success of the ERIK Network is that it has succeeded in identifying not just exemplary regional policies which advance innovation at regional level¹², but also tangible, documented success stories which describe the implementation of such regional policies and the effect they have in terms of stimulating and sustaining knowledge-driven growth¹³. This ground work helps to provide a straightforward roadmap for regional development. The Regional Policies of Innovative Actions (RPIA)¹² is a European Union programme that focuses on policies facilitating the identification, encouragement and support of the needs of entities concerning three major themes: the first of these is knowledge-based growth (the topic of the ERIK network³), the second is the pervasive expansion of information networks in the EU society, and the third is sustainable development.

We can observe a diverse spectrum of public (universities, research institutes, non-profit foundations, regional administration) and private (research laboratories, spin-off companies, multinational corporations) organisations which strive to promote knowledge-driven innovation. The latter can have a substantial and acute impact on the provision of new products, services or even infrastructure networks, and thus foster regional development. The most effective research projects that have a major impact on innovation occur in collaborative environments, and not in isolation. Understanding this is crucial to understanding the RPIA philosophy, but also to realising the ubiquitous necessity of knowledge creation, knowledge transfer and collaboration in this cycle. Frequently, the quintessential challenge is to efficiently coordinate the flow of information and ideas among the producers of knowledge (universities, research institutes) which undertake high-risk research endeavours that require adequate intellectual, financial and infrastructure resources, the users of knowledge (spin-off companies and established national or multinational corporations).



Figure 2.1: Biotechnology - Laboratory Experiment

Some aspects of existing regional policy and structures for implementation offer *real possibilities for growth and competitiveness*. They include the *strong and experienced support structures* already in place at European (EU) and national government level and the *funding opportunities* that are available to regions wishing to initiate, sustain or expand innovation programmes. Also important are the *synergistic effects* that other EU Actions have on innovation (funding available to universities and research centres, national government support for the creation of companies, collaborative actions supporting interaction of knowledge producers and users). The fact that triple helix actors (researchers, entrepreneurs and administrators from different EU regions) have *new forums for communication*, and do not need to waste time and resources going up and down the channels of bureaucracy in more than one country is another possibility for growth. Further, the *unprecedented size of EU* makes it possible for knowledge-driven entities to expand collaboration into new territory, while regional policy makers know more about strong, dynamic

and viable growth factors in their area, and are able to assess their success potential. Finally, the fact that *the RPIA will no longer be a separate programme*, but will be mainstreamed into strategic policy documents¹⁴ should not be perceived as an eventual elimination of available funding. Instead it provides the opportunity to integrate best practices and policy recommendations from the initiative into other crucial sectors, such as education, energy, manufacturing and financing.

However, it is also important to recognise *the risks and space for improvement in terms of regional policy*. First and foremost, the EU is a strikingly variant mosaic of cultures, knowledge specialisations, economic strengths and development opportunities. When examined at the regional or at the local level this overwhelming variety can make it difficult to commit to long-term growth goals. Moreover, regional policy makers and local government often lack expert human resources to make informed choices or may have issues with national governments over basic needs (infrastructure, natural resources) before they have the luxury of incubating innovation efficiently. Furthermore, policy recommendations often imply pivotal legislative measures that can only be undertaken by national governments. In this case (even if potential benefits are unanimously recognised) it is either too long before recommendations become legislated policies, or too politically costly. Economic growth and employment measures can often have adverse effects if they are not intrinsically sustainable as they may be abused for short-term gain.

The triple helix: Innovation in the 21st century is clearly aimed at economic growth and financial prosperity, and emanates predominantly by exploring, identifying and securing completely novel or even slightly modified pathways towards the creation of high-performance products, processes, networks and services. Reaching these pathways as a result of individual scientific or entrepreneurial effort becomes increasingly difficult, in stark contrast to what used to be the norm during the 19th and 20th century. In those days the groundbreaking researcher and the visionary entrepreneur could even be a single person, as confirmed by the fascinating biographies of Thomas Edison¹⁵ and Alfred Nobel¹⁶. The foresight of such pioneers was the intellectual locomotive which spearheaded the Industrial Revolution, made possible the massive migration to urban centres and the immigration to the New World, and provided the technology for two World Wars, for curing diseases and for conquering space. Throughout these centuries, personal incentive (coupled with governmental initiatives) was the major force underlying the majority of historic achievements. The contrast of these stories against competition found everywhere in today's globalised world is evident – one need only consider the dozens of multinational corporations which have research and development (R&D) teams working round-the-clock in several continents, sharing work incessantly via electronic means and networks. Systematic discovery of new products and services is essential for company survival and many have pipelined product development with state-of-the-art management strategies.

Therefore, and in order to initiate and support local entrepreneurship and economic growth, it is essential to recognise and bring together the three actors that can provide such growth. These are: (a) the centres of knowledge production, universities, public and private research centres, non-profit research organisations and even R&D sectors of companies (sometimes with enough independence to pursue projects), (b) the centres of knowledge implementation, private for-profit start-up or spin-off companies, subsidiaries or even state-controlled corporations (again with sufficient autonomy) that can exploit new ideas and intellectual property and transform them to commercial products and services, (c) the centres of local administration, the regional government, policy-making bodies and administrative support mechanisms: these can identify, encourage and support knowledge-driven activities of the two foregoing actor ensembles, especially during the initial, most crucial phase of commercial undertakings. As it is impossible to sustain a knowledge-driven company without novel intellectual property, and equally infeasible to profit from groundbreaking ideas outside a focused corporate environment, it is even more difficult to initiate and sustain innovation efforts without the committed and

enthusiastic involvement of regional government, which can efficiently act as a mediator for collaboration and a facilitator that can provide access to support and services.

Together, these three centres form the triple helix of knowledge-driven innovation and economic development, and are central to regional policies for innovation – not only within the European Union, but worldwide.

Swot Analysis of the ERIK Network

A SWOT analysis of the ERIK Network is extremely valuable both to provide an overview of past success and summarise its progress, but also as a gnomon for the future, to identify current problems and possibilities for the future. ERIK's strengths, weaknesses, opportunities and threats are summarised in Table 2.1.

S	<ul style="list-style-type: none"> - Collaboration and idea exchange among EU regions: wide variety of strengths and experience - Focuses on a real, pressing, long-term challenge (innovation) with parallel coordinated areas - Dynamic and flexible structure that allows rapid policy transfer and adaptation to new areas - Long operation time (4 years) with wide variety of activities and intensive transfer of skills - Unique experience in management, organisation and production of knowledge and policies - Well known in many EU regions with many academic, corporate and administration contacts - Thematic Working Groups (TWGs) have clear goals but allow flexibility to member regions
W	<ul style="list-style-type: none"> - Large number of regions induces inevitable organisational and work distribution challenges - Large management structure: appreciable internal communication and administration needed - Several other EU policy study networks exist: outreaching collaboration desirable but limited - No tool to ensure participation and commitment from regional policy makers - Lack of complementary concrete actions
O	<ul style="list-style-type: none"> - EU regions to gain unprecedented ideas and benefits (planning, development, policy making) - Recent EU enlargement and new EU programming period increase the need for networks - ERIK's operation and experience can be very valuable in large-scale network experiments - Knowledge repository (ERIK database) can accelerate experience and best practices transfer - Knowledge-driven innovation and best practices can improve the regions' economic standing - Dynamism and adaptability allows evolution and expansion of ERIK Network in new form - Possible to pursue participation in the Regions for Economic Change initiative (after RPIA)
T	<ul style="list-style-type: none"> - Possible EU policy changes and budget limitations may lead to diminished financial support - EU administrative/financial support changes can limit national and local government interest - Possible changes/differences in national strategies can impede regional freedom/commitment - Human/organisational changes in regional structures can impact policy lines and priorities

Table 2.1: ERIK Network SWOT analysis synopsis

Strengths (S)

Strengths (S) are defined as the resources or capacities which can be used effectively in order to achieve ERIK objectives. The most important ones include:

(a) *ERIK Network is founded upon a lasting and committed participation and collaboration of numerous regions*, which have been in constant and organised communication for many years. These member and associate regions cover almost all member states and have significantly different geographic, socioeconomic, cultural and administrative characteristics. The wide variety of regional identities and the extreme diversity of knowledge production and dissemination mechanisms underlying this network are its most fundamental strengths. With so many regions that have important experiences to share and detailed input to provide, the synergy of information exchange and the encouragement of collaborative efforts at the EU level occur at an accelerated speed, thus providing a powerful vehicle for addressing the Lisbon objectives. The very different policy-making bodies and tools, organisational structures and best practices (and the inherent disparity of cultures, trends and approaches in regional knowledge-based development) in these regions has been turned into a major advantage.

(b) *The ERIK Network addresses a real problem and challenge in Europe* (the promotion of innovation and the knowledge society) and therefore offers real added value in terms of collaboration and exchange of ideas. Rather than funding singular efforts or isolated, the existence and proliferation of such an EU network ensures that best practices and effective regional policies can be communicated and exchanged among 27 member states. Just as research and knowledge advances in leaps in groups rather than in isolation, the policy effect can be dramatic when it is spearheaded at its inception by coordinated efforts in a network.

(c) *Networks are dynamic and evolve by nature*, and thus they are robust, change-capable structures that can adapt to appreciable systemic disturbances without noticeable effects on performance and potential. The EU is a body of increased membership and enlarged focus which can encourage the effect of ERIK Network activities and successes on development. This is especially true in the new accession countries, in which the potential for innovation must be quickly and effectively supported both by adequate funding and by testing efficient structures. Just as knowledge transfer is a mechanism for economic development, policy transfer and adaptation is readily possible in new EU states.

(d) *Valuable experience that has been gained by the ERIK team in terms of management, organisation and production of knowledge and feasible policies*. The ERIK Network has now been running since 2003, with a wide variety of central and supporting actions (innovation workshops, topical studies, study visits, electronic database of best practices, training measures, widely distributed newsletters, final policy documents). In the course of several years, it had ample time to gradually develop and consolidate transferable skills among its members, especially in the context of four Thematic Working Groups (TWGs).

(e) *The ERIK Network is now well-known in many EU regions* and in all EU countries, with a network of contacts among triple helix actors. This pervasive network of contacts includes good relations with other networks and underlines the importance of human resources in forming and implementing growth policy. Ultimately, it is through local networks that knowledge creation occurs, it is through regional networks that knowledge-driven innovation is achieved in a financially relevant fashion, and it is through national and international (intellectual, corporate and administrative) networks that the



Figure 2.2: ERIK Network Stand at eChallenges 2006, Barcelona

fruits of knowledge-based innovation (products, services and infrastructures) are manufactured, sustained and disseminated. By creating this vast and viable network of human contacts, the ERIK Network has secured numerous possibilities for dissemination and for the perpetuation and proliferation of the research outcomes that have been achieved, long after the conclusion of its life.

(f) *The division of work is well defined and contributes to the overall scope.* The concept of Thematic Work Groups (TWGs) has certainly benefited Network objectives. It is well understood that a rigid structure of research and work would only create additional bureaucratic challenges and increase the organisational burden. However, flexible structures work best when all partners demonstrate continuous and consistent commitment to the scope and the objectives of the Network. Innovation can be pursued but not enforced; contributions are encouraged when regions participate in themes that are closest to their interests.

Weaknesses (W)

Weaknesses (W) are defined as the limitations, faults or defects that may impede the Network from achieving its objectives and from impacting on innovation and development efforts. These are:

(a) *The lack of a tool to ensure participation from the large number of regions* poses organisational and work distribution challenges which affect performance, productivity and potential. Currently the network does not avail of a tool with which to really influence and ensure sufficient participation and commitment to network objectives and activities. This is due to the inherent nature of such a thematic workshop but can limit consistent input from members. Priorities, deliverables and contractual obligations must be met, even at the expense of limited participation.

(b) *The large management structure can increase time needed for activities.* The structure of 2 lead partners and 4 coordinators is positive in terms of division of work and fruitful discussion. However, having to simultaneously accommodate a number of different regions can often lead to delays, as a substantial amount of allocated resources and time is spent for internal communication and network administration.

(c) *Multiplicity and competition is ubiquitous*, as it happens in both the academic and the corporate world. This is also the case for the ERIK Network. Several other similar EU networks have already been established on different programmes, with different sources and schemes of funding, encompassing different regions and countries, and with little overall coordination. ERIK's principal effort has been directed towards internal work programmes and objectives. Outreach and collaboration with other networks is desirable but limited, considering the internal coordination requirements, the pressure of deliverables and the resources available. Thus, staying informed about concurrent developments and avoiding duplication of results remains a challenge.

(d) *Initial commitments may not correspond to the changing environment.* While the performance and productivity of the ERIK Network is well documented, it should be reminded that the work plan, organisation (TWGs) and objectives have till now been largely linked to a specific programme. As such, some of the work carried out (and the outcomes publicised) to this date may rapidly lose its relevance due to the changing context of regional policy. For example, as regional programmes move on and less regions have an active RPIA, it is normal for attention to be slowly but steadily shifting from RPIA towards other regional programmes.

(e) *The successful achievement of the ERIK Network vision requires the active and sustained participation* of regional policy makers, and their commitment in terms of interest as well as time is frequently not a given. Through the ERIK Network has been successful in a number of significant cases, it is not always easy to actively involve them in the cycle of study and implementation of best policies and the network is missing a political steering mechanism to

ensure that best practices and recommendations are implemented or considered in regional decision-making within a reasonable amount of time.

(f) The Network has not concentrated enough on concrete “actions” as complementary activities to the fruitful experience exchange, study visits, and network database. Due to modifications to the initial project proposal, innovative and concrete ideas such as Regional Innovation Mentoring Schemes (RIMS) had to be abandoned.

Opportunities (O)

Opportunities (O) are defined as the favourable situations in the surrounding environment that can have a positive (even if unanticipated) effect on the ERIK Network and indeed what could be the future role of the network (and its members) in innovation support infrastructure and schemes. As such, we distinguish:

(a) *Regions of EU member states have by now gained an unprecedented degree of freedom and flexibility* in terms of governance, planning, defining development priorities and policy making processes. While the European Union in its early decades was spearheaded exclusively by the choices of national governments, major advances now enable regions to access resources and pursue growth at the regional level, having knowledge of local expertise and networks. Being a network of regional authorities, this puts the ERIK Network in a strong position to influence positive policy development on innovation.

(b) *The changes at European level associated with the new programming period and the recent enlargement increase the need for network structures.* Centralised government structures and polarised, autocratic management of policy-making processes becomes increasingly difficult due to the sheer number of member states and regions. Thus, the function and experience from ERIK has real potential value in future, large-scale network experiments. ERIK member regions will be able to lead such efforts, but also transfer the experience hitherto gained to other regions, both inside and outside the respective EU countries. ERIK can play a active role in the EC initiative "Regions for Economic Change".

(c) *Innovation is a pressing necessity which is constantly evolving*, so the topic of the ERIK network is not only timely, but also of long-term importance. With manufacturing costs plummeting by orders of magnitude in Far-East economies (India, China) and outsourcing becoming a wide scale reality, EU member states strive to protect their established employment basis and strengthen their national economies through knowledge. Turning to knowledge-intensive production helps national economies gain and maintain a competitive edge without unfair protection. A flexible network can adapt to changing trends and policies, thus ERIK can serve EU regions for the years to come, by providing clear, general and applicable guidelines about identifying innovation potential, cultivating triple helix synergies, providing timely and efficient support to new companies, and ensuring the constant influx of knowledge into innovation.

(d) *The ERIK Network can evolve and continue to serve its member and associate regions in the years to come*, due to its dynamic and adaptable features. Despite the conclusion of the RPIA programme, it is possible to pursue participation in the Regions for Economic Change Initiative, thus securing future opportunities to explore regional policies for innovation in more detail. The need to do so exceeds the new environment created after EU enlargement, and encompasses current and future challenges that are relevant to systems and processes affecting growth potential (intellectual property, education, legislation, banking and local government).

Threats (T)

Threats (T) are defined as unfavourable situations in the surrounding environment that are potentially damaging to the Network. Threats to ERIK include:

(a) The possible changes that the *European Commission may pursue and implement may lead to diminished administrative and financial support* to the ERIK Network, and thus to its members, work, and objectives. On the other hand, and despite possible changes in the EU organisational scene, networks and innovation remain a fundamental priority at the EU level. Because the RPIA will not always exist as an individual programme, ERIK must evolve or reinvent itself and secure new sources of funding and sustainability – thus, this threat can be turned into an opportunity, by accumulating experience and exploring the current support environment.

(b) The *fact that regions are free to participate in other networks with similar content may lead to a shift in priorities*. Essentially, this is a potential outcome of the fact that (while all ERIK member and associate regions are interested in its pursued objectives) ultimately, each local government is responsible for securing as many resources as possible for its own development. As many active EU networks produce useful policy results and gain international credibility, resource distribution and participation choice will understandably become a challenge. Thus, the availability of network resources and member participation may become limited. The challenge is to offer services and actions with added value for participating regions in fostering the knowledge based economy by professional network management, well organised study visits according to partner regions' needs (topics, geography etc) in combination with concrete actions, such as transfer of GP cases, coaching of implementation of innovation support tools.

(c) The *possible changes in national strategies* defined by the governments of member states, which may impede regional freedom despite the commitment of administrators and local entities. Changes in national government and legislation can have a dramatic impact on programmes and actions. Decision making processes in new member states remain particularly rigid.

(d) The *changes (both human and organisational) in regional political structures* can have a dramatic impact on policy direction and administrative personnel. Regions can be lost to the network this way. This is because the decision-making autonomy and financial independence of local government bodies which represent small regions also offers possibilities to look away from ERIK towards other advisory bodies, which may promise customised support. Human capital is important in such cases, as pre-existing structures and programmes often tend to be overlooked by newly appointed local administrators and their expert advisors, in favour of their own agendas.

Network Policy Recommendations

The above SWOT analysis of the ERIK Network clearly shows the level of experience and the consequent level of analysis that has come from four years of network activities.

As we move into the new EU programming period (2007-2013) and as RPIAs will no longer exist as individual programmes, networks such as ERIK will have to adapt to changing circumstances, changing conditions and to corresponding changes in the needs, interests and concerns of members. To this end, and based on the experience highlighted above, we attempt here to produce some network policy recommendations for how networks can overcome weaknesses and threats, and on how they can build on strengths and opportunities in order to ensure a functional European-wide superstructure with real added value for innovation and knowledge growth in the regions.

Learning from excellence and from mistakes in Pro Active Environments

Facilitating information exchange in a structured manner is a network feature that must be continued. Information exchange does not have to concentrate on positive examples of regional policy. Indeed, much can be learned from less successful actions, essentially from learning from the mistakes of others. Regional practitioners do not need to hide mistakes or changes to policy and actions. Instead, they and others can benefit from a critical analysis of events: detailed case studies on innovation projects¹⁷ or cluster structures¹⁸ are extremely valuable in this case. Helping regions with this type of analysis is one area where networks have real added value. While being valid for all regions, this becomes even more important in the growing EU. Regions with a long history of developing, deploying and evolving innovation and ICT strategies can help less experienced regions to gain positive elements from their experiences, while simultaneously avoiding negative aspects.

But how can sharing good practices really help? Not just by showcasing them at conferences and giving awards, but by bringing people together in meeting rooms and letting them discuss common problems and potential solutions. If the problems are the same, then different contexts do not matter, because ideas can always be adapted. It is not about copying what another region did: it is about learning from it and extracting what a region needs. Networks should secure funding to hold such events and organise intensive sessions, allowing people to think and to share knowledge.

Moving towards concrete actions

The concept of networks has long existed and European regions have had sufficient time to experiment with different formats, structures and ways of working. It is now time to build on this experience and to ensure that work on knowledge and experience exchange does not remain as simple exchange. level. Instead, the focus must move towards exchange for precise, well-defined purposes. Such concrete actions vary. They may involve in-depth feasibility studies for adapting one successful regional system to another reality, funding for sharing resources and facilities, or indeed implementation or inter-regional transfer of pilot actions developed from exchange activities. In this way, experience exchange can be transformed into sharing objectives. Regions with similar objectives can create targeted themes or subgroups to address issues that they can realistically address through exchange.

In fact, the new Regions for Economic Change initiative, while being run by the INTERREG IVC Secretariat, will see the participation of the European Commission in *Capitalising Networks*, where the member regions concentrate on using existing knowledge to build action plans which can be implemented in the respective regions, thus capitalising on the knowledge. The key slogan is: going from ideas to action. This slogan should be promoted and adopted by innovation networks.

Ensuring basic services to members

While it is true that networks should now try to move towards more concrete added value, they must also maintain basic services for which regions avail of network support. These include, above all, partner searches or contacts, and updated information on opportunities for regions. Network members should benefit from privileged information on EU policy priorities, on upcoming funding opportunities and from the opportunity to influence policy and programme development. This can be achieved through network web sites, through direct contact or through information events. Information seminars and similar events have the added importance of bringing people together, helping them to “network” in the real sense of the word.

In order to assure that these basic services are provided, networks benefit from a close contact with central European institutions. This can take the form of an established office in Brussels or of frequent contact with regional and national representations. These measures allow networks to be surrounded by information sources and to keep their fingers on the pulse of relevant developments.

ERIK Network
Policy Recommendation

Ensuring growth

As shown by the SWOT analysis above, the ERIK Network has concentrated time and energy on expanding its membership. This comes from the sincere belief that added network value is more likely if the membership is wide and diverse. In the context of ERIK, this expansion has focused in regions within the European Union's 27 member states. This has led to interesting and important exchange and is something on which a future network should dedicate specific actions.

However, as highlighted in the recently published European Commission Green Paper on the European Research Area¹⁹, in order to achieve the Lisbon agenda, Europe must cooperate with countries outside the EU. In a globalised economy, networks must also be of this view. Cooperation will not necessarily result in membership, as regulations on European funded initiatives would not allow this. However, two-way exchange and transfer of ideas, actions and network structures themselves can lead to open dialogue and positive results, both within Europe and outside its borders. Such dialogue and adaptation cannot help but increase our knowledge of how our policies and actions really work in different realities. Concrete methodologies and indicators proposed²⁰ and compiled²¹ for studying regional potential, and study visits²² are valuable to this end, as they can promote discipline-specific exchange. It is equally vital to identify clusters of excellence²³.

Ensuring a future

ERIK Network
Policy Recommendation

Projects financed with European Commission money can form a network basis or a foundation. However, without some form of further continued political and financial support, they risk having to close before their work can really bring tangible benefits to the regions. Throughout a network lifespan time and effort must be made to build on relationships and contacts and to attract interest, ideas and perhaps even funding for further work²⁴. This cooperation should be at different levels (local, regional, national and European) and with different public and private actors.

Linked to this is the vital cooperation between different networks and indeed an honest evaluation as to whether or not all existing networks are necessary. Networks are divided into themes but their interests, topics and activities, and even their methodological approaches will inevitably overlap and interlink. In order to avoid unnecessary duplication or competition, networks should be encouraged to communicate. This could lead to shared strategies, work plans and common events. It could even go further and lead to merging, as best suits improved levels of innovation and the growth of the knowledge society in European regions²⁴.

General Policy Recommendations: Regional Innovation

ERIK Network
Policy Recommendation

Build policies from a detailed and quantified understanding of territorial strengths

Realising the importance and uniqueness of regional innovation strategies²⁵, strengths, economic needs and viable resources is the foundation upon which successful and lasting industry-science relations can be built and thus contribute to innovation. Tight interfacing and systematic communication between producers and users of commercially valuable knowledge is

productive at a multitude of levels: it can result in profitable partnerships between many actors (e.g. universities and companies), provide directions for society- and economy-relevant research topics and economic opportunities²⁶, secure intellectual property (patent rights), and provide attractive employment opportunities for talented graduates with advanced academic degrees. Understanding that every region has a unique identity is elemental.

The *identification of existing clusters of excellence as well as the creation of new ones* is one of the most crucial and meaningful strategic innovation objectives²³. Identifying established and promising clusters can be done with quantitative metrics, which take into account a variety of intellectual, financial and corporate indices. New clusters require the provision of platforms and forums for frequent, close collaboration of knowledge producers and users, across different disciplines. Systematic market research studies and impact evaluation measurements are vital^{20,21}.

Emphasise the importance of education for innovation

ERIK Network
Policy Recommendation

*Assessing the scientific and technological potential of a region*²⁷ is essential for investment in creative skills, graduate education and innovative research therein. Academics, just as much as entrepreneurs, recognise that the hardest part of successful invention and innovation is coming up with *original, convincing and foolproof ideas*, which address wide societal needs, in a sustainable and profitable way. Higher education and postgraduate academic programmes can be studied²⁸ to identify research talent, an indispensable resource for knowledge-driven innovation.

More than anything, *entrepreneurial spirit and skills* should be encouraged to develop a credible strategic innovation culture. Practical, entrepreneurial based courses, including innovation-oriented communication, should be integrated into university and indeed secondary school curricula. Some examples include postgraduate student research competitions with judges from companies, research innovation competitions requiring the exhibition of functional prototypes (products, software), study visits, and company business plan competitions in which teams of students (often from a variety of different disciplines, e.g. Physics, Electrical Engineering and Finance) devise and present detailed plans for starting up an innovation-oriented company. These vehicles are already a norm in many US universities (MIT, Stanford, Caltech, Carnegie Mellon), and are now also encountered in certain EU universities (Imperial College London, Cambridge University, ETH Zurich).

Pervasive innovation policies (albeit seemingly time-consuming to devise and hard to integrate in education measures) can encourage creativity: it is no accident that enthusiastic and successful entrepreneurs have a sound grasp of theory, but are also gifted with practical and vocational skills.

ERIK Network
Policy Recommendation

Plan for success as well as failure

Innovation strategy at regional level should have clear goals and should include planning for failure. Uncertainty and financial risk are realities in the corporate world, where it is inevitable that even some of the most promising ventures will ultimately fail. Therefore, performance and success potential must be evaluated as early and as often as possible, and in the case of failure the experience should not be lost. For example, the closure of a start-up company is obviously a financial failure from a corporate viewpoint, but it may also constitute a useful or even enlightening tracer of the economic climate in the region it was created and the market sector that it was meant to serve. Capturing this meta-knowledge is elemental to innovation as fresh ideas can be born in the context of network-wide as well as regional policy conferences²⁹.

Introduce multiple and flexible support measures for innovation

ERIK Network
Policy Recommendation

A number of important support measures should be undertaken to foster innovation:

- *Project and risk assessment for innovation ventures* both as an initial service, and as a valuable launch pad towards periodically evaluating their viability³⁰.
- Local administrators and decision makers can *introduce/propose suitable measures*, (possibly to national governments) justified by relevant examples of success stories¹³.
- *Funding entrepreneurial awareness and education actions*: small start-up companies frequently do not know about available resources and need information and exposure.
- *Practical start-up company support and ancillary training*: funds are insufficient when an inexperienced entrepreneur struggles with balance sheets, tax statements, internet access or CORDIS applications. Providing seed funding to promising start-up and spin-off companies alongside training actions, so that entrepreneurs learn to seek and pursue public and private funding opportunities, identify business partners and markets, and close deals. For example, *Expert support mediators* (e.g. Imperial Innovations³²) can help to explore, train and support struggling start-up companies, and thus act as nuclei for hubs of excellence.

Encourage established as well as novel vehicles for finance

ERIK Network
Policy Recommendation

Providing *seed funding to risky yet promising ventures* is a popular regional policy. Essentially regional administration acts as a venture capital firm in its own right. Rather than just providing seed funding (which will eventually run out), it is better to change culture by creating *policies encouraging public-private partnerships*. Providing *matching funds* to embryonic partnerships is a good practice. *Prioritising is inevitable, but can be systematic* (e.g. by business plan competitions).

Regional administration policies on innovation finance have a considerable history in countries outside the EU. A notable example is that of the United States, where several state governments have planned and support successful funding schemes which require the committed collaboration of one or more academic research group and one for-profit start-up company or major corporation. One case is the Pennsylvania Infrastructure Technology Alliance (PITA)³³: it solicits proposals for commercial applications and provides *matching funds for risky projects, especially if they can potentially strengthen local manufacturing firms*. Other measures also encourage entrepreneurship and promising initiatives via local venture capital firms (many of which are start-ups themselves).

ERIK Network
Policy Recommendation

Encourage dynamic innovation endeavours at the sources of knowledge

Identifying the few but *outstanding research centres of excellence* and facilitating their matching with (or the emergence of) *agile and vibrant start-up companies* is the best established and widespread practice, and should inspire EU regional policy. Repeated success stories can result in the emergence of larger regions of excellence, such as the Cambridge Area (Massachusetts, USA), home of several biomedical and software companies that have evolved from MIT and Harvard University research. The most renowned region of excellence is arguably Silicon Valley (California, USA), home of numerous software and hardware technology companies which have evolved from Stanford University, Caltech and the University of California.

Lasting collaborations among universities or between universities and industries can lead to fruitful and beneficial *joint technology transfer programmes*. Two relevant examples showcasing the tremendous potential of such coalitions are the MIT-Cambridge University strategic partnership³⁴, and the Imperial College London-Georgia Tech iCPSE³⁵ (International Centre for Process Systems Engineering), a novel collaborative effort in modelling, design and control of

multi-scale process systems for advanced materials and pharmaceuticals. Innovation clusters exist in many industrially developed regions, inside and outside EU. The Centre of Process Systems Engineering (CPSE)³⁶ at Imperial College London has created the CPSE Industrial Research Consortium, a vibrant forum of experts that sees participation, sponsorship and intellectual contribution from major chemical companies. The Department of Chemical Engineering at Carnegie Mellon University (Pittsburgh, USA) hosts the Centre for Advanced Process Decision-Making (CAPD)³⁷, a forum specialising in the development of theoretical algorithms and computational methods for solving complex engineering problems encountered in the process industries.

**ERIK Network
Policy Recommendation**

Regional governments can use EU funding to experiment on sustainable innovation

Regional governments should ultimately use EU funding to kick start initiatives but the real touchstone is how to help regional companies to stand on their feet as quickly as possible, learn to seek and provide for themselves, and thus generate products and competition. Ultimately, the regional administration can undertake a coordination role to facilitate the provision of services (laboratory facilities, power/information networks, training) and of innovation, funding entrepreneurial awareness and education actions³¹. Regional Administrations can also evaluate performance and success potential as early and often possible.

However, regional policies should foster but not force, and support and experiment but not sustain innovation. The RPIA was a “laboratory” for ideas. This programme is now being closed. It is important that future initiatives will continue to encourage regional governments to support experimentation and risk taking, even though the funding as such is being mainstreamed. Real innovation lies in taking risks.

This kind of incentive ideally happens in collaborative work environments by broad exchange of ideas, after resolving the bureaucracy, support structures and risk-averting culture problems. By definition, regional policies must inherently promote sustainability in financing as much as they intend to do so in intellectual development and economic growth. EU funding can therefore be used not simply to provide seed funding but to create policies encouraging public-private partnerships and change culture. One example of a successful “culture changing” initiative is that of Carnegie Mellon University which hosts an annual seminar series where entrepreneurs and venture capitalists present and discuss their companies’ stories with graduate students.

Conclusions and Summary of Recommendations

The main policy recommendations for efficiently promoting triple helix synergies towards sustainable and economically beneficial regional innovation are summarised in Table 2.2. These are in excellent alignment with proposals of the ERIK Network concerning the reform of the EU Regional Cohesion Policy for the next period (2007-2013)³⁸.

Encouraging research and entrepreneurship towards knowledge-driven innovation that can advance local economies at the regional level depends upon the introduction of modern and efficient policies: this is an urgent necessity for the European Union, not just in order to achieve the ambitious Lisbon goals in view of the upcoming milestone (2010), but also in order to secure and improve its position against industrial giants. This has been understood thoroughly: a manifestation of commitment is the Regional Policies of Innovative Actions (RPIA) programme and the successful actions therein. Nevertheless, the extreme variability in EU regions affects the degree of participation, the achievement of critical resource masses and hence the potential for innovation. The ERIK Network offers a significant contribution towards surveying the current European environment of innovation support, identifying the major factors affecting it and analysing a wide variety of support measures applied and tested in real situations. There is

always room for increasing participation and collaboration of regions. Many ERIK workshops, study visits and collaborations provided Good Practices already implemented in various EU regions; concrete regional policy recommendations have been contributed after these efforts.

NETWORK-WIDE POLICY RECOMMENDATIONS

- Learn from excellence as well as from mistakes in Pro-Active Environments
- Move towards concrete actions in knowledge exchange, experience exchange and innovation
- Ensure basic services to (and frequent communication among) network members
- Ensure growth by open dialogue, adaptation and transfer of ideas, actions and structures
- Ensure a future by intra- and inter-network cooperation and communication

GENERAL POLICY RECOMMENDATIONS: REGIONAL INNOVATION

- Build policies from territorial strengths
- Emphasise the Importance of education for innovation
- Plan for success as well as failure
- Support multiple and flexible support measures for innovation
- Encourage established and novel vehicles for finance
- Ensure dynamic innovation endeavours at the sources of knowledge
- Regional governments can use EU funding to experiment and kick start sustainable innovation

ERIK Network
Policy Recommendation

Table 2.2: ERIK Network – main policy recommendations for knowledge-driven innovation

The analysis of these four themes and our experiences thus leads to overall policy recommendations from a combined academic and entrepreneurial perspective, due to our involvement in application-oriented academic research in systems engineering and in two successful corporate ventures in this area.

Our cornerstone policy recommendation is that regions must enthusiastically invest in development, mobility and proliferation of human, intellectual and financial capital:

1. *People are the most important resource*, since they initiate and apply innovation, but also because they, as administrators, advocate policy measures to governments. The *triple helix* (knowledge producers / researchers, knowledge users / entrepreneurs and innovation catalysts / regional administrators) is thus the foundation of innovation. Process Systems Enterprise (PSE)³⁹ and Parametric Optimisation Solutions (ParOS)⁴⁰, the two spin-out companies



Figure 2.3: ERIK TWG Meeting, Vienna, 22nd and 23rd May 2006

of Imperial College London, rely on *talented and accomplished researchers* to produce software and solutions for managing complex chemical process systems; these are used by major

corporations around the world, who advance knowledge by providing challenging problems. *Even with the best support structures, success is impossible without human talent.*

2. Knowledge is another resource that must be generated, protected and implemented with ease, by pursuing technological problems and societal needs with profit margins, creating new products and securing the intellectual capital via patent acquisition, but also by effective intellectual property management (R&D pipelines are essential here).

3. *Supporting start-up/spin-off companies* is vital, both by training and by funds, but also by advocating national policy measures that *simplify capital flow procedures*: capital means hiring new talent (researchers), accessing funds (financial support) and cooperating with other triple helices (in the same or other regions) to exchange ideas.

4. *Clusters of innovation excellence* must be identified, created and encouraged, and all triple helix actors can pursue such efforts: *strength comes in numbers*. A good example is the Centre for Research and Technology (CERTH, Greece)⁴¹ and its associated Technology Park, which brings together researchers and an incubator for new start-up companies which are based on promising new ideas. *Interdisciplinary consortia are also dynamic in pursuing innovation.*

5. *Innovation finance* must be provided quickly and efficiently, preferably to the most promising companies: regional policies can directly manage or indirectly regulate funding, but must foremost *encourage entrepreneurial spirit in early stages*. Creating *Venture capital firms* using expert structures to analyse start-ups and secure funding via various measures should be encouraged.

Literature References

1. Communication from the Commission: The regions and the new economy: Guidelines for innovative actions under the ERDF in 2000-2006 (31/1/2001).
2. Communication from the Commission to the Council and the European Parliament: Wider Europe Neighbourhood: A New Framework for Relations with our Eastern and Southern Neighbours (3/2003).
3. ERIK (European Regions Knowledge Based Innovation Network) – Specific Network Programme Application Form (Innovative Actions under the ERDF in 2000-06).
4. ERIK Thematic Working Group (TWG) 1: Industry-Science Relations – Final TWG Report (2007).
5. ERIK Thematic Working Group (TWG) 2: Support for Start-Ups and Spin-Offs – Final TWG Report (2007).
6. ERIK Thematic Working Group (TWG) 3: Clusters and Business Networks – Final TWG Report (2007).
7. ERIK Thematic Working Group (TWG) 4: Innovation Finance – Final TWG Report (2007).
8. Communication from the Commission: A European initiative for growth: Investing in networks and knowledge for growth and employment (Interim Report to the European Council) (1/10/2003).
9. Communication from the Commission: The Structural Funds and their coordination with the Cohesion Fund: Revised indicative guidelines (25/8/2003).
10. Communication from the Commission: Paving the way for a New Neighbourhood Instrument (1/7/2003).
11. Innovative strategies and actions: Results from 15 years of regional experimentation, European Commission Working Document (2006).
12. European regional programmes of innovative actions: Laboratories for innovation (11/2004).
13. ERIK Online Database of Best Practices in Thematic Work Groups (<http://www.eriknetwork.org/>).
14. Communication from the Commission: Regions for economic change (08/11/2006).
15. Stross, R.E., *The Wizard of Menlo Park: How Thomas Alva Edison Invented the Modern World*, Crown Publishing (2007).
16. Binns, T.B., *Alfred Nobel: Inventive Thinker*, Franklin Watts (2004).
17. ERIK Thematic Working Group (TWG) 1: Case study OPTOMED, Innovative Technologies in Ophthalmology, (2007).
18. ERIK Thematic Working Group (TWG) 1: Case study SIDEUM, Clusters and Innovation in Southern Småland, (2007).
19. GREEN PAPER: The European Research Area: New Perspectives, Commission SEC(2007) 412.

20. Mutual Learning Platform – Regional Benchmarking Report: Blueprint for Regional Innovation Benchmarking.
21. ERIK Thematic Working Group (TWG) 2: Final TWG Report with Set of Indications and Review of the Methodology, Activities and Results (2007).
22. ERIK Thematic Working Group (TWG) 2: Study visit in Évora (Alentejo, Portugal), (2007).
23. ERIK Thematic Working Group (TWG) 3: Clusters and Business Networks - General Description Document.
24. ERIK European Regions Knowledge based Innovation Network Newsletter #9, p. 12 (3/2007)
25. ERIK European Regions Knowledge based Innovation Network Newsletter #1, p. 8 (9/2003).
26. ERIK European Regions Knowledge based Innovation Network Newsletter #2, p. 7 (1/2004).
27. ERIK European Regions Knowledge based Innovation Network Newsletter #3, p.11 (4/2004).
28. ERIK European Regions Knowledge-based Innovation Network Newsletter #4, p.15 (11/2004).
29. ERIK European Regions Knowledge based Innovation Network Newsletter #5-6, p. 15 (9/2005).
30. ERIK European Regions Knowledge based Innovation Network Newsletter #7, p. 11 (6/2006).
31. ERIK European Regions Knowledge based Innovation Network Newsletter #8, p. 6 (10/2006).
32. Imperial Innovations, London, UK (<http://www.imperialinnovations.co.uk>).
33. Pennsylvania Infrastructure Technology Alliance (PITA), USA (<http://www.ices.cmu.edu/PITA>).
34. The Cambridge-MIT Institute, UK-USA (<http://www.cambridge-mit.org>).
35. International Centre for Process Systems Engineering (iCPSE) (<http://www.cpse.gatech.edu>).
36. Centre for Process Systems Engineering (CPSE), Imperial College (<http://www.ps.ic.ac.uk>).
37. Centre for Advanced Process Decision-Making (CAPD), USA(<http://capd.cheme.cmu.edu>).
38. Position of the ERIK Network concerning the reform of the EU regional cohesion policy (4/6/2003).
39. Process Systems Enterprise (PSE) Corporate Website (<http://www.psenderprise.com>).
40. Parametric Optimisation Solutions (ParOS) Corporate Website (<http://www.parostech.com>).
41. The Centre for Research and Technology Hellas (CERTH), Greece (<http://www.certh.gr>).

3

Thematic Working Group: Industry Science Relations

3.1 Introduction and Policy Recommendations

Silvano Bertini - Economic Development Policies Service, Ministry of Industry, Emilia-Romagna Regional Government & Lucio Poma - Faculty of Economy, Ferrara University

University towards Industry

In recent years a wide debate among academics and policy makers has been taking place all over Europe on the new role that universities can play in the development and strengthening of industry at national level. The debate has grown up in the wake of events in the USA where, for a long time, universities have been undergoing structural repositioning in order to better meet the technological needs of the market. More and more interest is developing around the so-called university 'third mission'. This thesis sustains that the two traditional missions already carried out by universities – teaching and research – should indeed be integrated with a third one: an academic capacity to provide direct contributions to industry (Etzkowitz and Leydesdorff, 2000).

The issue of the exact point at which to set the border between public research and market needs, and of the importance of *commercial knowledge*, divides the academic community. On one side there are those that refuse dialogue with the business world and, on the other, those who see the use of private external funds for research activities as extremely important (Shinn and Lamy, 2006). Central to the debate is the issue of the external conditioning of university research which, according to open science, should be left free from any binding constraints and whose results should be considered public heritage.

Taken in its most extreme interpretation, this perspective does not coincide with the opening up of university towards industry. In addition to owning the innovation they have financed through patents for related results, companies must also orient some research aspects towards areas applicable to their own market. The closed attitude resulting from an extreme interpretation of open science has caused delay in Europe in terms of technology and knowledge transfer between university and industry. Such a situation is made worse by the following four factors: i) a deep-rooted inertia and indeed laziness of academic world in exploring financing possibilities with the business community; ii) a lack of information necessary to set up sound relations with companies; iii) the lack of internal propelling mechanisms; iv)

where relations between single researchers and companies do exist, they are mainly informal, occasional and uncoordinated with other research activities in the same centre.

The failure to match university research and companies' R&D needs has been ratified, starting with the Green Paper on Innovation (European Commission, 1995) which coined the term "European Paradox": Europe's research excellence coexists alongside an industrial tissue which is limited in innovation and competitiveness³. In order to address this paradox, the European Union has launched programmes, actions and measures aimed at drawing together university research and industry. This kind of action becomes essential in the face of global competition based on the knowledge economy, aggravated by policies which reduce public funds devoted to research.

While Europe suffers from an ancient disease, the United States, which traditionally boasted a strong connection between academic and economic worlds, have been forced to intensify actions to promote technology and knowledge transfer from university to companies. Global competition based on the knowledge economy requires, from large companies, a greater and more burdensome investment in research compared to the past. R&D escapes from the narrow boundaries of productive sectors or sub-sectors. In order to develop any kind of product, it now becomes necessary to draw on knowledge coming from dimensions that were once distant and clearly separated from each other. This knowledge interpolation makes it impossible, even for very big companies, to carry out internally all the research necessary to develop and implement highly innovative products, as ceaselessly requested by the global market.



Figure 3.1: Innovative Automotives - Car Engine

The Bayh-Dole Act⁴ represented a turning point in that its impact (Mowery and Ziedonis, 2002) has removed and redefined the boundaries between universities, industry and government (Leydesdorff and Meyer, 2006). A sound body of literature, gravitating around the so-called *Triple Helix* model (cf., Etzkowitz and Leydesdorff, 1997) analyses the implications of the evolutionary interaction of the three innovation actors: university, industry and government, from which the triple helix name results. By

co-evolving, the three subjects develop joint networks modifying the cognitive environment in which innovation and research develop (Gibbons et al. 1994).

Such a model recognises complexities arising from interaction between the three dimensions, whose objectives sometimes compete. The Triple Helix model differentiates from the celebrated *national systems of innovation* (Lundvall 1988, 1992; Nelson 1993), as the latter

³ Although some authors have recently claimed that the presumed European scientific leadership is more a myth than a reality (Dosi et al. 2006), it is true that the distance between ingenious European scientific research and the ability to adapt it to economic and industrial use remains very wide.

⁴ It deals with the Patent and Trademark Amendments Act, better known as Bayh-Dole Act voted in 1980, named after the signing senators. Universities and public centres can patent research results financed by federal funds. This law has conveyed a strong impulse for technology and knowledge transfer from university laboratories to industry. Moreover, through the patenting system, the law protects the large knowledge patrimony developed in the United States from international technological plagiarising acts.

puts the company at the centre of the innovation process, while in the former the university is the main actor.

According to Etzkowitz and Leydesdorff (2000), three different, historically conditioned patterns exist in terms of relations between the three innovation actors. In the first, named by the authors Triple Helix I, the State encompasses and manages relations between universities and companies. The second, Triple Helix II, is based on the separation of the three institutional actors by clear and sometimes insurmountable boundaries. In the third pattern, Triple Helix III, which we see growing ever stronger, the boundaries between the different actors are fading with subsequent overlapping and interaction among the institutional areas needed to generate new knowledge.

Placing universities in a market context and paying greater attention to their relations with industry requires a careful consideration of the philosophy at the base of the university mission: the boundaries between academic research and business world, once clear and distinct, are now fading away. Such a phenomenon often involves governmental institutions with the task of coordinating and propelling industry/science relations and moving or removing the boundaries between the private and public sectors.

The triad composed by universities, companies and governmental bodies – previously having precise borders – now becomes an interactive body whose *governance* is decisive both for results and for the direction of research and its application in the industrial field.

The *milieu innovateur*, the environment where innovation originates and develops, is neither strictly defined⁵ nor totally spontaneous⁶. Innovation is part of a system of relations, sometimes embedded in the territory, whose reach varies from regional level to the Community dimension.

The strategic role of regional policies

It is from these last considerations that we can observe the novelty of the role of regions in government and in the promotion of innovation through the transfer and circulation of knowledge. One new and crucial aspect is that the regional level should not be considered as an innovation system on a reduced scale in comparison to *national system of innovation*, rather as something deeply different⁷. Indeed, there is a close relationship between the territorial level of intervention and the effectiveness of innovation and technology transfer policies. Even when considering the possibility to replicate a good practice, through a *top down* or a *bottom up* process, we can identify optimal intervention areas with considerable influence on innovative trajectories and on results.

The regional environment is the optimal place to build networks of relations among the key actors of the innovation cycle (universities, research centres, competence centres, and companies) and interconnections between scientific and technological competences on one side, and territorial productive systems on the other. By supporting the development of these relations in a governable territorial dimension through project implementation, the Region can generate a continuing multiplier effect in knowledge production and innovative activity. Furthermore, SMEs are involved in the process. Regions are therefore protagonists in achieving Lisbon strategy objectives.

The regional dimension has not yet been adequately addressed in academic literature dealing with university/company interaction. As we can see below, from a close examination of the good practices and research programmes analysed within the ERIK Network it clearly emerges that some of these innovative projects draw on specific territorial characteristics around which academic and private research has polarised.

⁵ For example, scientific research programmes within universities.

⁶ As happens in the industrial environment case within an industrial district

⁷ For further information please see Poma (2003) and Bardi and Bertini (2005).

The Emilia-Romagna Region has role of coordinator of the ERIK Industry/Science Relations Working Group as, in the past few years, regional innovation policies have concentrated on this objective, crucial for competitiveness in the whole European Union. From this experience, we have directly verified the potential that emerges from the creation of strong relations between companies and research environments. The Regional Programme of Innovative Actions anticipated, in Emilia-Romagna, a wider programme for Industrial Research, Innovation and Technology Transfer, the PRRIITT Programme. This experience addresses:

- the promotion of a technology transfer centred organisation of public research of industrial interest through the creation of laboratories involving or supported by companies which are dedicated to topics of interest to the regional productive systems and in particular to the development of innovative technologies and their transfer to industry;
- the promotion of the entrepreneurial and professional exploitation of research results;
- the promotion, through R&D projects, of collaboration contracts activated by regional companies with universities and research centres, of the use of the laboratories and of safeguarding intellectual propriety;
- increased human resources involved in research activities within companies, and those involved in industrial research and technology (third function) within universities;
- the construction of a governance and service system for the promotion and development of this network.

We believe that this recent experience, which can be added to other consolidated experiences developed in different competitive, European regions, can be of great interest to future regional strategies promoted by the European Union for cohesion and increased competitiveness in line with the Lisbon strategy. At the same time, we have undertaken with great pleasure and interest the activity relating to the collection of experiences from ERIK partner regions on the fundamental theme of Industry/Science Relations.

A new scenario for innovation policies

Being forced to concede supremacy of low cost manufactured products, countries with a well developed economy must focus production on highly innovative and high value products. The innovative challenge concerns 3 areas: 1) high tech sectors, ii) emerging sectors, such as healthcare, environment protection and multimedia productions, iii) mature sectors which can be re-launched by applying information technology or using new materials. The actors involved in these challenges are: i) big groups or large companies located in the territory; ii) universities and research centres; iii) territorial productive specialisations.

By matching competitive solutions with innovation actors the following matrix can be set up:

Relapsing fields	High tech sectors	Emerging sectors	Mature sectors
	Key actors		
Large companies	Less present in EU than in USA and JAPAN		
Universities and Research Centres		Poor links with applied research	
Territorial systems and clusters			Incremental innovation Resistance to innovation

Table 3.1: Matrix on innovation dynamics and actors

The matrix presupposes a strong correlation between the sectors involved and the main innovative agents in order to draw an indirect line of correspondences.

High-tech sectors such as microelectronics, computer processors and mobile telephones are dominated by large, multinational groups that are little present in the European context. The European university structure boasts an excellent research quality and quantity in emerging fields such as health, people care and environmental technologies. However, in these fields, the connection with the productive tissue - both for large and small-medium companies - remains weak and dispels the fertile knowledge potential for wide and diversified productive applications. Finally, when matching local productive aggregations with mature sectors rooted in the territory, we can see that mature sectors are ploughed by innovative potential and evolving within territorial clusters which make knowledge creation central to production. However, small companies in particular can show resistance to change and to radical innovation which can potentially re-launch the mature sectors in which they operate.

Industrial policy addressing innovation has traditionally acted to stimulate and strengthen correspondence along the indirect line of the matrix. In the first case, work concentrated on incentives for R&D within large groups operating in high-tech sectors. This was promoted through co-financing or tax relief, through favouring aggregations⁸, through leverage of territorial marketing, through territorial operations to encourage settlement *in loco* of these large, high-tech groups and through faith in a potential “waterfall” effect involving small, local companies’ sub-providers. In the second box match, an effort has been made to recuperate existing research potential by favouring technology transfer to companies operating in application sectors of basic research and by promoting spin-offs processes. As for the last box, in the past direct and indirect incentives were available, primarily to single companies, for the purchase of innovative machineries or by offering “real services” calibrated according to productive specialisations and aimed at supporting small companies in staff training and innovation mainly of an incremental nature. These policies supported innovation in a competitive context with low levels of dynamism and openness, with low reaction timing and in which incremental innovation could be a winning strategy.

Between the old millennium and this one the speed of market opening has accelerated in a staggering manner. Innovation has a radical, systematic, continuous and increasingly complex nature; knowledge has expanded and has overtaken traditional boundaries and dimensions. Research and development are not confined to a sector level. Rather, they draw on knowledge from very distant knowledge fields.

Policies built on the combinations of Table 3.1 appear dated in the face of knowledge competition based, and spontaneous mechanisms are incapable of implementing the complex connections necessary for knowledge production. Thus, there is a clear need for interaction between the combinations illustrated in the table, even if this means that public and private innovation agents should re-define and re-organise their roles to face change through innovative knowledge.

Knowledge governance is the ability to provide an adequate level of coordination to establish a difficult equilibrium between the new roles of the different actors involved, who can sometimes find themselves in conflict.

Table 3.2 shows this new situation. The new strategic function of innovation policies is not limited to stimulating links between the different matches⁹, rather to operating a recombination

⁸ For example, at European level, the aerospace sector was freed by the Antitrust control as it was considered a strategic sector for the creation of so-called “European champions” operating in a global market. In Italy, Article 4 of Law n. 287 of 10 October 1990, states that the Authority can authorise forbidden agreements according to article 2 also «taking into consideration the need to ensure for companies the necessary competitiveness on the international market and linked in particular with the increase of production or with the qualitative improvement of the production itself or of the distribution, that is with the technical or technological progress».

⁹ For example technology transfer or policies with incentives for purchasing technological machineries.

of knowledge which in turn creates further knowledge. By coordinating innovation agents, innovation intermediates, in addition to replicating knowledge produced by single projects, can also recombine it for the generation of new knowledge.

New innovation policies should therefore act on two levels: transform a part of knowledge into collective knowledge and create new knowledge through the re-combination of actors, their roles and their actions. This means escaping from the classical diagonal in Table 3.1 and moving towards the direction of the arrows in Table 3.2 in order to promote, in more complex terms, an increased dynamism of regional economies based on the diffusion of knowledge.

Relapsing Fields	High-tech sectors	Emerging sectors	Mature sectors
Key actors			
Big groups	Less present in UE than in USA and JAPAN	→	←
Universities and Research Centres	↓	Poor link with applied research	→
Territorial systems and Clusters	↑	↓	Incremental innovation Resistance to innovation

Table 3.2: Knowledge governance and the role of public actors

Each single research project produces knowledge. A part of such knowledge, defined here as *specific knowledge*, is embedded in the project's particular characteristics. It is a *distinctive knowledge*, highly specialised that only has a value within the single project. Another part of knowledge, defined as *collective knowledge*, can be replicated in other projects, for example discoveries that are patented or *good practices*. Such knowledge can form a collective patrimony for a network of actors. Specific knowledge can be coded or tacit while collective knowledge must be coded in order to be transferred and spread. The structuring of relationships among different innovation agents in a formal project implies a partial codification of research relations and paths. The codification is a necessary condition but is not sufficient to convey parts of specific knowledge into collective knowledge. The codified collective knowledge should indeed be made available and should be shared with more actors through networking activities.

The ERIK network aims to develop this collective knowledge at regional policy level. The task of the regions, on the basis of the scheme described in Table 3.2, becomes crucial and complex and should aim to network the key actors of the innovative process, mainly universities and research centres on one side, and companies and clusters on the other.

Innovative Actions: launch of a European ISR experience among regions

The theme of the Regional Programme of Innovative Actions (RPIA) in the framework of which the ERIK Network was created aimed to strengthen the regional knowledge-based economy. The action lines focused on themes linked to technology transfer, to the improvement of relations and to coordination among actors developing technology and knowledge. The Good Practices have achieved good results by increasing the knowledge patrimony of the topics developed. They have produced knowledge: partly constrained to the project carried out (*specific knowledge*), partly to be shared and replicated in other occasions (*collective knowledge*). The RPIA has induced a codification of relations among the actors involved,

converting tacit knowledge into codified but still not collective. The added value of ERIK has been to systemise the knowledge codified by the RPIA projects, thus generating collective knowledge. It has done this both by replicating individually generated knowledge, as in the case of good practices, and by recombining it among the different innovation actors, for example by adjusting the good practices to specific cases or by identifying obstacles or incentives to the aggregation or to the coordination of the different agents.

A lesson that can be drawn by the analysis of the 17 regional good practices on Industry/Science Relations collected by the ERIK Network is that the mobile boundaries between the 3 dimensions complicates multiple balances. Therefore, adopted coordination models influence the outcome of results and research directions. The coordination difficulties originate from different and sometimes conflictual objectives or from a behavioural inertia linked to past positions and habits. The good practices offer solutions to remove such inertia and intensify levels of interrelation between universities, companies and governmental bodies, highlighting the need for new competences.

The following table summarises the main topics of knowledge governance in the framework of which universities, companies and government can find possible synergies, as they emerge from the analysis of the good practices.

	Universities	Companies	Government
Research programmes	Conditioned by companies Learning and encouragement	Adequate to the market needs	Appropriate to the economic and social development
Patents	Conflict with open science	Necessary to protect themselves	Useful as knowledge measure
Spin-offs	The university becomes enterprise	Possible complementarities	New entrepreneurship
Scientific productivity	Can be stimulated by the collaboration with companies	Higher interest to applied results rather than to publications	As a mean to widespread knowledge
Information	Low as for the companies needs	Low as for academic research abilities	Low on both dimensions
Coordination costs	Sometimes very high compared to the resources	Bearable	Usually supported as "collective wellness"
Managerial ability	Low	High	It depends on
Implementation timing	Usually long	Lower compared to universities	Intermediate between universities and companies
Geographical area	Very wide	Wide as for big companies. Local if SMEs	It could exceed a given government level
Companies' competitiveness	Sometimes ignored	Main goal	Among the main objectives
Knowledge creation	It is in their mission	They can contribute to academic research	It creates knowledge by recombining
Territorial elements	Higher emphasis to the local context	Territorial specialisations	Local specialisations in international contexts

Table 3.3: Coordination among universities, companies and governmental bodies

Research Programmes. The fact that interaction with large companies can influence or address academic research is often addressed in literature on the Triple Helix. Although it is important to limit excessive private sector influence on academic research¹⁰, it is also true that

¹⁰ Sometimes, it is the university itself that conditions the companies' path by proposing them researches of high interest to the university but with low economic relapse for the companies. The displacement in favour either of universities or companies depends on the contractual power of the counterparts and on the level of informative asymmetry.

market influence on research can reveal a positive aspect for knowledge sharing. To this end, in the ERIK network framework the creation of partnerships - particularly with the private sector - has been the most highly emphasised aspect of successful elements in the good practices. The good practices *3TNET* (Tuscany), *OLIOTEC* (Sicily), *OPTOMED* (Tuscany) and *TITANE* (Liguria), have developed specific technologies to be transferred to their industrial tissues: the transfer of knowledge to industry relating to the creation of new products for the textile sector and the implementation of new low environmental impact technologies; new biotechnologies for oil production; innovative technologies and methodologies used in ophthalmic medicine transferred to companies operating in the optoelectronic sector; the use of titanium within the ship building sector.

Patents. The field of intellectual propriety rights is characterised by controversy between the request from companies to take possession of innovation developed with universities and the need claimed by open science for "widespread" public knowledge. The European Union, encouraged by the Bahy-Dole Act, is oriented towards a higher valorisation, both subjective and economic, of university knowledge. The long latency of European academic structures in the economic valorisation of their own research capacity¹¹ has caused a chronic scarcity of centres in charge of facilitating the recognition of academic research propriety rights. Therefore, particularly important are services and infrastructures aimed at promoting the use of intellectual propriety developed by *OTTAGONO* (Sicily), *CRIA* (Algarve), *SBO* (Flanders), *Postdoctoral Fellowships* (Flanders) and *OPTOMED*, in order to address a lack that is pointed out by the good practices *INNOVATION SPACE* (Alentejo) and *SIDEUM* (Småland & islands), underlying how little attention is devoted to the development of aspects related to intellectual propriety.

Information, coordination costs and managerial ability. The use of the Triple Helix model implies a proactive role of universities which requires an, often totally absent, managerial and administrative ability. Moreover, it makes a high volume of information necessary, information which is currently often scarce. Companies are not aware of research potentials available within universities that, in turn, ignore companies' needs, while governmental bodies register an informative lack in both directions. The organisation and management of complex interrelations imply elevated coordination costs¹² and, sometimes, the time and resources to be dedicated to projects drafting, monitoring and reporting is incredibly high if compared to the time dedicated to the research itself. If an adequate scale economy is not found, the resources involved in administrative aspects of small projects can outrun those involved in operative research.

The ERIK Network provides valuable examples of platform creation for knowledge exchange. *SIDEUM* and *CRIA* are platforms aimed at facilitating and promoting relations between research units and companies, at propelling start-up and spin-off development and at contributing to the development of innovative environments. *Fachdialog* (Lower Austria) is a platform for seminars aimed at intensifying dialogue among SMEs, at creating a network for knowledge exchange and at developing the transfer of research results into finished products. The *Virtual Technological Park* (Emilia-Romagna) is a virtual technological park on health genetics and biotechnologies which provides different "typical services" to companies, health organisations and research centres. *VIS-TD* and *TETRA* (Flanders) are valid project examples addressed to SMEs. The first aimed to facilitate SMEs innovative process through the selection of projects that should transfer to SMEs, in an understandable way, the results of public research. The second is a fund created to stimulate technology transfer from universities to large groups of SMEs. Projects are proposed by complex groups of SMEs, universities and possibly other actors organised in committees.

¹¹ For example, only Research and Technology Transfer in Health (Emilia-Romagna) and Postdoctoral Fellowships (Flanders) have highlighted the creation of propriety rights.

¹² In some cases the costs of internal transactions are higher than the market transaction costs wanted to be decreased.

Company competitiveness. In the long term investing in R&D increases the competitiveness of a country. The applicative results of a research programme can either have general or long term worth or they can be specifically addressed to the enhancement of short term competitiveness of a group of companies or of a productive sector. *Research and Technology Transfer in Health* (Emilia-Romagna) also pursues the objective of enhancing competitiveness and of propelling SME development (more than 70% of companies involved will continue the project). *OTTAGONO* networks the system of agriculture companies, enterprises, research centres and service companies to increase the efficiency of the value chain with particular attention to the distribution network. In *3TNET* the use of new technologies in the final phase of textile product processing saves up to 70% of the time necessary, decreases costs by 30% and saves energy by at least 20%. In *OLIOTEC* biotechnologies are applied to the productive process with the aim of obtaining higher added value products and software development to allow complete product traceability.

Territorial aspect. Some cases show that research has been developed thanks to the productive specificities available in the territory, normally clusters or industrial districts. *OPTOMED* makes use of competences developed in previous collaborations with the optoelectronics cluster. *TITANE* has benefited from the presence of the naval district and *3TNET* from the textile district. *OLIOTEC* has made use of the knowledge developed in the local oil processing cluster, while *Virtual Technological Park* is strictly linked to the presence of the bio-medical district.

Finally, after describing the key elements of the single good practices presented within ERIK Industry/Science Relations working group, we would like to suggest some brief aggregated considerations on the good practices as a whole.

We have classified¹³ by priority order the main actors involved in the elaboration of the 17 good practices. The three actors mainly involved are the ones contemplated by the Triple Helix model. The Regional Authority is the main actor in project elaboration: it is involved in 14 good practices and almost always in the first place. University follows, present in 15 projects but often in the second or third position by order of importance. Industry is involved in 13 projects; however it obtains very low positions by order of relevance and is often in the last position. Regional development agencies follow, involved in a minor number of projects (9) but in relevant positions, and finally we find external consultants, involved in only 8 projects.

Taking into consideration the same actors for contribution to project implementation, the positions and degree of relevance change considerably. University moves to the first place in number of presences (15 projects) and it is almost always in first and second place for relevance. Industry follows in number of presences (14 projects) but not by relevance as it almost always appears in the last places. Regional authorities and regional agencies show similar presences (10 and 9 respectively); however regional agencies are more often in first place. On the contrary, external consultants have a marginal role, being present in only 6 practices and not relevant positions.

By confronting the 2 situations some brief considerations emerge. Firstly, actors involved in the project elaboration are often not those implementing it. This means that a specialisation is undertaken along with a subsequent division of work between those producing project knowledge and those producing knowledge applied to research.

Secondly, industry is the weak element. In planning and in implementation it participates to the same level as university and regional authorities, but always with a lesser role.

Industry is the main actor in project implementation only in 2 good practices *Research and Technology Transfer in Health* (Emilia-Romagna) and *TITANE* (Liguria) and is in second place in one project, *3TNET* (Tuscany). It is not a coincidence that 3 out of 4 of these good practices are the ones in which the territorial element are highlighted. There is, therefore, a sound

¹³ By assigning a weighted score in respect to the position hold and by ordering the actors by the relevance shown in the project fiches (1 to 5 scale).

correlation in project implementation between the value of the territorial element and the relevance of companies. Research drawing on territorial specialisations can lead to higher company co-participation.

Thirdly, external consultancy is much more present in the planning phase than in implementation. This shows the low managerial or planning level of the Triple Helix actors in some projects. Consultancy has been used by those regions which are institutionally less structured or in projects boasting accentuated specificities. We can only assume¹⁴, with some prudence that in the first case external consultancy contributed to general drafting, while in case of specific projects, external consultancy was determined for its distinctive knowledge niche.

Finally, regional agencies, where present, perform a more relevant role in project implementation rather than in elaboration, usually the responsibility of regional authorities.

The emerging framework highlights the complexity of Triple Helix model operations. There are many possible combinations, on the basis of single situations where a perfect balance among different actors can be in place or, on the contrary, where there can be a prevalence of universities, companies or governmental bodies. Such combinations determine research paths, their results and their impact on the national economy and general wellbeing. Some combinations can be regressive and *de facto* can wrongly address economic resources and research. On the contrary, others are progressive and can create new knowledge by recombining the knowledge of participating actors.

Final considerations

The analysis of these good practices collected within the ERIK Network highlights the importance of the RPIA, promoted by the European Commission together with the regions. Despite being an experimental initiative with limited resources, it has represented an important learning experience for European regions. This experience has led to the development of further regional programmes, innovative in respect to the history of the majority of the regions themselves. Above all, this experience will bring important results to the newly started Structural Funds 2007-2013 period, entrusting regions with the task of launching their own strategies to orient their regional systems towards a knowledge-based and innovation dimension.

The reflections which emerge from these Innovative Actions experiences, brought together by the ERIK Network, including those relating to the traditionally complex theme of Industry/Science Relations (made even more complex in European industry dominated by SMEs), can lead us to some affirmations and policy recommendations.

Developing research fields connected to territorial talents



The issue of market influence on research programmes has aroused an academic debate on opportunities for strict interaction between universities and industry. The analysis of the ISR practices presented within ERIK has made it clear that such influence is undoubtedly positive. In particular, the advantages deriving from this interaction are higher when research is developed in the proximity of a productive area around which research groups have crystallised.

The first lesson learnt is therefore to develop research activities pertaining as much as possible to territorial talents. *OPTOMED* makes use of competences developed in previous collaborations with the optoelectronics cluster. *TITANE* has benefited from the presence of the naval district and *3TNET* from the textile district. *OLIOTEC* has made use of knowledge developed in the local oil processing cluster, while *Virtual Technological Park* is linked to the presence of the bio-medical district. However, as demonstrated by the relevant practices, territorial specialisation should represent the starting point of the research programme which should then aspire to an international dimension.

¹⁴ In the Good Practice template the reasons were not indicated, only the level of importance in the project.

Although the good practices *3TNET*, *OLIOTEC*, *OPTOMED* and *TITANE* have implemented specific technologies strictly connected to their referring industrial tissue, at the same time they have developed technological research of international relevance which can be applied to contexts different from the local one.

ERIK Network
Policy Recommendation

Increasing the involvement of companies in the project planning and implementation phase

In the ERIK ISR good practices the creation of a partnership, particularly with the private sector, is the most emphasised success factor. However, the value scale shows that, despite being present in planning and implementation phases with the same frequency as universities and regional authorities, industry performs a minor role.

In the implementation phase Industry is the main actor only in 2 practices (*Research and Technology Transfer in Health* and *TITANE*) and is second only in 1 practice, *3TNET*. There is a sound correlation in project implementation between the value of the territorial element and the relevance of companies. Research drawing on territorial specialisations is able to reach a higher co-participation of companies.

In order to propel company involvement, *TETRA* is a fund created to stimulate technology transfer from universities to large groups of SMEs, where projects should be proposed by complex groups of SMEs, universities and possibly other actors organised in committees.

Enhancing and increasing structures to facilitate the recognition of university research IPRs

ERIK Network
Policy Recommendation

Companies request knowledge jointly developed with universities to be appropriable. European universities are historically devoted to open science and are unprepared for a systematic and efficient economic valorisation of their own research capacity and are not used to offering adequate guarantees in term of knowledge exploitation to the companies with which they collaborate.

From this consideration, the need to enhance and increase structures in charge of facilitating the recognition of university research Intellectual Propriety Rights (IPRs) emerges. Therefore, particularly important are services and infrastructures aimed at promoting the use of intellectual propriety developed by *OTTAGONO*, *CRIA*, *SBO*, *Postdoctoral Fellowships* and *OPTOMED*, in order to address a lack pointed out by the good practices *INNOVATION SPACE* and *SIDEUM*, underlying how little attention is devoted to the development of intellectual propriety aspects.

ERIK Network
Policy Recommendation

Enhancing the quantity and quality of information

Any policies based on interactive relations among universities, government and industry require a huge amount of information which in reality is often lacking. The ERIK Network provides examples of valid platforms for promoting the spread of knowledge.

SIDEUM and *CRIA* are platforms to facilitate and promote relations between research units and companies, propel start-up and spin-off development and contribute to the development of innovative environments. *Fachdialog* is a seminar platform for intensified dialogue among SMEs, and which creates a network for knowledge exchange and transfer of research results into finished products. *Virtual Technological Park* is a virtual technological park on health, genetics and biotechnologies aimed at providing different "typical services" for companies, health organisations and research centres. Finally, *VIS-TD* facilitates SMEs innovative process through the selection of projects that should transfer the results of public research to SMEs in an understandable way.

Increasing the managerial capacity of universities and regional bodies

The knowledge governance required for coordination among three such relevant institutional areas (universities, companies, regional bodies and agencies) can only be imposed by a certain managerial capacity which companies have always had, whereas universities and regional institutions have not. In the practices analysed the role of external consultancy is much more present in the planning phase than in implementation. This shows the low managerial or planning level of the Triple Helix actors in some projects. Consultancy has been used by those regions which are institutionally less structured or in projects boasting accentuated specificities.

In recent years, there has been a marked effort to enhance the managerial and management capacity of public actors and, among the practices analysed, an improvement of managerial capacities of research centres and regional agencies can certainly be highlighted.

Boosting company competitiveness

Nowadays, it is fundamental for university research to enhance productive competitiveness. To the end, *Research and Technology Transfer in Health* aims at boosting competitiveness and propelling SME development. *OTTAGONO* networks the system of agriculture companies, enterprises, research centres and service companies to increase the efficiency of the value chain, with particular attention to the distribution network.

In *3TNET* the use of new technologies in the final phase of textile product processing saves up to 70% of the time necessary, decreases costs by 30% and saves energy by at least 20%. In *OLIOTEC* biotechnologies are applied to the productive process with the aim of obtaining higher added value products and software development to allow complete product traceability.

Defining task division between project planning and implementation in a logic of integration and partnership between two levels

The analysis of the good practices highlights the fact that the actors in charge of project elaboration are often different from the ones implementing it. A specialisation and division of tasks in the knowledge production area is indeed taking place, between those producing project planning knowledge and those producing knowledge applied to research. Notwithstanding the evident advantages of such specialisation, the benefit of a constant dialogue between those planning the project and those proactively implementing should not be forgotten.

Betting on human resources and on the enlargement of social capital

In the triple interaction, it is not only companies that increase their potential but also governmental bodies and universities. In the co-planning and co-implementation of projects, besides achieving the expected results, a sound institutional learning activity takes place where communication methodologies and languages improve alongside the knowledge and competencies of the human resources operating within these institutions. Institution networks entwine with networks of other actors so making each other stronger. 76% of the good practices have indeed described a bottom-up approach to testify an evident effort towards the investment on local human resources.

Literature References

1. Bardi A, Bertini S. (2005), (Eds.), *Dinamiche territoriali e nuova industria*, Maggioli, Rimini 2005.

2. Dosi G., Llerena P. and Sylos Labini M. (2006), *The relationship between science, technologies and their industrial exploitation: An illustration through the myths and realities of the so-called "European Paradox"*, «Research Policy», 35, 2006, pages 1.450-1.464.
3. Etzkowitz H., Leydesdorff L. (1997), (Eds.) *Universities and the Global Knowledge Economy: A Triple Helix of University-Industry-Government Relations*, Cassel Academic, London 1997.
4. Etzkowitz H., Leydesdorff L. (2000), *The dynamics of innovation: from National System and "Mode 2" a Triple Helix of university-industry-government relations*, «Research Policy» 29, 2000, pages 109-123.
5. European Commission, (1995), *Green Paper on Innovation*, EC, Brussels, 1995.
6. Howells J. (2006), *Intermediation and the role of intermediaries in innovation*, «Research Policy» 35, 2006, pages 715-728.
7. Gibbons M., Limoges C., Nowotny H., Schwartzman S., (1994), *The New Production of Knowledge: The Dynamic of Science and Research in Contemporary Societies*, Sage, London, 1994.
8. Leydesdorff L., (2000), *The Triple Helix: an evolutionary model of innovations*, «Research Policy» 29, 2000, pages 243-255.
9. Leydesdorff L., Meyer M. (2006), *Triple Helix indicators of knowledge-based innovation system. Introduction to the special issue*, «Research Policy» 35, (2006), pages 1.441-1.449.
10. Lundvall B.A. (1988), *Innovation as an interactive process: from user-producer interaction to the national system of innovation*, In Dosi G., Freeman C., Nelson R., Silverberg G., Soete L., (1988), *Technical Change and Economic Theory*, Pinter, London, 1988.
11. Lundvall B.A. (1992), *National system of innovation*, Pinter, London, 1992.
12. Nelson R.R. (1993) (Ed.), *National System of Innovation: A Comparative Study*, Oxford University Press, New York 1993.
13. Mowery D.C., Ziedonis A.A. (2002), *Academic patent quality and quantity before and after the Bayh-dole Act in the United States*, «Research Policy», 31, 2002, pp. 399-418.
14. Poma L. (2003) *Oltre il distretto. Imprese e istituzioni nella nuova competizione territoriale*, Franco Angeli, Bologna 2003.
15. Shinn T. and Lamy E. (2006), *Paths of commercial knowledge: Forms and consequences of university-enterprise synergy in scientist-sponsored firms*, «Research Policy», 35, 2006, pages 1.465-1.476.

3.2 Case Study: OPTOMED - Innovative Technologies in Ophthalmology - Tuscany

Strategic Regional Context

Tuscany is located in the centre of the Italian peninsula. The region covers a total surface area of 22,992 km², 7.6% of the national territory and is the 5th largest Italian region. The regional capital is the city of Florence. Tuscany is divided into 10 administrative provinces and further into 287 local councils, thus dividing competences between three administration levels: regional, provincial and local council. Tuscany has a population of around 3,500,000 inhabitants with population density of 153 in. /km², a figure lower than the national average. The birth rate is also low with a current demographic growth rate standing at -0.3 / 1000.

Over the last 30 to 40 years the region of Tuscany has continued a process of economic, social and demographic changes through intensive urbanisation of the territory, and the concentration of the working population in industrial, tourism and commercial sectors. Logically this has led to a reduction in agricultural, which now covers around 14.6% of the regional economic structure. Tuscany can now lay claim to a dynamic, diversified economy based around a market which covers 7% of the Italian population and over 350,000 working companies (around 1 for every 10 inhabitants). The Gross Domestic Product (GDP) in 2004 stood at 83,285 million euro, with a growth rate of 1.1%. Export propensity (export/ added value) stands at around 28%.

The Tuscan economic system is characterised by the size and geographical / sector based distribution of manufacturing plants. Industry in Tuscany specialises in traditional sectors, such as textiles, leather, marble, furniture and crafts. Tuscany is divided into 12 industrial districts

with the following productive specialisations: Valdinievole - Leather and Shoes; Castelfiorentino - Leather and Shoes; Empoli – Clothing; Prato - Textile and Clothing; Santa Croce Sull'arno - Leather And Shoes; Poggibonsi- Furniture; Sinalunga – Furniture; Arezzo – Jewellery; Capannori – Paper; Carrara – Marble; Valdarno Superiore - Leather and Shoes; Casentino - Val Tiberina - Textile and Clothing. Two rural districts, those of Siena and Grosseto, are also of notable importance.

The Tuscan industrial system is not only composed of traditional manufacturing. High tech sectors, such as pharmaceuticals and biotechnology, robotics, ICT and optoelectronics, show relevant growth rates. The agro-food industry also shows important signs of development.

Regional Initiatives promoting innovation and Industry-Science Relations

In 2001 € 886,668 was invested in R&D, accounting for 1.07% of the regional GDP. It is estimated that in 2003 this percentage had risen slightly to 1.2%.

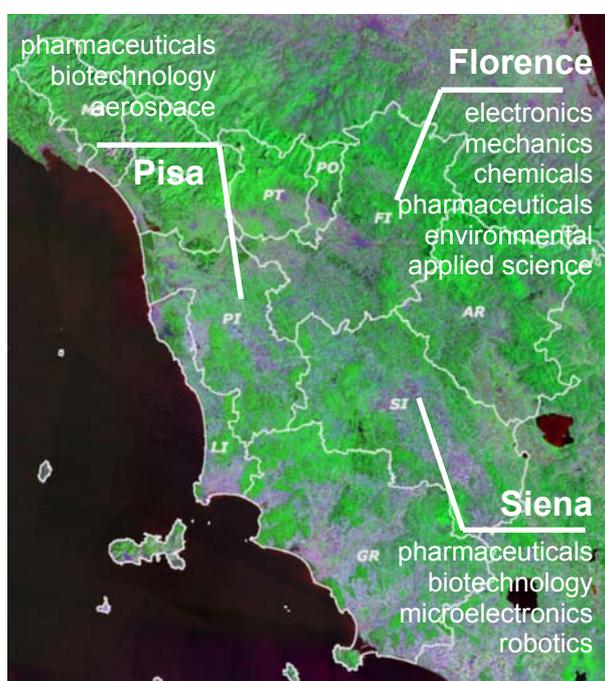


Figure 3.2: Location of Tuscan R&D centres

Tuscany can lay claim to a great number of agents and actors involved in innovation and research. These are diversified by type, by geographical location, by sector and by service provided. The five University campuses (Firenze, Pisa, Siena, Sant'Anna and the 'Normale') boast over 100,000 students a year in 37 faculties with over 11,000 staff employed in research. There are 240 public and private research centres, 54 trade associations and 74 organisations offering direct support to companies. Tuscany also hosts 5 European centres of excellence (CEO – Centre of Excellence in Optoelectronics, CERM – Magnetic Resonance Centre, LENS – European Laboratory for non-Linear Spectroscopy, Department of Molecular Biology and the Institute of Clinical Physiology).

The most outstanding feature of R&D investment in Tuscany is the high rate of public investment, standing at around 70% of the total compared to 30% private investment. The regional government has identified the reasons for this small scale private involvement mainly in the dimensional structures of the industrial system characterised by micro-enterprises.

Therefore, in recent years the regional government has committed itself to the implementation of a strategy based on technology transfer, on one side towards the creation of innovative networks and, on the other, the development of actions on private equity and innovative finance.

RITTS (Regional Innovation and Technology transfer Strategies) Tuscany

The Tuscan RITTS (Regional Innovation and Technology Transfer Strategies) project was launched in 1997 to develop regional intervention in support of innovative processes. Among other objectives, the RITTS project aimed at promoting greater private sector participation in

R&D initiatives and providing training to stimulate osmosis between research agents and traditional sector SMEs. The Action Plan identified 3 strategic targets, all relevant to ISR and to the context in which the OPTOMED project was developed: Innovation support to traditional sector SMEs; Creation of innovative clusters; Support to the creation and consolidation of high tech enterprises.

Actions related to ISR in these action lines include: the evaluation of business support systems for innovation in SMEs and R&D activities, projects supporting working groups on transverse technologies applicable to traditional sectors and demo projects for technology transfer, scientific-technological partnerships at international level, the creation of mixed laboratories (physical and virtual) in selected fields of excellence, a promotional campaign addressed to researchers identified as potential entrepreneurs and selection of those who require support in terms of training and financing, and the establishment of a commercial marketing structure.

To achieve successful results from this programme the Tuscan Regional Government engaged in collaborations with major national R&D actors (Ministry of Research, National Research Council, ENEA, Telecom, Enel) and with Tuscan businesses and research centres, including the Italian Space Agency. Results include the creation of a Meteorological and Climate Modelling Laboratory (LaMMA) which now constitutes a permanent structure, creation of three laboratories linking digital technologies to application areas, development of laser technology for restoring cultural artefacts and the resultant formation of a company known as 'Clean SmartUP' set up to manufacture and market the device.

Regional Programme of Innovative Actions (RPIA)

Tuscany's Regional Programme of Innovative Actions 2002-2003 was approved on the theme "Regional Economy based on Knowledge and Technological Innovation" and started from the above-mentioned consideration that the regional productive system, due to the net prevalence of SMEs, does little to encourage private investment in technological innovation. Meanwhile, public investment in R&D and the superior regional training system show an increase, albeit slight, in investment in research and development activities.

"PRAI ITT" aimed to stimulate technology transfer and the spread of innovation in specific sector-based and technological contexts through the creation of cooperation networks among companies, universities, research centres, local public institutions, innovation centres, company service providers, training agencies, social factions (workers and trade unions, etc.) and financial organs. This general goal was accompanied by the more specific objective to identify and develop exemplary methodologies for the spread of innovation potentially applicable in different territorial, sector-based and technological contexts. PRAI ITT was divided into the following action lines: Technology transfer and the spread of innovation in western Tuscany; Technology transfer and the spread of innovation in the fashion sector: textile, clothing, footwear; Development and industrial application of optoelectronics technology; Development of industrial and Agro-industrial application of biotechnology; Programmes for the modelling of pilot project results.

36 pilot projects directly involving 484 actors were proposed. From these 14 pilot projects and the same number of networks were financed, involving a total of 227 actors. Partnerships were composed of research centres, universities, local entities, service centres, SMEs and sometimes large companies. The role of enterprises (above all SMEs) was central to the programme, being in fact both the object and the main lever for the implementation of the programme itself.

The policy experimentation has been adopted by the regional authority and integrated into other initiatives. As the Programme's was carried out in contact with the authority responsible for the SPD ob.2 (Community Programme Services in extra-Agro-industrial areas), a high level of collaboration and coordination between the two instruments was guaranteed.

Both the actions defined by the RITTS Action Plan and the PRAI ITT pilot projects represented the necessary pre-implementation for two ISR related measures of the SPD (Single Programming Document) -Objective 2: measure 1.7 'Technology Transfer' (1.7.1 Innovation in SMEs and 1.7.2 Technology Transfer Networks) and measure 1.8 'Industrial research and pre-competitive aid with research centres and enterprises' (1.8.1 Industry and pre-competitive aid).

The New RPIA

PRAI ITT identified a policy and operative methodology which, if correctly applied, can form the basis important intervention instruments for innovation and technology transfer. It also contributed to outlining the new RPIA approved with two year duration on the 19th of December 2005, with a total budget of € 4,200,000 (47.6% financed by the ERDF).

PRAI V.IN.C.I (Virtual Innovation and Cooperative Integration) aims to promote Virtual Enterprise / Virtual Organisation as an instrument for the creation and management of aggregations which reinforce competitiveness in the main Tuscan industries. The VE / VO model is experimented particularly in the field of technological innovation and technology transfer which, in a system of micro-firms such as Tuscany, represents one of the weakest links in the value chain. The Programme works along four action lines: analysis and design of VE / VO models in specific sectors of regional industry and dissemination of results; experimentation, through pilot projects, of associated



Figure 3.3: The OPTOMED laser diode

models of an innovative nature which develop forms of virtual cooperation; modelling, trans-regional comparison, mainstreaming of results; animation, monitoring, technical assistance.

Despite the initiatives outlined above, relations between the regional centres of knowledge and the centres of production remain difficult. Successful cases, such as OPTOMED and others outlined above, remain the exception rather than the rule. This is due largely to the complexity of the relationship in terms of culture, interest and governance of the process.

The OPTOMED project represents the union between ophthalmic technology and application in the bio-medical sector. It considers the important issue of safety in the health sector. OPTOMED encourages the identification of new industrial opportunities linked to the production of highly technological instruments with low side effects to be used both in diagnosis and in treatment.

Tuscany boasts the presence of a number of CNR institutes (Consiglio Nazionale delle Ricerche – National Research Council) and university departments with proven scientific experience in this sector. Furthermore, a number of Tuscan enterprises already use and apply this technology. Leading Tuscan enterprises in the ophthalmic sector have developed autonomously and from these instruments have identified new application fields, concentrating on increased competitiveness in the “saturated” manufacturing sectors (leather cutting with laser; marble; diagnostics in metal with laser; technological usage in the environment; satellite platforms sensors for “earth observation”).

Political Context

Optoelectronics represents an extremely important sector of excellence in Tuscany. Its value has been increased through time with different instruments starting from the Regional High Technology Network, which identified it as a technological area of excellence, and continuing with the RITTS and RIS+ projects which confirmed the optoelectronic cluster as an important high-tech cluster susceptible to innovation with high systematic consequences.

OPTOMED was successful in mobilising all local actors interested in contributing to this field. It saw the participation of the main optical clinics, two of the most prestigious centres of optoelectronic research and the leading enterprises in laser production. This group reached a decidedly effective level of collaboration. Furthermore, the project, thanks to its scientific and applicative results, was presented and promoted in various applicative sectors and geographical contexts as a functional model both for the results and the methodology.

Project objectives

The OPTOMED project had the following objectives:

- Transfer of innovative technologies developed by public research centres, to be used in ophthalmic surgery for the application of new laser-assisted cornea suturing techniques, in transplants, in cataracts, and in the treatment of perforated injuries.
- Design, construction and development of new demonstrative prototypes by Tuscan enterprises operating in the fields of optics, electronics, laser technology, pharmaceuticals, and services for hospital systems.
- Studies aimed at pre-clinical in vitro e in vivo experimentation, validation of the developed technologies and surgical methodologies, and setting up of new diagnostic techniques to monitor the reparation process of the cornea.
- Evaluation of pre-clinical results and definition of clinical protocols by four main ophthalmic clinics of Tuscany.
- Evaluation of economic and social impact of new technologies and surgical procedures.
- Dissemination and training through meetings, conferences, exhibitions, and post-doc specialisation courses.

Description of Activities

The OPTOMED Project lasted from January 2003 to March 2004, and had a total budget of €449,815, with ERDF funding equal to €195,355.

OPTOMED developed and transferred innovative instruments and methodologies for ophthalmic surgery to Tuscan enterprises operating in the field of optoelectronics and hospital care in university clinics and hospitals. The project set up prototypes of new surgical diode lasers, ophthalmic instruments for intra and post surgery diagnostics, and new pharmaceutical formulations of photo-sensitizers for use with laser radiation in corneal surgery.

When applied in surgical procedures, such as cornea transplant and treatment of perforating corneal wounds, these instruments and related technologies use laser-induced welding of the cornea instead of conventional suturing with surgical wire. This process has been demonstrated in previous experimental studies and shows significant advantages with respect to traditional suturing. Prototypes and methodologies were validated in pre-clinical experimentation. The last project phase defined clinical protocols for the application of this

technique on patients. Four ophthalmic clinics of universities and public hospitals in Tuscany were involved in this phase.

The project was organised into 6 work packages (WP). In brackets, the number of months (M) for each WP is indicated:

- WP 1 – Development of diode laser systems (M1-M7)
- WP 2 – Development of the systems for ophthalmic diagnostics (M1-M8)
- WP 3 – Development of photo sensitizers (M4-M9)
- WP 4 – In vitro and in vivo pre-clinical studies (M2-M11)
- WP 5 – Definition of criteria and protocols for clinical applications (M7-M14)
- WP 6 – Evaluation of social and economical impact (M11-M15)

The project formed a network of public and private partners which enabled innovation transfer to various application fields. Beneficiaries could be identified as follows:

- The industrial sector: technologies related to innovative pharmaceuticals and instruments with ophthalmologic applications, previously developed as prototypes in the Tuscan scientific axis (CNR, Centro di Eccellenza Optronica, and University), were transferred to enterprises working on laser technology, optic and electronic components, ophthalmic instruments, pharmaceutical products, economic consulting and planning for the Health System. All were capable of engineering, mass producing and marketing these instruments.
- The hospital field: instruments, pharmaceutical products, and innovative procedures were created and tested in 4 university clinics and hospitals in Tuscany, thus involving final target consumers during the development phase. This guaranteed that products matched intended consumers in appropriate contexts, thus favouring distribution and large scale use.
- The public health system.

Partnership

The project was undertaken by a wide network of actors made up of research centres, universities, enterprises and end-users.

The project saw the participation of two important public research centres, which had recently carried out in-depth studies on instruments and technologies targeted for potential transfer: Consortium for Optoelectronic Excellence, Centre for Medical Laser Applications (CEO-CLAM) and the Institute of Applied Physics Nello Carrara, National Research Council (CNR -IFAC).

The medical component was formed by four important ophthalmic universities clinics and public hospitals in Tuscany, which represent potential end users of the medical techniques:

- The second Ophthalmic Clinic of the Ophthalmology Department of the University of Florence, located in the Careggi Policlinic area
- The Ophthalmic Clinic of the Ophthalmology and Neurosurgical Sciences Department of the University of Siena
- The Ophthalmology Operative Unit of the Public Health Board of Florence
- The Ophthalmology Operative Unit of the Public Health Board of Prato

The industrial component was formed by eight enterprises:

- EL.EN. spa, ACTIS srl and LOTO which developed diode laser systems, optical fibre delivery systems, and surgical hand pieces

- CSO-Construction of Ophthalmic Instruments srl, Gestione SILO srl and EUREL srl, which developed prototypes of corneal topography with integrated pupil graph and a topography-barometer for cornea diagnostics
- Molteni Farmaceutici spa, in charge of the pharmaceutical formulations of photosensitises to be used in association with laser irradiation for cornea welding
- ITAL TBS spa and CESAV spa, which produced evaluation studies on the impact of these new technologies on hospital use

Some previous cooperation did exist, particularly involving research centres and enterprises developing laser technology and between research centres and ophthalmic clinics. However, prior to OPTOMED there were no examples of such an industrial partnership with direct contact between laser companies and ophthalmic clinics.

Programming

The Regional Programme of Innovative Actions 2002-2003 in Tuscany identified cooperation networks stimulating pilot projects for the transfer of optoelectronic technology as a focal point. Technology included biomedical instruments, industrial and craft production, protection and restoration of cultural heritage and environmental services.

The identification of pilot project participants within each action line was based on their specialist skills in single activity areas and on selected criteria to ensure quality and reliability: scientific and technical excellence; to what extent the project was firmly rooted in the interested area; costs of the service; availability to co-finance project activities; interest in the potential application of results.

The project was submitted in response to a public call released in April 2002. An External Evaluation Commission composed of experts in the sector was formed. This commission approved OPTOMED in second place among projects financed, and first on action line 1.3. The project received this impressive evaluation as it is truly exemplary in many different aspects.

On the scientific front, corneal suturing through diode laser surgery welding undoubtedly represents progress in the field of cornea transplant and therefore helps to find a cure for ophthalmic illnesses. On the technical front, the instruments identified and developed in the project are now in the engineering phase which precedes the phase of large scale production. Regarding organisational elements, the proposed network was solid from the beginning due to the successful mobilisation of public and private local actors and, furthermore, it was an “open network” which welcomed extended collaboration with new partners. Finally, from the beginning the project showed significant potential for social impact regarding cornea transplant, a decisive step forward in this sector in which developments have for some time been limited.

Management Structure

The OPTOMED Project was coordinated by 3 Working Groups (WGs):

WG 1: Transfer and Development of Industrial Products. Participants were all the enterprises involved in technological development and public research centres

WG 2: Pre-clinical Experimentation and Validation Participants were public research centres, university ophthalmic clinics and other university departments

WG 3: Medical, Social and Economical Evaluations: Participants were public research centres, university ophthalmic clinics, public hospitals and evaluation centres.

One of the key success factors of the project was the management by the research centres, already experienced in co-ordinating large, multidisciplinary research projects. They were largely responsible for organisation of the various phases and for maintaining close

contact between hospitals and enterprises. They also promoted the results of the project in conferences, exhibitions, as well as in the scientific and the general press.

The management had close contact with the steering committee (chaired by the Regional Minister for 'Policies for Craft, SMEs, Industry and Innovation' and in charge of the orientation, coordination and monitoring of programme activities, approval of pilot project selection and reporting supervision), by means of a group of experts nominated by the Tuscany Board, which supporting the SC in the development of activities, who verified the results. This fact helped transversal coordination with other projects carried out in the same framework, operating on similar topics or funded to deal with similar technologies. For example, this co-ordination helped to establish a new network in Tuscany, called OPTONET, aimed at the development and transfer of innovation in the field of Optoelectronics.

The management substantially sustained small companies and universities from the administrative point of view, in order to prepare cost reports for reimbursement.

Marketing

The project was promoted and publicised by means of 2,000 copies of a brochure (in Italian and English) distributed at public events, 5 scientific articles and around 20 press reports, articles in national newspapers and interviews. The consortium also participated in 5 meetings and exhibitions and several national and international scientific conferences. A project web site was created, reporting the objective of the project and the link with the partners.

Effectiveness

The project attained the expected objectives and respected the initial financial plan and the executive project. The collaborative research carried out within OPTOMED involved 16 researchers and 8 companies and led to the creation of 4 new jobs. 2 researchers were involved in mobility schemes, 2 people working within universities were involved in training activities within companies and 2 SMEs participated in training activities. Moreover, the project led to the creation of the following innovative products, processes and services: a laser, an instrument for ophthalmic diagnostics, a procedure for laser suturing of the cornea and a clinical service of corneal transplant at the Ophthalmic Department of the Hospital of Prato.

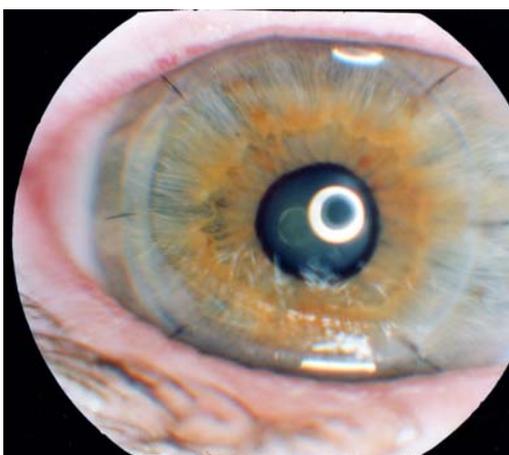


Figure 3.4: OPTOMED: Innovative Laser Techniques for Cornea Suturing

Tuscany's different production fields.

OPTOMED, as indeed all RPIA projects, had an experimental nature but is still clearly identifiable as a relevant tool for the spread of knowledge. Frontier research and contextual knowledge were experimented, associating sustainable development with technological innovation. Technology transfer networks generate applications that go beyond their specific sector and reduce barriers between the research sector, enterprises and civil society.

The presence of research centres of excellence in the sector and, in parallel, of enterprises producing laser instruments, such as EL.EN. SpA (the second world firm for power and measurement lasers quoted on the Stock Exchange), facilitate the creation of applications with potential high technological value in

The above elements helped to achieve one of the programme's objectives of strengthening relations between interested actors, facilitating interaction and identifying new and profitable application fields and helping collaboration with significant new partners.

The OPTOMED project has had significant impact on the Tuscan economy, on regional competencies and on opportunities to widen RPIA initiatives. OPTOMED has direct impact, with social and economic advantages, on the public health system. Among the social advantages are patient health and improved quality of life as technical-surgical improvements in cornea transplants and injury suture lead to a reduction in treatment times and consequently in collateral inflammatory side effects, quicker healing and greater stability of astigmatism.

Moreover, the OPTOMED project has strengthened Tuscan technological excellences and production specialisations, speeding up and reinforcing links between research and enterprises, thus strengthening technology transfer dynamics in the Tuscan optoelectronic cluster.

Among the economic advantages are reductions of hospital costs, less need for check ups, a reduction in costs throughout the healing period, and reduced costs for lenses and glasses.

The project - thanks to close cooperation through the network between the academic medical sector and the industrial research component - also allowed for cross fertilisation processes of laser technology, which encourage continuous growth in regional competences both in the technological and medical field.

Finally, the project has obtained additional results beyond the ones foreseen. To name but a few, the project created a common laboratory between research centre and laser technology enterprise, sharing instruments and technical personnel and two enterprises, coming from the project partnership, have started a joint venture to develop a new high technological biomedical instrument (not part of those foreseen by the project), sharing their respective competences in the fields of diagnostics, ophthalmology and lasers.

Innovation

This type of technology lies at the base of a regional strategy which introduces, through the use of Information and Communication Technologies (ICT) and high technology, sustainable methods and products. In this way it is possible to reach product and / or process innovation both in traditional and in new generation production sectors.

The OPTOMED project is highly innovative both in scientific and organisational content: on a *scientific front*, where new technologies were presented, discussed and accepted; on the *medical-surgical front*, as progress in the field of cornea transplants has been limited in the last decade; *in technological terms*, through providing for the transfer of innovative instruments such as the diode laser for cornea surgery alongside new integrated diagnostic techniques and new forms of photo-sensitising pharmaceuticals.

The innovative nature of OPTOMED in organisational terms is visible through the successful development of a public-private partnership which paved the way for a process of innovation transfer. This was true in the industrial environment through a network of enterprises capable of producing pharmaceutical instruments and products with a high technological content in the ophthalmologic sector. These instruments were first prototyped in the Tuscan science pole (Centro di Eccellenza Optronica, CNR and University). It was also visible in the hospital environment through experimentation and application of the above mentioned instruments in some Tuscan clinics, in order to encourage testing and diffusion on the market.

An analysis of the programme of innovative actions and the uptake of the results within action line 5 of RPIA ITT in Tuscany 2003-2003 was carried out. This analysis focused on the process of network creation in support of innovation. From the analysis one of the most significant results is that optoelectronics represents the nucleus of innovative technology within the whole programme. This is a real network of public research centres with specific competences in the area of electronic technology. This structure has the potential to become a structured network for the promotion of technology in areas ranging from surgery to

manufacturing work, capable of mobilising the production sector and creating so-called “generative relationships” which encourage innovation and contribute to the reduction of problems with collaborative actions between subjects with different working conditions (comparing, for example, the SME with the university research centre).

Sustainability and Transferability

The project, thanks to the concrete results obtained through the production of pharmaceutical machinery and products, is inherently self-sustainable. In fact, it sets in motion a constructive cycle that goes from research to product testing and implementation to garnering profits which in turn feed the cycle anew. In this way, the project is in harmony with one of PRAI ITT's priorities: co-financing projects will potential economic benefits, as best expressed by flexible, collaborative ventures with specific objectives and without bureaucratic complications.

Partners' interest in prolonging their partnership set in motion by the project has already been confirmed by factual evidence. Most notably, they have set up a joint lab in which one of the enterprises and one of the research centres work together on a daily basis. Furthermore, they are designing a second, larger lab in which all partners will be able to work as a team in an effort to develop and improve new products and procedures. Therefore, the project shows a consolidation of relationships and marginalises need for private support, as the competences and relationships are sufficient to allow automatic development of new initiatives.

Both the project model and its results are highly transferable. The project demonstrated the validity of an intervention model that can be easily replicated in different geographical areas and professional sectors. A careful analysis of the project's operative methods, intended to pinpoint and draw out successful policies enacted in network management, enhance synchronicity with PRAI ITT's long-term goals. These include testing innovative technologies in the field to create and manage networks capable of transposing these technologies to other sectors or areas.

The potential for transfer of OPTOMED's technical results is increased by intensive dissemination efforts. These initiatives include participation in scientific conventions, demonstrations, expos and post graduate education. The commercial enterprise, concretised through EL.EN spa's distribution network, revolves around the sale of instruments produced by the project, thereby guaranteeing the transposition of surgical practices and techniques to the broadest possible range of national and international hospitals. The new techniques and devices are already being transferred for preclinical and clinical testing in the USA, through international cooperation between CNR-IFAC and the Ophthalmology Operative Unit of the Public Health Board of Prato with the Bascom Palmer Eye Institute of Miami, FL, recently been ranked the first Ophthalmic Clinic in USA.

Obstacles in terms of design or implementation

The main problems experienced in project implementation concerned the lack of project experience of small enterprises. They often felt that participation in a common strategy was a constraint or indeed a waste of time. Moreover, they found bureaucratic and administrative management a huge obstacle. These problems were also visible in the two hospital clinics, whose administration was not familiar with the forms and documentation required for cost reimbursement. In this case they would have preferred to participate as subcontractors, thus avoiding most of the bureaucracy. The coordinator (IFAC), through its technical secretariat, supported them in fulfilling administrative requirements. In the longer term simplified administrative procedures would certainly be desirable.

During project development it became clear that only innovations which were almost ready for industrial development had real possibilities of success. Sometimes the product appeared “too innovative” for the industrial process, especially when the design of whole new devices was

proposed. It is easier to reach industrial production of a new laser for corneal suturing through modifying existing laser devices, rather than proposing a completely new technology.

Two years after the end of the scheduled activities, the project is now in one of its most important phases of exploitation regarding clinical application of new surgical instrumentation and procedures. During this period the project has not been supported by regional or national funding, a lack aggravated by the fact that public research centres in Italy are facing a serious economic crisis. Some research developments have been carried out by means of direct contract with laser companies and hospitals.

Conclusions and Lessons Learnt

The second RPIA in Tuscany (described above) was greatly influenced by the indications from the OPTOMED experience, which clearly provide an organisational pattern for a sustainable process of technology transfer from the world of science to the world of industry. The OPTOMED project, its ability to finalise contextual knowledge and frontier research towards relevant and effective applications, the network composition and the dynamics of project partners, all formed important starting points for PRAI VINCI.

Concerning the method adopted, the project was successful in coordinating a multidisciplinary partnership, with researchers, enterprises, hospitals and agencies for economic impact assessment. The close dialogue between those actors shortened transfer and innovation development time. In particular, it was possible to reduce time needed for preliminary planning and industrial research, engineering of new instruments, pre-clinic checks with supervision from hospitals representing end-users and technological or cost evaluations. Another fundamental aspect was that the project management (research centres) had both management coordination skills and a well established technical expertises in developed technologies.



Figure 3.5: The OPTOMED laser diode being used for Corneal surgery

OPTOMED can have strategic value for regional policies on innovation and research. Its relevance goes further than the financial contribution obtained or the application developed, shown clearly by the continued activities and by the regional government's attempt to incorporate some of the results into successive programmes. The impulse provided by the European Commission in the form of the RPIA was important for initial awareness raising and as an opportunity to test operative approaches.

Contact Details

Dr. Roberto Pini, Istituto di Fisica Applicata, Consiglio Nazionale delle Ricerche
Via Madonna del Piano 10, 50019 Sesto Fiorentino (FI) – Italy
Tel. +39 055 5225 303, Fax +39 055 5225 305
e-mail: r.pini@ifac.cnr.it
website: www.ifac.cnr.it

3.3 Case Study: SIDEUM: Clusters and Innovation in Southern Småland

Strategic Regional Context

The Region of Småland and islands is strategically located in south-eastern Sweden. The eastern area is an integrated part of the Baltic Sea region and the western area is centrally located between Sweden's three largest cities. The region is comprised of 4 counties, 34 councils, and has 800,000 inhabitants (8% of the nation's 9.1 million inhabitants). The area covers 33,333 km² thus representing 9% of Swedish national territory. The population density in the region stands at 24 inhabitants/km². The region is sparsely populated and a relatively large part of the population lives in the countryside.

Importantly however, the region's major cities are dynamic with a diversified range of services and university environments. In conformity with a nation-wide trend, many smaller cities and councils are experiencing significant rises in population. Småland and Islands have undergone a period of positive population development in recent years, though not to the same extent as the country as a whole. The weak but positive development is maintained through immigration, which means that the domestic relocation balance is negative.

The labour market in Småland has historically been favourable with high employment and low unemployment and sick leave. The level of education is rising and is following adjustments in the business world. Along the coasts and on the islands, tourism, agriculture, and the oceanic industry are important, while the inland is mainly characterised by manufacturing and forestry related industries. The importance of trade and commerce is increasing.

Industrial production has been a vital net income in the business sector, but current trends show a gradual replacement by an increasing number of services in industrial processes. The production industry is very important for the region, both as an employer and as an engine for export and commerce. Often these successful companies bring competence and new techniques to the region. Economic development points to increased internationalisation, increased specialisation, and diversification, as well as an increasingly blurred boundary between production and service industries. Previous experience indicates that the business world of the future will most likely build on the strength areas of today, but become more knowledge and service intensive.

Renewal and diversification of businesses takes place mostly in universities. The companies that establish themselves often show high levels of knowledge and innovation. A number of companies have successfully adapted to the changing market conditions. For others, there are new challenges. A number of traditional manufacturing companies, however, will likely remain to provide for markets which are characterised by high transport costs related to product value or which need close interaction among customers, producers and suppliers. These companies will likely be highly automated and employ relatively few people. Employment will instead be found within the service intensive elements of the "new" manufacturing industry. A company's ability to adapt to changes will therefore be important for regional development.

The traditional business culture has in many cases lead to a male-dominated manufacturing industry and a female-dominated public sector. Altered conditions within the business world can change these structures in the long run and further stimulate fresh ideas and innovations.

The context in which the region operates

Småland and Island is only a formal region in a NUTS 2 context. In reality Småland and Island consists of four different counties with their own political and public administration. This means that the region cannot be considered as other regions where NUTS 2 and administrative

borders are the same. In a European cooperation context this is a challenge as policies from four different decisive boards must merge into a common view before action can be taken. The Objective 2 programme (2007-2013) for the region is a concrete example of cooperation.

Business and enterprises



Figure 3.6: SIDEUM premises, Videum Science Park in the Växjö University Campus

The economy in Småland is greatly concentrated around the manufacturing industry. There has long been a strong enterprise tradition in this field and even today the number of manufacturing companies is large. This especially applies to western Småland in the so-called entrepreneur region. Cross-county cooperation within clusters exists within a number of strong industrial branches, for example aluminium, timber and heavy-duty vehicles. Öland's and Gotland's (the islands) economy is characterised more by the agricultural sector and tourism. In recent years, cluster-like networks

have also been established within the food and tourism industry, among others. It is important that this type of cooperation is supported to ensure continued competitiveness. Long term further development of the timber industry is important as Småland has excellent surroundings for this industry with large amounts of raw forest material and strong forest growth compared with the northern part of the country. Development efforts occur within the areas of materials and energy.

In a recent study NUTEK (Swedish Agency for Economic and Regional Growth) stated that large parts of the region are vulnerable to the dominance of large companies in which employees have low education levels. Low work force costs in Eastern Europe and Asia means that businesses in Sweden are exposed to strong competition. This is particularly evident in Småland and islands with the significant, mostly labour intensive manufacturing sector. Swedish international companies locate a great deal of production abroad and foreign-owned companies choose locations according to cost conditions. It can be said that the risk for production relocation increases if the number of foreign-owned companies is high. According to a study on Swedish business culture carried out by ITPS (Swedish Institute for Growth Policy Studies), 20% of those employed by businesses in Småland and islands work for companies with foreign owners and 58% for domestic companies. In that regard, the business sector in Småland is less vulnerable than in the country as a whole.

Region	Foreign-owned Companies	Swedish International Companies	National Companies
Småland and Islands	20.4	21.2	58.4
Sweden	23.3	20.0	56.7

Table 3.4: Employees in Relation to the Companies' Ownership, 2003 (%) Source: ITPS

In Småland and the nearby islands, there are a number of very successful industrial companies, which are world leaders in their branch, and the great majority of their production is

exported. According to Exportrådet, the collective exports from the region for the year 2004 totalled 70 billion SEK (IKEA, Volvo, and Electrolux).

One way to meet the stiffening competition from countries with low work force costs is to increase the level of services concerning products and/or increased customer adaptation which demand a flexible production process to be able to satisfy different customers' wishes. Design and fast product renewal are other areas to work with in order to increase competitiveness.

Innovation in the Region

A central factor for regional growth is the ability to stimulate economic renewal, especially important for Småland and islands against the background of their structure and the challenges faced to compete with other regions for company establishment and workforce.

The county administration in Södermanland has developed an innovation index to shed light on the conditions for renewal in the business world. According to this index, Småland and Islands find themselves in the middle among NUTS 2 regions (see table below). The region does well in terms of regional specialisation and is on par with the national average on creativity and openness but slips behind on creative competence. The region also has a low index in regards to the level of technology and research and development.

Region	Creativity and openness	Level of Technology, Research and Development	Entrepreneurship and Business Leadership	Regional Specialisation	Total
Stockholm	132	139	119	114	129
Småland and Islands	100	42	91	104	78
Southern Sweden (Malmö)	96	102	101	91	99
Western Sweden (Gothenburg)	99	117	100	103	106

Table 3.6: Innovation Index, Sweden as a whole =100 Source: County Administration of Södermanland

Regional actors involved in ISR

In Småland and Island there are a great number of actors involved in industry and science interaction to promote industrial development. There are 3 EIC, 4 Science Parks, 4 Industrial Development Centres, 4 Universities (Växjö, Kalmar, Jönköping and Gotland) with a total of 41,000 students, 7 research centre, 4 SME development organisations, 2 Innovation System and Cluster facilitators and 13 Clusters (Aluminium, Heavy Vehicles, Wood, CNC, Plastic, Furniture, Glass, ICT, Environment, Tourism / Music, Food / Biotech). Other publicly financed regional operators also exist but are not directed connected to ISR.

Prior to the implementation of SIDEUM, several attempts were made to promote business development more efficiently. Moreover, Växjö University was aware of the difficulty of strategic and structured communication with the business-sector. The idea of the SIDEUM project was to pool resources in order to be more efficient, more customer-oriented and speak with one voice on knowledge-based SME-development, through clusters and innovation systems.

The regional Economic Growth Programme addressed the above described situation, which indicated the need for strategic actions and a reduction in projects and greater focus for strategic future investments. The tool for focusing the efforts was the concept of SIDEUM.

Political Context

From the beginning the project identified political and public institutions as key players. They were involved during the whole process. The Governor was appointed to host the

initialisation of the process which, in concrete terms, consisted of a formal prospect that was sent to Växjö University, the County council and to all 8 councils. The prospect posed four questions to the potential public and academic stakeholders:

- What is your view of the objectives of the SIDEUM initiative?
- What is your view of the organisational proposal?
- Are you prepared to be formal member of SIDEUM?
- Are you prepared to financially contribute to SIDEUM?

All 8 councils, the County council and the university made formal decisions in their councils / boards. All actors responded positively to all four questions, aside from one council which, however, decided to join SIDEUM one year later.

Project objectives

The project objectives were:

- Bring knowledge-based economic growth. The region has successful SMEs, but has not taken advantage of the young, growing university (Växjö University).
- Reorganisation of the regional development toolbox by creating an operative platform from which a knowledge-based economic development can emanate.
- Policy into action: a regional tool to activate academic and political policies
- Internationalisation: securing regional participation in national and EU-projects.
- Finding a way for the region to be competitive using clusters and innovation systems, and doing this through a learning process.

Description of Activities

The SIDEUM project was carried out from October 2003 to April 2004 and had a budget of € 500,000 of which € 22,500 ERDF contribution. It concerned a feasibility study aimed at identifying new ways and means to manage and promote clusters and regional innovation systems. Basing the work on an awareness of limited regional focus on R&D related business development structures, the SIDEUM project created a common platform for frontline development processes between academia, the public arena and the business sector. The project was organised into 4 steps:

- Step 1 (WP1): Elaboration of a plan for a commonly (academia, business and public sector) owned structure in the form of a company.
- Step 2 (WP2): Presentation to regional stakeholders of good practices developed in other parts of Europe (Tampere, Finland and Bavaria).
- Step 3 (WP3): A formal prospect was sent from the Governor's office to regional actors. Agreements were made with 8 councils, the County Council and Administration, business networks and Växjö University. In total 700 decision makers were involved in the dialogue.
- Step 4 (WP4): Collection of decisions from the stakeholders. Public institutions and the university were positive about the idea and were willing to become members. Several banks and large companies also decided to become formal partners.

The company was named SIDEUM Innovation AB. The size of the project was not big but the process in anchoring and "selling" the idea was extensive.

In the initial stages the main beneficiaries were public institution: councils, the county council and administration, the regional business sector and Växjö University. However, the final beneficiaries of the project results were the regional clusters and networks (and therefore, the participating companies) that, prior to the creation of SIDEUM Innovation AB, had at least 10 public institutions to communicate with. Through the reorganisation of the regional business development structure the number of institutions needed to be contacted was greatly reduced.

Partnership

A consortium was formed with industrial, public and academic partners. The steering committee had 7 members from Växjö University, local councils and the county council. No business representatives worked in the steering committee as they often had limited interest in the working process and were instead more interested in the results. The steering committee decided, in agreement with the business sector, that industry should be approached when the results were formulated into a prospectus. The formal responsibility for the project lied in a publicly owned company, Videum Science Park. Videum owns the real estate of which Växjö University is tenant and also runs the university incubator.

Växjö University is a founder and provider of knowledge in the process. The public representatives provide SIDEUM with political legitimacy and with basic funding. Companies fund SIDEUM as sponsors to a limited extent but they are part of the clusters connected to SIDEUM in which they invest more directly. Industry is of course an end-user. Examples of companies on the Board of SIDEUM are VOLVO and IKEA.

Programming

The project needs can be summarised as follows:

- 1. Internationalisation: Swedish membership in the EU opened up many possibilities. On the regional level, perspectives and focus changed. Being part of European cooperation projects was seen as essential.
- 2. Competitiveness: The regional economy is based on SMEs and entrepreneurship. Growing international competition puts pressure (and raises possibilities) on industry. One way to meet this is through knowledge and learning by creating clusters and innovation systems.
- 3. Academia's need for a cooperating formula: A young expanding university trying to find a recipe for cooperating with industry.
- 4. Making strong calls: The region's ability to participate to competitive bids in European and national calls for proposals was limited due to its small size. The need for focusing resources and building alliances with others was evident.
- 5. Structural change in industry: The regional economy has a base in traditional manufacturing and forestry. Companies in these sectors are generally competitive and strong. However, the region needs to promote new types of media and creative industry. Traditional industries' need for higher R&D content to face international competition is also a strategic element in regional development.

The project was selected due to its innovative approach in finding new ways for the region in organising its efforts in building a modern structure to deal with regional development issues.

The build-up of the project was initially "parallel". Växjö University was designing a project to improve cooperation with industry based on a cluster and innovation approach. At the same time an internal discussion within the County council focused on the fact that the business toolbox in the region was only to a small extent focused on research and higher knowledge.

Since the project aimed to create a partly new structure for the region to address these issues, sustainability was built in from the start. However, a lesson learnt from the project was that national actors should have been more fully involved. The current situation is encouraging in that dialogue with national authorities is now proceeding well and the two sides are finding common ground.

Management Structure

The project leader, Mr Lars Johansson, is a former Chief Executive of a successful industrial group (Profilgruppen AB). His reputation in academia, business and politics is outstanding. It was important that the key person had gained “trust” in all sectors, not concentrated in only a few.

The steering committee consisted of 7 academic, public and business officials. It went through a learning process since many questions arose during project implementation. This group was the main ambassador at a critical stage. When the project turned into a permanent structure half the participants left their ordinary positions for other jobs. Although just a coincidence, it resulted in a vacuum and opened different interpretations on the importance of SIDEUM. The starting phase of the permanent structure was therefore tougher than expected, also because stakeholders developed different views about the project. SIDEUM management invested a lot of time in the early stages of the company creation in communicating the business plan and general idea.

Meetings were held with 108 people in the region and abroad. Although efforts in anchoring the idea and philosophy behind the SIDEUM concept was ambitious, it became clear that after the project end the general understanding was not deep enough. The core group of people that understood the entire depth and width of the concept could have been wider.

Marketing

The project was promoted and publicised through:

- A formal prospectus, signed by the Governor, which was sent to the stakeholders.
- Several articles in local media.
- All political bodies, approximately 10, and the university board in the region were approached with a lecture and written material as a base for their individual decision.
- The business community could not be approached in the same way as every company is an individual entity and they do not make collective decisions. The information was extensively disseminated in their networks.

Innovation

One weakness of the Triple Helix perspective is that the price of exit from the process is low. When politics, business and academia develop a common project or process for the region the critical stage is when commitment is to be made and each actor has to be step out of their comfort-zone.

The situation before SIDEUM, with several public and academic actors trying to promote the Triple Helix concept in a county consisting of only 180,000 inhabitants, was not satisfying. By analysing current resources when it came to staff, money and knowledge, the conclusion drawn was that the region could work much more efficiently if a commonly owned structure was established. A common arena for future policies needed to be established between academia, public and business sectors. This kind of dialogue had previously been tested in several forums but it lacked focus. SIDEUM was therefore innovative in its focused, dedicated structure.

Furthermore, the key innovative element of the new configuration is that the stakeholders are “chained” to a common structure by jointly owning a company. This means that the cost of exiting from a SIDEUM community initiative when tough decisions and priorities have to be made, is much higher. Also the agenda does not only consist of harmless issues that the stakeholders know in advance can be solved. The new structure deals with difficult and sometimes controversial issues. The price for stakeholders to leave the boardroom is therefore too high as real problems need to be solved. This tactic of ensuring stakeholders’ commitment by making them responsible (in terms of money and time) has been interesting and effective.

Effectiveness and sustainability

The SIDEUM concept is established and running. It will take a number of years to achieve all the goals set but the direction is clear and well supported. As mentioned before, the project met the initial objective of creating a professional prospectus for stakeholders. The result was the establishment of SIDEUM with the Governor as appointed chairman. Within a year the project turned into a company owned by the public and private sectors and a university. Local Council, university, county council and county administration are responsible for basic funding. They provide the economic stability needed to operate as a non-profit development agency.

Thanks to the establishment of the company, there is now a more strategic approach to developing the business sector in the region. The public authorities have a “tool” which they can use in promoting economic growth.

Also important is the fact that SIDEUM focused on strengthening regional clusters with knowledge and networks and, through this facilitating approach, has started to increase cluster quality and to secure a higher return on investment of public money spent on clusters.

Transferability

In general terms the project can be transferred to other regions. However, the preliminary process is more important than the concrete results. The 4 step SIDEUM process can inspire other regions although cannot be instantly copied. Every region must take the model, adapt it and implement individual processes.

It is important that the leadership of the process is local. Projects like SIDEUM would not probably have the same success rate if the process was lead and controlled by external actors.

Obstacles in terms of design or implementation

The main obstacles were:

The terminology: the concept of clusters and innovation systems was accepted but not deeply understood by industry or politicians. The concept is not always easy to explain.

More policy, less projects: the idea of moving from project oriented policy to a more strategic and systemised methodology raised questions in several forums. Questions such as “what will happen to us?” from organisations based on project-funding were legitimate.

The need to change the focus of public institutions from projects to policy formulation: public officials are used to drafting policies, setting goals and describing what policies are aimed at. Instead, making individual projects a priority is indeed SIDEUM’s task.

National dialogue: dialogue with national authorities was lacking. For example NUTEK, the National Authority for new enterprise creation, should have been further involved in the prospect presented to stakeholders. This was understood when SIDEUM was already operative. NUTEK was at first hesitant to cooperate with SIDEUM since it traditionally cooperates directly with the County Council. Now these problems have been solved.

Present clusters were at first not convinced by the mission and regional backup. Cluster boards did not see the upside. Some even saw SIDEUM as a competitor for regional grants.

A concrete example of how these obstacles were dealt with was the launch, in autumn 2006, of a regional Process Management Programme (PMP). The PMP consisted of 5 one-day seminars, each focused on a specific topic. The PMP were designed in cooperation with the clusters and national authorities such as NUTEK. The target group was regional cluster managers, university staff and relevant public offices. The final event of the PMP was a study visit to the region of Styria in Austria with 28 participants. The general idea was to define the role and challenges for clusters in a regional context.



Figure 3.7: Växjö University: One of the Founding Members of SIDEUM

The PMP initiative helped to create team-spirit among cluster managers, allowed them to meet their colleagues in the region and have free access to a valuable network through SIDEUM. It also helped to show politicians the potential of the group and how to use it more efficiently with better dialogue and knowledge. An obvious conclusion is that cluster managers have a somewhat naive view of the political aspects of regional development. The knowledge among cluster managers of how politics work, its constraints and possibilities, has to be developed.

Conclusions and Lessons Learnt

The establishment of SIDEUM has been a learning process for the region. The need for greater cooperation between academia, business and politics was concluded in the project investigation phase. Different organisational cultures among the three entities were evident from the beginning. SIDEUM is a small project but even small projects with limited funding can have an influential impact and can bring new thinking and ideas into a region. The project scale is not the critical factor. It is the core idea, the commitment among participants and boldness of project management that counts. In the SIDEUM case, the financial support provided by the EC 'Regional Programme of the Innovative Actions' helped to radically speed up the process.

Contact Details

Per Scholdberg, Process Manager
Videum Science Park, S-351 96 Växjö
Tel: +46-470-794872
scholdberg@sideum.se
www.sideum.se

4

Thematic Working Group: Clusters and Business Networks

4.1 Introduction and Policy Recommendations

Clive Winters, Alex Hicks and Soizic Nelo, Coventry University Enterprises Ltd

*“Clusters are geographically close groups of interconnected companies and associated institutions in a particular field, linked by common technologies and skills. They normally exist within a geographic area where ease of communication, logistics and personal interaction is possible. Clusters are normally concentrated in regions and sometimes in a single town.”*¹⁵

Researching the definition of a cluster does not generate a straightforward answer but perhaps one of the most used definitions is that developed by Michael Porter, above (1990). This definition highlights a series of key concepts that must be developed further and understood. The notions are not always found all at once within a cluster, but four key components are common:

- geographic concentration
- collaboration
- personal interaction
- common technologies and skills

In an era of globalisation, this definition is tested and stretched to its maximum as new activities are identified that interact with the “stand-alone-basic-ingredients” commonly used to define and identify Clusters.

It is within this context of globalisation that the ERIK network has examined cluster development. Within the ERIK network participating regions have been faced with the same challenges but historically they had not been able to exchange experiences. While each regional setting was different, a number of similarities were recognised in participating regions.

The ERIK clusters thematic working group approach recognised that regions with developed clusters both within and outside Europe, would have encountered similar issues, would have dealt with them in a similar way, and would have experiential knowledge that could be utilised by other regions. These “experienced regions” could transfer their successes, but also their failures. From them the lessons learnt and results from actions implemented in one region could be used to benefit other regions. This philosophy of exchange of cluster practices

¹⁵ Michael E. Porter (1990), *Competitive Advantage of Nations*, New York: Free Press

would allow regions that may never have thought in the same way, to learn from concrete examples and question their current practice.

It is not for regions to be identical throughout Europe or on a global scale but to give opportunities for the evaluation of regional economic development approaches. All European regions are working towards the objectives and targets of the Lisbon agenda and this provides them with a unique development responsibility and supports them in fulfilling their maximum potential. The strategic vision defined by the Lisbon Agenda highlights the importance of interregional working and collaboration and the development of common aspirations for European regions

At an enterprise and business network level, companies encounter barriers and difficulties that need to be addressed in order for clusters and networks to exist successfully. By examining each component of Porter's definition one can understand the challenges that enterprises or regions face within this new context.

Geographic concentration

It is sometimes assumed that clusters operate on a local or regional scale. It is true that clusters are often formed by a multitude of enterprises in a local setting and thus benefit from proximity. An initial cluster objective is commonly to reproduce the effects of economies of scale, so that small enterprises can enjoy the economic benefits afforded to larger enterprises, in particular by "collaborating to compete".

In addition, it has been highlighted that clusters have historically been established as a result of the availability of raw materials, traditional regional know-how or customer demand in a specific area. Those assumptions should be confronted as new issues and challenges arise from globalisation. Due to market prices, labour costs and new technologies regional clusters must be more competitive but must also evolve outside their local environment to maintain and enhance comparative advantage.

Collaboration and personal interaction



Figure 4.1: Uniflair Premises - ERIK Study Visit Veneto (16-17 January 2007)

Traditionally collaboration is used to foster the success of a local cluster. Success in this context is synonymous with bilateral agreements and a level of trust that allows enterprises within a cluster to develop activities in an integrated way and at the same pace. Enterprises operating in this environment are predominantly part of a value chain, similar to internal value chains operating in large firms; these enable them to benefit equally from collaboration. Collaboration in this context is based upon trust and considered quite exclusive. This link between enterprises

does not necessarily encompass formal or written agreements but would be treated as such by the parties involved.

As clusters become larger and organisationally more complex traditional bilateral agreements and trust are no longer appropriate. Clusters are now composed of enterprises linked horizontally but also vertically and thus traditional collaboration agreements are not physically possible. As a result of these changes, enterprises face new competitive pressures that affect their performance.

Common technologies and skills

Porter (1990) refers to the common technologies and skills that link enterprises within a cluster. Historically clusters have developed around the adoption of similar processes and skills within a given industry. Enterprises have commonly collaborated as a result of their use of technology and as a driver for process improvement. As a result both enterprises and the people they employ have become specialised in particular fields. These assets have been viewed as crucial for the success and reputation of the cluster itself and have enhanced their relevance within a region.

However, as new processes and technologies emerging, reliance on these “well-proven” methods can irreversibly damage a cluster. Enterprises that are too specialised can become narrow-minded and unable to cope with change. Similarly, enterprises that are technology concentrated are less adaptable and flexible. Adaptation is crucial for the successful evolution of clusters.

The government response to support regions within a changing global environment is to tailor public policies to support cluster evolution. It would be wrong to isolate cluster policies from other regional policies as they are inter-related and many act as a catalyst even though they are not directly targeted at the economic development of cluster initiatives. Cluster policies should directly or indirectly respond to the issues identified above. Measures should contribute to regional economic development and should allow for collaboration and for an environment favourable to cluster evolution. As outlined previously, it is essential to realise that not only cluster policies impact on cluster development but regional policies as a whole.



Figure 4.2: Politecnico Calzaturiero Premises - ERIK Study Visit Veneto (16-17 January 2007)

The ERIK Experience

The ERIK network has populated an online database to observe practices in partners regions and the causal effects of policies and cluster policies in European regions. The table below summarises cluster policies and related initiatives implemented in the ERIK network participating regions.

Authority in charge	Cluster policies or initiatives	Main objectives	Main areas of focus	Financial support	Results and examples of clusters
---------------------	---------------------------------	-----------------	---------------------	-------------------	----------------------------------

Alentejo Regional Authority	PRAI Alentejo: Programa Regional de Acções Inovadoras no Alentejo	- regional economy based on knowledge and technological innovation - regional identity and sustainable development	- Promote innovation in regional clusters - cooperation between diverse partners - (tacit) knowledge transfer with exploitation to new technologies	80% structural fund 13% public 7% private	Innovation Cycle Rout of Flavours Old techniques, New concepts
BIA Bremen Innovation Agency	Regional network of players in the area of mobile solutions	- constitution of a network for integrating mobility functions in computer applications - shift from "old industries" to service and technology based industries	- Clusters and business networks - Improvement of access to, and use of mobile information and communication technologies - Exploitation of advanced mobile ICT potentials	50% structural fund 50% public	Mobile solution group GmbH founded in 2002 Nucleus of Cluster of Mobile Solutions
Economic Development Agency of Castilla y León	RPIA LEGITE: Excellence and Generalisation of Innovation in Companies -Castilla y León	Regional economies based on knowledge and technological innovation	- promotion of innovation within the region to peripheral area - creation of virtual clusters of companies	70% structural fund 23% public funds 7% private contribution	Network of regional Innovation Agents (RIA) Castilla y León
Dytiki Makedonia regional authority	GRPIA: Innovative Greek Action	Regional economies based on knowledge and technological innovation	- improving Innovation capacity in the sector of Wood - promotion of innovation in existing clusters	94% structural fund 6% private contribution	K- Cluster 5 projects received grant for development of new products / processes in wood sector
Regione Piemonte - Industry Direction	RPIA DISTRICTS: From industrial districts to digital districts	- Regional economies based on knowledge and technological innovation -e-EuropeRegio: the information society at the service of regional development	- develop peripheral areas to ensure structural development and social cohesion - test broadband connectivity in decentralised areas - improve collaboration between SMEs - promote use of ICT by SMEs, local public bodies and citizens	n/a	Creation of a focused limited-term Association (TAA) that united several pre-existing bodies both public and private

Regionförbundet i Kalmar län	RPIA ISMIS: Innovative Smålan and islands	<ul style="list-style-type: none"> - regional economy based on knowledge and technological innovation - e-EuropeRegio: the information society at the service of regional development - regional identity and sustainable development 	<ul style="list-style-type: none"> - cross sector collaboration in clusters - promote competitiveness in the region - integrate an innovative approach into regional development strategy 	50% structural fund 50% public fund	Refine: creation of regional innovation system for cluster development ReNoKAL: aluminium cluster
IUC Gnosjoregionen Småland	GnowHow: respond to employment crisis in the region	<ul style="list-style-type: none"> - respond to employment crisis in the region - maintain regional know-how - creation of competences centre 	<ul style="list-style-type: none"> - fusion of two clusters - knowledge transfer and redeployment of employees - regional economic development 	n/a	Screw cutting national centre polymer cluster
IWT (regional authority) Flanders	Thematic Innovation Stimulation projects	<ul style="list-style-type: none"> - Provide pro-active guidance during company innovation process, particularly SMEs with mutual technological problems - Support companies in optimising mutual cooperation between themselves and with knowledge centres 	<ul style="list-style-type: none"> - access to innovation for SMEs - promotion of cluster activities - financial and advisory support for SMEs and R&D projects 	n/a	70 cooperation projects funded

Table 4.1: ERIK database Good Practices for the TWG Clusters and Business Networks

It is important to note that the ERIK regions are very heterogeneous: historically, economically, geographically, culturally, technologically and especially in cluster development. As highlighted in this table, not all regions have developed specific cluster policies but this has not prevented the evolution of clusters, illustrating that there is not a one to one cause-effect of a regional policy.

Clusters can form the perfect environment to enhance competitiveness by allowing firms to take advantage of local knowledge, suppliers, information, skills and enhanced innovation opportunities. For that reason cluster policies should address issues that cannot be resolved by clusters themselves and would add value through the formulation of a public policy measure.

Market and systemic failures	Policy response	Regions cluster based policy making
Limited interaction between actors in innovation systems	Provision of platform for dialogue	Bremen: MSG, Alentejo: rout of flavours
	Facilitation of cooperation in networks	Flanders: VIS-TIS, Småland med oarna: Refine
Mismatch between knowledge and market needs	Facilitating joint technology transfer programme	Alentejo: Old techniques new concepts, Western Macedonia: WIN
	Facilitating joint industry-research cooperation	Flanders: VIS-TIS, Småland med Oarna: TEC
	Human capital development	Småland med oarna: GnowHow
Informational failures	Strategic innovation culture	Castilla y Leon: RIA, Western Macedonia: K cluster

Table 4.2: Cluster Policy Initiatives from the ERIK regions

It is claimed that policy measures should only be developed with the occurrence of market, policy or systemic failure and measures should be taken only if failure has been recognised. Public authorities should be seen as facilitators rather than initiators. Through the experience of the ERIK network, a series of policies initiatives and clusters policies have been recognised.

Policy Recommendations

Through the ERIK experience the following policy recommendations have been formulated:

ERIK Network
Policy Recommendation

Platform for collaboration

Regions have recognised the need to address the lack of interaction between innovation actors, but many have difficulty in involving these actors and maintaining their interest in innovation. Constant dialogue between innovation actors and authorities is crucial to a successful innovation system.

The ERIK experiences from the Bremen region in Germany, with the “Mobile Solution Group” initiative, highlights that the provision of a platform for dialogue is essential. The project established a virtual platform where mobile technology actors in the region could interact. It is recognised in the region that this platform permits better understanding of the issues enterprises face, the solutions available and the support that can be given through a bottom-up approach.

As a result the platform provided innovation actors with the instruments that were needed to coordinate actions in the region around mobile technology solutions. The measure was so successful that a limited company was created at the end of the initiative in 2002. The collaborations carried out within the project, and the environment created during the initiatives constitutes the nucleus of the Mobile Solution Cluster in the Bremen region.

Public policies need to facilitate cooperation in networks

ERIK Network
Policy Recommendation

Regional actors tend to act innovatively but in their own respective fields. Many regions possess the knowledge and expertise for innovation but it is very rare for all innovation stakeholders to collaborate actively together. While the requisite components exist for regional innovation systems, policies must facilitate cooperation in networks. Research has demonstrated that the triple helix model constitutes a perfect innovation system but in order to help regions to achieve this model, public authorities must assist the diverse actors and stimulate cooperation.

A suitable example of this is the “ReFine” project that was undertaken in the Småland med Öarna region in Sweden. The regional innovation system was an alliance between businesses, public institutions and university/R&D institutions. Active participants were from manufacturing and service companies, local councils and public institutions, knowledge transfer institutes, universities and R&D institutions. Examples of activities range from international collaboration and assisting local companies to access new markets and develop new and existing products, to studies of the economic environment, supply chains and innovation benchmarking. This project integrated an innovative approach into the regional development strategy. The ReFine group created in the project is fully active in this strategy.

ERIK Network
Policy Recommendation

Joint technology transfer programme

Regions need to constantly evaluate their economic position and scan for new opportunities in creating knowledge. With the creation of knowledge and the development of new technologies, regions have difficulties to align market demands with their core competencies. Regional authorities need to develop programme for joint technology transfer.

“Old techniques new concepts” is a project conducted in the Alentejo region in Portugal that addressed this issue of technology transfer. The project was established to harness the tacit

knowledge of traditional craftsman, strong in the Alentejo region. The project permitted a joint knowledge transfer between very experienced craftsman using traditional techniques and the capacities of young design graduates that used the latest technologies. The region recognised the need to evolve this traditional cluster through the adoption of new technologies and to transform their regional economy. The knowledge transfer programme was very successful and resulted in the creation of a line of products utilising tacit knowledge to obtain the best raw materials and knowledge of unique designs aided by specific software.

Joint industry- research cooperation

ERIK Network
Policy Recommendation

Regions have recognised the need for a bottom-up approach within clusters initiatives. In order for SMEs involved in Clusters to absorb R&D carried by research institutions, it is essential for research to be demand led. Applied research performed by research centres implies that industries have the capacity to maximise competitiveness in the region. Universities are becoming a crucial actor within innovation system by providing the appropriate level of knowledge and skills that SMEs lack to offer solutions.

Småland med Oarna, with the “TEC” project developed a methodology where universities have collaborated with the Heavy Vehicles cluster. It has thereby contributed to competence-development, R&D initiatives and other cooperation. In connection with such initiatives cooperation has also been developed with other clusters and groups of enterprises.

Close cooperation was developed with Växjö University, which has chosen heavy vehicles as a special profile within the science-area technology. Cooperation has also developed with a number of other universities and research-institutes. Stevens Institute is a leading university in the USA within Systems Engineering which has been identified by the enterprises as a key-competence for the development of complex technical systems. Stevens Institute and Växjö University have decided to develop cooperation around both research and education.

The networks between enterprises and R&D recourses that were developed together with R&D initiatives have enforced the innovation system in regional industry. New programmes for research and education have been developed which is essential for the future development of the industry.

ERIK Network
Policy Recommendation

Human capital development

Regions need to be aware of their human capital and constantly have cluster policies that support the upgrading of skills and competencies that are essential to develop a competitive region and to foster innovation potential. This factor is not only crucial for the effective development of the cluster but also for SMEs to be able to upgrade their internal competencies. It is for regional authorities to ensure that the cluster environment integrates universities and training facilities to maintain the development of human capital.

Due to the relocation of a large employer from the Småland med Oarna region, the regional authorities developed the “GnowHow” project in order to redeploy a large number of redundant staff and to retain tacit knowledge within the region. The project supported the development and cross linking of two clusters through the adoption of competence centres. The clusters were focussed on screw cutting and polymer production. The good practice supported the cluster development in order to create growth. Activities have concentrated on company development, product development, benchmarking and related information and have encouraged staff reemployment with key technology and process expertise.

Strategic innovation culture

ERIK Network
Policy Recommendation

For innovation to be seen as a strategic priority within a region special attention must be given to developing an innovation culture in a uniform and systematic way. Innovation needs to

be addressed in regions as a priority and be integrated within a regional innovation strategy in order to enhance innovation within clusters and permit cross-cluster collaboration.

“K cluster” was developed in the Western Macedonia region of Greece. The initiative was set up to awake the innovation spirit in SMEs. A series of innovation workshops and knowledge transfer events were organised where cross-sector activities were encouraged. Innovation groups were established where consultants highlighted innovation issues in SMEs. For the purpose of the project events were presented under themes and sectors that were considered by authorities of importance for the regional economy. Efforts were made in the Agro-tourism sector and the food sector in particular and SMEs made presentations in events and workshops of innovative processes, products and ways of thinking towards innovation in those sectors.

The “WIN” programme was also developed in Western Macedonia in order to engage enterprises from the wood industry to innovate. A call for proposals for innovation within the wood sector was launched and as a result 5 pilot projects were financed and developed for SMEs. Those pilot projects proposed innovative processes, products or services in the wood industry and their results were presented at a series of workshops.

Strategic market information and strategic cluster studies

ERIK Network
Policy Recommendation

Measures taken without prior market information and cluster studies are inappropriate. Regions must have a better knowledge of their own environment. The first step that needs to be taken by all European regions is a mapping exercise. It is for regions to know what is happening in their regions and what the exact state of their cluster development is. It is not possible to develop appropriate support measures when the regional picture is not available.

A full study on regional clusters with their organisation, their function, their presence and their importance in the region will permit the basis of any analysis. It is crucial to understand not only the basic statistical data available in the region but the linkages that are occurring within the region through clusters and the interaction between them. Other than regional data, a qualitative understanding of knowledge transfer flow as well as the dynamism of communication between regional actors needs to be known. Cluster mapping provides information on the actual development stage of clusters in the region and as a result it gives incentives to policy makers on the specific support needed throughout the cluster life cycle.

ERIK Network
Policy Recommendation

Impact measurement

Many regions have developed programmes and projects in order to improve clusters in their respective regions. Measures towards improved clusters performances in regions are numerous and recognised as crucial for regional economic development. Regions have also recognised that no formal impact assessment of policy measures has been developed. Even though cluster policies have been developed and implemented it is not an easy task to transfer lessons learnt to other regions if the real impact of a measure cannot be assessed. Regions have sometimes demonstrated that an informal assessment tool is utilised within their organisations or region but results are not disseminated and the outcomes of the measures are not clear. Regions must develop and use a formal and systematic cluster measurement process in order to assess the impact of a measure in their regions. An understanding of what does and what does not work within the region is a simple reality that policy makers must know.

Foresight activities

ERIK Network
Policy Recommendation

The UK Foresight Panel defines the aim of Foresight as: “To create a vision of the future by looking at possible future needs, opportunities and threats and deciding what should be done now to make sure that we are ready for these challenges” And “To build bridges between business, science and government, bringing together the knowledge and expertise of many people across all areas and activities in order to increase national wealth and quality of life”

The idea underpinning foresight activities is to gather a group of regional stakeholders and discuss eventualities and needs that will occur in the future. For foresight purposes different tools are utilised and comprise benchmarking, brainstorming, focus group, action planning, SWOT analysis, Scenarios as common exercises techniques.

The rationale of those techniques is to provide stakeholders with a picture of what the region is doing in term of clustering and the exercise will provide them with possible issues and barriers for the future. Foresight activities give power to cluster stakeholders to make decisions now for the future. Challenges will be easier to tackle if they have been thought of before hand and if solutions are envisaged before any crisis arises. The pro-activity of this method enables stakeholders to be in control of the region and anticipate, in order to respond better.

The ERIK network is a very important tool as benchmarking is one of the main objectives of the network. Regions present other regions with measures and initiatives that worked for them in a specific context and in answer to a specific regional need. It is for regions partners to learn and try to replicate successes across regions.

4.2 Case Study: Azione 7.1 E-cluster – Regione Veneto

Strategic Regional Context

Geography and Demography

With a surface area of 18,391 km² and a population of around 4.6 million inhabitants, the Veneto Region represents around 6% of the Italian territory and 8% of the total population. It is located in the north-east of Italy and its capital is Venice.

The Veneto Region is divided into 7 provinces and 500 local councils. Just 3 main towns - Venice, Padua and Verona - exceed 200,000 inhabitants. Among the other provinces - Belluno, Rovigo, Treviso and Vicenza - only the latter exceeds 100,000 inhabitants. In the region there is an average of 10.1 inhabitants per enterprise.

Economy

Veneto is one of the most developed areas at European level. It produces around 9% of Italy's gross added value and is 5th among Italian regions in terms of per capita GDP (24,945.90 euro). Veneto's economic system is oriented towards industrial export, in particular metal-mechanics, textile, leather, electrical equipment, metal and metal products and other manufactured goods. In import terms transport, chemical and food products are significant.

The industrial sector is well developed and its many small and medium-sized firms form the region's industrial base. Typical industrial sectors in Veneto are the clothing sector and furniture industry. With infrastructure evenly distributed throughout the territory and a good road network, it has been possible to avoid over-concentration of industry. It is vital to note the number of SMEs which are often family run but are more and more oriented towards a new "group" organisation. Agriculture, predominantly small or medium sized farms, is another important regional resource.

Labour Market

The total number of employees is 2,042,300. The employment rate stands at 63% of the work force, among the highest in Italy, and the unemployment rate at 4.02%. The rate of female employment is 39.8%. The sector based employment distribution rate is as follows: 56% in the service sector, 40.5% in industry, and the rest in agriculture.

Research and Development

Veneto spends 0.7% of its GDP on research and development, of which 0.4% comes from public sector, 0.08% from government, 0.02% from university and 0.2% from the private sector.

The 2 Regional Programmes of Innovative Actions financed for the Veneto region were based on theme 1 “Knowledge-based Regional Economies and Technological Innovation” and theme 2 “E-EuropeRegio: the Information Society and Regional Development”. The RPIAs fit into the framework of the region’s aim to extend and improve development of various aspects of the Information Society, with a view to a gradual transformation towards a Knowledge-based Society. Ultimately, the region hopes to apply the Lisbon recommendations by 2010.

The first Veneto RPIA approved by the European Commission with a total financial allocation of 5.2 million euro, 2.6 million of which was funded by the EFRD, was completed in 2004 and focused on the on-line services sector.

Three factors slow down the spread of public and private on-line services unless they are adequately developed: on-line trust, the culture and knowledge needed for on-line work and easy telematic access to public services. The Regional Innovative Actions Programme “Accelerate the development and spread of on-line services in the Veneto Region” adopted three action lines, each with a pilot project to deal with these factors:

- Accelerate integrated development of trust-enhancing guarantees for on-line services, with special reference to electronic business transactions via Internet (*Safe Commerce*);
- Develop the tele-work capacity in the Veneto by instituting a network of E-Learning workshops (*Veneto Net ELTW*);
- Facilitate relations between citizens and their local administration by means of a personalised portal (*MY PORTAL*).

In 2004 the European Commission approved a second PRAI proposal “Veneto Net Goal 2006” which aimed in part to provide continuity for initiatives launched in the first Programme and in part to respond to requirements for future regional economic development with relation to small and medium-sized industrial concerns. Recent scenarios arising from de-localisation of production to areas of low labour costs have had a particularly striking impact on the Veneto Region, with negative repercussions on firms that made up the local supply chain. Furthermore, the inevitable internationalisation of markets leads to a consequent necessity for SMEs to find new configurations and human resources to identify and exploit new business opportunities.

Four action lines were devised to fund pilot projects and new applications: E-Government; E-Business; Networking; Net-learning. The e-cluster project, on the second action line, set out to devise and test an alternative, innovative model of cluster organisation, a model that could cope with new competitive challenges and boost collaboration between clusters, organised into virtual networks of customers and suppliers.

Political Context

In Italy, cluster policy largely corresponds to industrial district development, districts being large number of SMEs organised into an industrial network. As a system for organising economic activity, industrial districts have made a significant contribution to the development and competitiveness of the Italian economy. Since the early 1990s a body of legislation approved at a national level has aimed to decentralise decisions on industrial district support to a regional level, recognising the territorial specificity of the districts and the need to delineate industrial policies capable of meeting specific local requirements.

While this process of transfer has proved correct in its basic concept, it has also exhibited severe limitations. In spite of various actions undertaken by Italian regions to implement industrial policies at a district level, district systems have seen a fall in competitiveness in recent years, only partially explicable by economic factors. This has led some parties to sustain that the incremental innovation model proposed by traditional industrial districts constitutes a point of weakness in a global context.

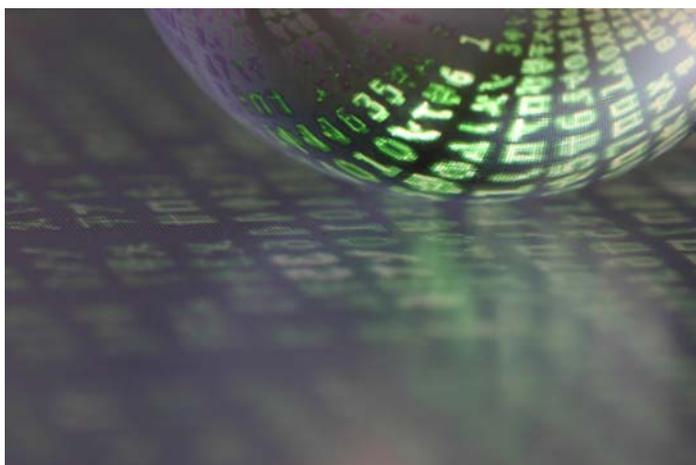


Figure 4.3: Computer Digits

According to the report produced by COTEC Foundation on behalf of the Ministry for Innovation and Technology (COTEC 2005): "...particularly in the initial stage of the transfer process, there was insufficient strategic clarity on the operational management of districts. The absence of an effective model of governance was only occasionally offset by activities undertaken by individual regions. The lack of governance was sometimes accompanied by a consequent lack of strategy.... regions were not provided with the tools required to conduct initiatives geared to promote competitiveness through research and development and networking within the district. To a large extent, the local industrial development model established for the districts appears to be entirely detached from public and academic research in the local area. Lastly, there is a tendency to neglect the role of large enterprises in driving, coordinating and orienting subcontracting activities of smaller companies, which in the majority of cases are the mainstay of the districts themselves."

These initiatives have until now had little effectiveness on the development of clusters and networks strongly geared towards innovation and competitiveness, which only in recent experiences of technological districts have assumed a role of collaboration between enterprises and research facilities as an element capable of generating new forms of competitiveness.

Like the rest of north-eastern Italy, the Veneto region is experiencing an increasing gap between exports and productive internationalisation. While Veneto-based enterprises have not experienced any particular difficulties in tackling international markets through exports, it is only recently that they have begun to address the question of internationalising production stages.

While the Veneto production system tends to consist of closed production chains, which are open only in the upstream (raw materials) and downstream stages (outlet markets), it is progressively becoming more open. We are seeing not only an increase in foreign investments, but also a lengthening of the supply chain (e.g. Eastern Europe). This transition from short to long networks provides opportunities to valorise and renew knowledge external to local systems while posing challenges for maintaining local knowledge and expertise on production stages.

Project objectives

The e-cluster project tests how small high-tech enterprises can connect with service and supply enterprises, which are currently experiencing a period of crisis due to the phenomenon of production relocation to areas where labour costs are lower. The e-cluster project addressed this problem by encouraging firms to experiment with new forms of organisation and to develop new areas of knowledge through the use of new technologies and platforms.

The connection between different enterprises should lead to new cooperation opportunities in terms of projects and supply management. It should lead towards new clients, even outside of the immediate geographical area, through the use of modern technology. Therefore, the project had a twofold final aim of defining and testing alternative approaches to improve co-operation and repeating project results in similar contexts inside the region in order to translate these results, methods and good practices into regional policies supporting business networks.

Description of Activities

The e-cluster project is divided into the following three stages:

Stage 1: Definition of the Model

A dynamic cluster model was devised following analysis of good practices in other regions inside and outside of the EU, of the specific features of the Veneto region and of theoretical models developed in academic fields and published in literature.

In the first phase of the project researchers hypothesised an innovative e-clustering model. In particular, the development and evolution lines of business networks were identified. This phase concentrated on singling out key factors, ICT and organisational models which could help to combine organisational processes in company clusters and make them more efficient. In parallel the study phase highlighted the importance of improved communication among e-cluster actors.

Stage 2: Experimentation and Pilot Projects

After defining the key factors of e-clustering, Veneto Innovazione, with the help of its partner Entrepreneur Associations, selected some companies in the clusters to carry out the experimentation and test what was hypothesised in the research.



Figure 4.4: Information Flow

The companies had to possess certain characteristics. They had to be firmly rooted in the region, with a local supply network and a set of skills/know-how that is characteristic of the Veneto; they had to be a medium-small family-run firm which recognised the need for organisational innovation; they had to be at a critical point of passage/change (growth in size,

generational change, acquisition of new market segments) and they had to be committed to the model and have a good reputation with other cluster companies.

The experimental methodology makes use of ICT to recognise and enhance the efficiency of company processes and to support the information flow between the company and the reference network (see figure above). The goal is to valorise and develop extended networks collaborating in physical and virtual contexts, with strong involvement from all participants.

The entrepreneur and key figures involved also receive coaching to help redefine their roles and responsibilities in view of the increased intensity of relations within the cluster.

Stage 3: Extension of the Good Practice

The initial intent of the experimental stage was to support implementation of the e-clustering approach in order to replicate and extend the model in similar circumstances. Thus, this stage identified enabling conditions and critical elements for the model, methodologies and ICT and performance indicators to monitor the pilots. The goal of the experimental stage was to learn lessons to translate the solutions tested into regional priorities and policy contents.

Following an extensive analysis of regional industrial districts, it was possible to identify two interesting clusters for experimentation and one on which a feasibility study could be conducted to investigate the possibility of developing a shared e-clustering strategy and potential ICT tools to support collaboration between the companies involved. The chosen companies in the two clusters involved in experimentation were: *L'Abbigliamento Bambino* (Children's clothing) and *La Scarpa Sportiva* (Sport shoes). Both companies were involved in an experimentation phase where ICT was introduced to facilitate production or distribution processes. After the experimentation period, results from the indicators developed for the e-cluster project were analysed and compared. Despite the short experimentation period some interesting results can be observed.

In both cases it was noted that using ICT to improve effectiveness of production and distribution to the final end user could lead to streamlined collaboration between different enterprises involved in production and distribution. The experiment also helped to understand and recognise issues and barriers that arise during the e-clustering process. The results in both companies showed some similar issues in implementing the e-cluster methodology. Particularly important was the commitment of the management to adhere to the new technology, both by training staff and by dedicating extra human resources to make sure that any technical difficulties related to new technology could be dealt with immediately. Results also highlighted the necessity of commitment from all enterprises in the supply chain not just the main SME.

Partnership

The project benefited from high levels of commitment from all partners, detailed below.

Veneto Innovazione (www.venetoinnovazione.it): Veneto Innovazione is a Shareholding Company which promotes and develops applied research and innovation in regional production systems. Special focus lies on technology in SMEs, improved environment and training human resources. Veneto Innovazione works through research, implementation, the spread of emerging technology and computer systems and the development and implementation of operational projects and research and study programmes. In 2005 the Veneto Regional Government granted the role of coordinator of the e-cluster project to Veneto Innovazione.

The project benefited from the cooperation of two research groups belonging to the Department of Economics and Business Management of Ca'Foscari University in Venice, and the Department of Techniques and Management of Industrial Systems of Padua University.

University of Padua (www.unipd.it): The University of Padua, founded in 1222, is one of the oldest universities in the world. Padua has a remarkable history of professors including Galileo Galilei (1592-1610). Promoting International studies from the beginning, Nicholas Copernicus (1473-1543) was one of many students who came to Padua from other European countries. Today, Padua is still ranked as one of the world's leading universities.

University of Ca'Foscari (www.unive.it): Ca'Foscari University of Venice has an outstanding national and international reputation for academic excellence in teaching and research. Founded in 1868 as the first Italian higher education institute devoted to commerce and economics, it has since moved into new subject areas. Ca'Foscari is now a modern and well-renowned university offering a wide range of teaching and research activities across four main subject areas: economics, languages, science and humanities.

The beneficiaries of this project were small and medium sized enterprises in the service, industry and agricultural sectors. In order to experiment the e-cluster methodology developed the two above-mentioned companies were chosen:

L'Abbigliamento Bambino: A small-to-medium, second generation company with 20 employees and a turnover of 8 million euros. Annual growth rates currently stand at 20%. They make clothing for children aged between 0 and 14 in two collections (spring-summer and autumn-winter) featuring around 400 products within 4 lines.

La Scarpa Sportiva: This firm produces three different models of football boots, has a turnover of 40 million euro a year, over 1,100 employees in Italy and abroad and produces and sells around one million sports shoes a year.

Programming

The planning and programming of this project fits into the overall strategic context described above. In order to increase effectiveness and tangibility of regional policies supporting innovation, it is necessary to define the practical problems that companies face in establishing a network on ICT-based knowledge, which obstacles hinder the implementation of technological platforms, which organisational obstacles and barriers exist and which skills are missing and finally which are the best solutions to stimulate and facilitate change.

The most suitable research method for answering these questions is undoubtedly *action research*. As its name suggests, action research is a method of research that involves a course of action to find a solution for the problem at hand. Certain characteristics of action research made this method particularly well-suited to studying e-clustering or the process stimulating e-cluster creation.

Firstly, action research made it possible to conduct experiments assessing the process of cluster-supporting technologies adoption in the field. It also made it possible to test the effectiveness of e-cluster practices by studying them their implementation in context. Furthermore, it provided the opportunity to carry out an extensive, sufficiently long-term study to make it possible to implement technologies or practices and to visualise and evaluate their results. Furthermore, during the e-cluster experimentation, the researchers worked in close contact with the companies involved, not just as a means for gathering data but also to facilitate and stimulate discussion and thought on conducting activities and collaborating with others in the cluster. This not only led to intensified network relations; it also triggered a complete rethink of certain activities.

Discussions with staff members and an analysis of the situation within the chosen companies made it possible to clarify the sometimes tacit knowledge possessed by the individuals on the activities conducted, as well as serving training purposes for staff members themselves. Several meetings were held with staff at La Scarpa Sportiva and L'Abbigliamento Bambino to analyse the context and processes, define the aims of the experiment, plan the intervention and evaluate its progress.

The action research was carried out by a team of researchers coming from the University of Padua and the University of Ca'Foscari. This meant that, not only was the team able to dedicate sufficient time to gathering data within the company and working in close contact with members of the organisation, but also subjectivity issue, deemed one of the greatest weaknesses of action research, was bypassed. Indeed the presence of more than one researcher during interviews and meetings to discuss the data allowed the researcher to have a more objective viewpoint of the events observed.

Management Structure

The e-cluster project was coordinated by Veneto Innovazione, the regional development agency for the Veneto region. The other partners of the project were the University of Padua and the University of Ca'Foscari (described above). The project management team comprised 17 people from Veneto Innovazione, Padua and Ca'Foscari University and 2 external ICT and innovation consultants. The two selected companies were also involved.

Veneto Innovazione had the over all responsibility of coordinating the project. It was responsible for the day to day running of the project and to ensuring that project objectives were achieved. As explained above, some researchers were included in the process in order to undertake the more technical analysis and research needed to understand and address the issues encounter by e-clustering. Those researchers were from the universities mentioned and the two external ICT and innovation consultancies.

For management purposes a series of meetings were organised between the management team, IT experts and the two companies involved. Details can be found in the Table 4.3.

Marketing

The creation of the cluster attracted a lot of attention throughout the entire geographical area of the region. Both the Innovative Actions Programme and individual projects were promoted through Veneto Innovazione's website (www.venetoinnovazione.it), and the IRE website (www.innovating-regions.org). The project was also shown on the European Commission's website.

L'ABBIGLIAMENTO BAMBINO		
PARTICIPANTS	SUBJECTS DISCUSSED	NUMBER OF MEETINGS
Veneto Innovazione, University of Padua, staff from the sales office and the general manager of L'Abbigliamento Bambino	Analysis of the context (products, markets, mapping the supply network, physical flows, processes, etc.)	4
Foreign agents, sales office staff from L'Abbigliamento Bambino, Veneto Innovazione, University of Padua	Discussion of project for entering orders via web	1
Veneto Innovazione, University of Padua, director general	Definition of indicators for evaluating the experimentation	2
Veneto Innovazione, IT consultants, L'Abbigliamento Bambino staff	Training on software and data entry	7
LA SCARPA SPORTIVA		
PARTICIPANTS	SUBJECTS DISCUSSED	NUMBER OF MEETINGS
Veneto Innovazione; University of Padua, IT consultants, planner of the La Scarpa Sportiva plant in Italy, management control staff, managing director.	Analysis of the context (products, markets, mapping the supply network, physical flows, processes, etc.)	4
Veneto Innovazione; University of Padua; planner of the La Scarpa Sportiva plant in Italy, management control staff, ALSS manager of order handling	Mapping the process for managing orders ALSS	1
Veneto Innovazione, IT consultants, staff from La Scarpa Sportiva	Training on software and data entry	6
Veneto Innovazione; University of Padua; planner of the La Scarpa Sportiva plant in Italy, management control staff.	Evaluation of the experimentation	1

Table 4.3: Meetings Held Throughout the e-cluster Project

A conference was held in January of 2007 called "Patterns of Clusters Evolution", and the finding of this project was shared with policy makers, EU experts, academics, district managers

and practitioners coming from about 20 European regions. The conference organised in collaboration with the IRE and ERIK networks, focused on the future of clusters: how to structure suitable organisational models, how to foster networking and transnational cooperation, role and input of technologies and policies for cluster development. Participants compared different experiences to compose a multifaceted but comprehensive framework and help identify the most suitable innovative clusters to increase European competitiveness.

Effectiveness

This project had a high impact on the regional economy, and a directly resulted in notably improved co-operation between actors and research and design institutions in the area.

The ERIK network has developed a series of indicators that enable good practices to self-assess their effectiveness. This tool demonstrated that the e-cluster project scored exceptional results and has had a positive effect on the region of Veneto. The good practice fitted with regional strategy and, having being formed by a combined approach (both bottom up and top down), engaged partners from enterprise, academia and public authorities. As a result, e-cluster collaboration has dramatically improved levels of regional cooperation between enterprise and R&D institutions, so much so that supporting infrastructures have been created through the good practice. E-cluster has also helped to develop further ICT infrastructure and R&D opportunities for the Veneto region.

To sum up, e-cluster has played an important role in strengthening existing partnerships and bringing new actors together, increasing support and infrastructure in the region crucial for the sustainability of the project and in disseminating results at inter-regional level.

Innovation

In addition to the innovative nature of the e-cluster model itself, the main innovative aspect of this project lies in the fact that the e-cluster model is applied to a real context in which contact between participant companies, the perceptions of entrepreneurs, organisational and operational modes and business imperatives provide an essential key to achieving results.

Deep transformations in the world economy have led to new structures and forms of competition among companies and economic systems, by imposing a rethink of production processes and value creation which involves businesses and territories. Consequently, in this project focus is no longer on the “cluster” as a formal institutional object of support policies. Instead, more importance is attributed to the “network” in the sense of grouping participant bodies engaged in the same value chain, with a common strategic vision, a shared business language and approach and functional technological facilities capable of conveying the requisite information flow.

Further innovation of the good practice is seen in the combination of tacit know-how with ICT towards to construct a virtual cluster. The Veneto region e-cluster succeeds in bringing together and maintaining the local knowledge to upgrade their local value chain by opening to global markets.

Sustainability and Transferability

Veneto Innovazione currently ensures that coaching and support to clusters will continue. Since 2003 Veneto Innovazione has developed several specific competences in promoting and managing networking and clustering at different stages: from networks of distance workers cooperating in a virtual environment to wide networks of firms in the same sector or the same value chain, to the analysis of the structure and governance of regional industrial districts.

The sustainability of this model is based on four factors:

- The physical /geographical contiguity: implying reduced transaction-costs and the possibility to develop economies of scale;
- The productive specialisation favouring mutual learning and incremental innovation
- The social capital: the workforce's high specialisation and competence (mainly of tacit know-how), the swift information diffusion inside the local community, family, schools etc.
- The plurality of actors as co-ordinators of domestic activity and external promotion.

Certain aspects of this project could be transferred to other regions wishing to experiment with new forms of cooperation and aggregation. In addition to other enabling conditions, this model requires the right cultural setting, considerable motivation and trust between the parties, all conditions that remain relatively unusual on a regional level. Replicating the e-cluster model is not therefore feasible by spontaneous implementation, i.e. by simple imitation.

Some aspects of the project that could be transferred to other regions are:

- Planning: the organisational and operational methodology described above
- Process: the methodology to support the evolution of clusters (identification of key companies in the cluster, entrepreneur coaching, performance indicators)
- Results: the technological infrastructure and the research final report

The following actions or phases could be used to create a local context promoting the spread of clusters and business networks based on the use of knowledge, innovation and collaboration as key elements for competitiveness.

- A. Information: Spreading knowledge of success stories such as the project in Veneto create the right conditions for clearing the path to the e-cluster model. It is vital that success stories be supported by testimonies from the companies involved in clusters and networks to give credibility to the stories themselves on an operative level and not just on an experimental level. The entrepreneurial associations participating in the project, which are able to make easy contact with member companies, can play an important role in managing this phase, as can Chambers of Commerce, Districts, Science and Technology Parks, etc.
- B. Analysis of the business model, processes/technologies and creation of core competencies: The second phase involves analysis of the solidity of the business model proposed for the cluster, analysis of the information and operative flows characterising the supply chain, and building of critical skills to ensure innovative management. Existing information exchange technologies and environments also need to be analysed with a view to subsequent implementation. In this phase as well as in the phases that follow, it is essential to ensure that all required external skills (universities, business and organisational consultants, ICT consultants, technological and managerial innovation centres) are placed at the cluster's disposal. The action-research method is a key factor for guaranteeing project success.
- C. Reorganisation of the processes and implementation of the technologies: The third phase is based on updating the business model, innovative planning for information and operational reorganisation of the cluster analysed in phase 2 and the implementation of exchange and collaboration technologies, so as to make it possible to reappraise the process. In this phase, too, a group of staff with all the key skills and operating according to action research methods is required.
- D. Enabling Services: This phase involves "enabling" or accompanying the company as it builds the e-cluster. This activity is not limited to the e-clustering phase; instead it is continued through the course of time in an attempt to maintain and reinforce e-cluster competitiveness. This activity is the real core of the process and cannot be

carried out without parallel development of skills and activity models within professionals and consultancy companies.

Critical Success Factors

The success factors of this project are as follows:

- The role of the managing structure in co-ordinating the partnership and in overseeing communication flow among the actors involved;
- The identification of strategic regional priorities which are highly supported by both companies and public administrators;
- The direct involvement of the private sector which provided important feedback on needs and lacks to the regional government;
- The importance of testing hypothetical solutions in the experimentation stage and of privileged testimonials of transferring models and solutions to other companies.

For Veneto Innovazione and the project staff involved, the entire implementation phase of the e-cluster project provided an invaluable source of experience and knowledge. The experimentation phase turned out to be particularly useful with regards to acquiring otherwise unavailable knowledge. Amongst others, this knowledge included operational issues that need to be overcome if local companies are to develop their own organisational methods, extending their networks of collaboration and spreading the e-cluster model throughout the Veneto region.

Obstacles in terms of design or implementation

The way the partnership worked together to obtain results was successful, but one obstacle was the fact that the business sector was not sufficiently consulted in the experimental phase. The project management felt that the partnership would have been more efficient and specialised if it had been less institutionalised and if greater consultation with SMEs had been taken. It would have reduced the volume of outsourced workload for analysis and would have increased SME participation (due to a lesser involvement of public sector and local authorities) during the experimentation process.

Conclusions and Lessons Learnt

The lessons learnt whilst implementing the project have led to the outlining of a preliminary phase prior to the e-cluster as the most immediate objective for local policies supporting dissemination of the model. E-clustering is a process which sets out to transform the business model and which focuses on one or more of the following organisational areas: production processes, R&D structure and designing of new products and sales and distribution structure. Project results suggest that preliminary regional policies should focus on this objective.

Veneto Innovazione has noted the following conclusions:

- Doing business in an innovative manner calls for new approaches. In this case, involving networks of companies that work together demonstrates their ability to compete effectively when built on a clearly-defined business model;
- From this point of view, the model put forward by the e-cluster does indeed seem able to provide a useful reference point for transformation processes as described above;
- Nonetheless, in addition to other enabling conditions, this model requires the right cultural setting, motivation and trust between the parties. These are all conditions that are still relatively unusual at regional level. Replicating the e-cluster model does not

therefore appear to be feasible by simple imitation) except in special cases or over long time periods.

A further insight of considerable importance afforded by this project is that the transition towards the e-cluster model requires profound developments within the local tertiary industry. Without such developments an approach that focuses chiefly on the granting of financial incentives for creating e-clusters risks being ineffective.

Contact Details

Matteo Ametis - Deputy Director, Veneto Innovazione s.p.a.
Via della Liberta 12, 30175 Venezia Marghera
Telephone: 0039 04 1509 3078
email: matteo.ametis@venetoinnovazione.it
Web site: www.venetoinnovazione.it

4.3 Case Study: Knowledge Alliance, Knowledge to the Market - Zuid Holland

Strategic Regional Context

South Holland with a population of 3,500,000, forms part of the Randstad, the highly urbanised core-region of the Netherlands. This region's strength lies in its wide diversity of activities comprising the world's number 1 seaport, the headquarters of the Dutch government, international law institutes, greenhouse agriculture, various cultural and educational centres and many advanced service industries. However, South Holland is also confronted with a number of problems, notably: an erosion of social cohesion; high unemployment in certain districts of Rotterdam and The Hague; traffic congestion; shortcomings in the quality of housing and business facilities; growing urbanisation reducing the quality and quantity of natural and landscaped areas.

To address these issues, South Holland has used projects financed by European programmes such as Objective 2, URBAN and INTERREG. The province participates in the "North West Europe" and "North Sea" INTERREG III B transnational cooperation initiatives and in the "West" INTERREG III C interregional cooperation initiative. Like all Dutch regions, South Holland also benefits from Objective 3 funding designed to support education, training and employment policies.

Together with 8 other cities, Rotterdam (Delfshaven, Feijenoord) and The Hague are covered by the "Urban Areas Netherlands" Objective 2 Programme which amounts to around 588 million euro, of which the European Regional Development Fund provides 199.7 million euro. The programme has three key priorities: improving the urban economic environment, stimulating economic activity and enforcing the social economic potential.

An URBAN Community Initiative Programme in Rotterdam provided 9 million euro over the period 2001-2006. European funding has attracted a further 15 million euro in investment from the public sector, creating total resources of 24 million euro. The programme area covered three neighbourhoods (Oude Noorden, De Agniesebuurt and Het Liskwartier), north of the centre of Rotterdam with a population of 29,551 and struggling with severe social problems. The programme has three main priorities: improving the physical business environment, including a stronger recreational and tourist function for the river "Rotte" (10 million euro); stimulating economic activity (6 million euro); enhancing the socio-economic potential (7 million euro). An additional 1 million euro is available for technical assistance.

In order to better address the challenges of Dutch innovation, the Ministry of Economic Affairs has renewed and restructured its instruments and their implementation. The aim of the proposed reform is to achieve greater flexibility and customised solutions to meet business needs. Accessibility to instruments is improved by reducing the number of access points and by means of a substantial reduction in preparation costs and administrative burdens. Financial and non-financial measures should motivate entrepreneurs to deliver “top performances”. The new approach groups the restructured instruments into two different “packages”.



Figure 4.5: Modern Business Site

The “basic package”, primarily aimed at SMEs, provides information and advice on, for example, access to knowledge infrastructure and financial support in the form of credits, loans and guarantees schemes. The “programme-based package” identified key areas of strategic importance for the Dutch economy. In collaboration with the ministry of Economic Affairs, actors within a specific key area (industry, universities, etc.) define the organisation and objectives of an innovation programme, allocate financial resources, and formulate projects supporting these objectives. Following approval the government provides “tailor made” support, including co-financing and other instruments grouped within the “programme based package”.

The innovation policy reform is accompanied by a change in the role and structure of organisations involved in policy delivery of industry-oriented research and innovation. This results in the establishment of a “one-stop-shop” for entrepreneurs with promising business ideas needing support. The entities involved at present will evolve into a (virtual) front office addressing industry needs. Their role in policy formulation will also change in time. At the time of writing this reform is being defined and has not yet been completely finalised.

Regional Programme of Innovative Actions

The regional programme of innovative actions in South Holland was entitled “ANSWER” (A Novel South Wing Economic Reply) and was run between 2003 and 2004. The programme had a total budget of 6.38 million euro (EU - 2.99 million, Public - 2.99 million, Private - 0.4 million). The ANSWER programme aimed to transform the South Wing area into a regional centre of

excellence based on knowledge oriented activities. It looked to improve the transfer of innovative potential from knowledge institutes and research centres to businesses in the region.

The projects submitted through ANSWER were experimental and demonstrative by nature and offered new solutions that could be transferred to other national or community instruments. Based on an overall approach three main actions were planned and implemented:

- South Wing, frontrunner in innovation: this action aimed to promote innovation and knowledge transfer to traditional urban economic activities and to encourage strategic and innovative entrepreneurship within SMEs through networks between SMEs and knowledge institutes and R&D activities. Furthermore, the action concentrated on high-tech start-ups stimulating high skilled labour and searching for financing opportunities.
- Strengthening interface between socio-economic partners in the South Wing: this action aimed to adapt professional education infrastructure to innovative needs in regional business, thus improving innovative impulses in business, enhancing co-operation between education and business and fine tuning the labour market to business needs. It also aimed to better utilise educational capacities to support innovative initiatives within SMEs.
- South Wing Innovation Network Generator (SWING): this action implemented pilots for the development and setting up of new business and citizen oriented services based on the newest IC related infrastructure and technology. It also introduced “Community Service Points (CSPs)” in which innovative facilities were made available for citizens, interest groups and professionals and offered media facilities and training for their application. Furthermore, the action line provided knowledge intensive business clusters in important branches of the economy with common ICT facilities and well equipped training facilities.

Political Context

In 2003 the Dutch Ministry of Economic Affairs published a document presenting an analysis of Dutch innovative performance. It showed that The Netherlands are losing momentum and the present international competitive position is not as strong as it used to be. An important issue concerns the innovation paradox, which involves the problematic translation of fundamental research results into industrial applications and economic gains. One example is industry sensor technology industry in which The Netherlands holds a strong position in fundamental research. However, this position is not translated to a strong internationally competitive sensor industry.

This thesis analyses the Dutch sensor technology field using a system of innovation approach, which studies the actors involved in sensor technology and the relationships between them. The most important actors are sensor technology firms, technical universities, research institutes, and various bridging or networking initiatives. This analysis aimed to determine how public policy can contribute to the innovative capacity of the sensor technology industry in the Netherlands.

There is a concentration of firms and research institutes in the province of South Holland, which could benefit from focused policy efforts. Therefore, a case study performed in the province of South Holland aimed to determine whether the actors in this geographical area could be regarded as a cluster of innovative firms and institutions. Cluster policy could prove to be effective in order to stimulate the innovative capacity of firms in this region. The data collection concerned questionnaires and interviews, as well as existing publications on sensor technology. The questionnaires were sent to sensor technology firms and interviews were performed with entrepreneurs in South Holland. Interviews were also held with representatives of scientific institutions as well as Dutch policy makers and executers.

It is not clear that sensor technology firms and knowledge institutions in South Holland can be regarded as an innovation cluster. The firms and institutions are not strongly interdependent

and often operate individually. There is little co-operation in joint innovation trajectories aimed at the creation of turnover and profits. Furthermore, most important networks in which sensor technology firms are active are not localised but rather national or international. The main strengths of the Dutch sensor technology system include the high quality of fundamental sensor technology research, the strong international competitive position of some firms, and the growth potential of the industry. The main weaknesses are the problematic transfer of knowledge from universities to industrial applications, the labour supply, the access to capital, and the absence of strong home market demand. Current policy measures have a stimulating effect on innovation in general. However, the results of this research pinpoint gaps in current policy measures. This analysis was completed before the Regional Programme of Innovative Actions (RPIA) and thus formed the basis of the programme proposal.

The Knowledge Alliance is a combined initiative between companies and the local council of Delft. It is supported by the three universities, other councils, the regional government and a number of research institutes. Since closure of the RPIA in December 2005 these parties have fully financed the Knowledge Alliance activities.

Project objectives

This project was financed under the RPIA on Theme 1 “Regional Economies based on Knowledge and Technological Innovation”. The project started in September 2003 and ended in December 2005 and was awarded a total budget of 2 million euros.

The objectives were to target nine clusters that had been identified as requiring support and being of strategic importance, namely: composites, greenhouse farming, ICT, international law, life sciences, process industry, shipping, transport and logistics, sensor and nanotechnology, water and delta, and to enable them to create new alliances and product-market combinations that could give rise to new innovative industry in the province of South Holland.

Description of Activities

The ambition of the province of South Holland is to become a leader in innovative business. The province already has the potential to do just that. South Holland has enough entrepreneurs, research institutions, educational institutions and government institutions with an existing head start in the knowledge arena. The purpose of the Kennisalliantie Z-H (Knowledge Alliance) is to add further impetus to innovative industry in South Holland.

While entrepreneurs, research, educational and government institutions already operate innovatively in their respective fields, real progress in the knowledge economy demands real cooperation. There are numerous interfaces between the four actors but in practice their activities are not optimally harmonised and are less than concrete. Ideas are only ideas, plans remain nothing but plans.

The aim of the Kennisalliantie Z-H is to bring the group of actors together and to address this critical shortage of concrete projects. By bringing together marketers, producers, developers, inventors and researchers and helping them to speak the same language, existing obstacles could be removed. The basic concept of the good practice was to address the four main groups in the innovation chain: entrepreneurs, research institutions, academic institutions and government institution, to generate interaction between them and to create new initiatives within each group.

Knowledge to the Market concerned new business development and innovation in the nine business clusters named above which represent strong future innovation clusters. In each cluster research institutions, educational institutions, entrepreneurs and government organisations worked together and gave guidance to the processes and activities. The target

for this project was the realisation of new products, processes and services to small and medium sized enterprises, and in fact 32 new products, services and processes were created.

For each cluster, some promising themes are first selected by the cluster organisation itself. These themes are selected on the basis of specific indicators, such as promising markets or strengthening international competition. Following this identification process “theme-meetings” are organised in order to establish common ground among the firms. These meetings are generally large with participation of between 50 and 200 firms.

The third step is to organise smaller workshops with around 10 or 20 firms concentrating on common issues. The result should be participation in strategic innovation projects. In this phase there is also a possibility to execute feasibility or market studies. When the group reaches an agreement to start the project, a letter of intent is signed. The Knowledge Alliance withdraws from the process and the group is fully responsible for implementing the innovation project.



Figure 4.6: the funnel method

The Kennisalliantie Z-H implements a wide range of instruments to obtain effective results. As each branch of industry has its own idiosyncrasies no “one size fits all” instruments are used. One frequently used method is the so called ‘funnel method’ (see Figure 4.2) which is used to identify problems and issues raised during theme meetings and to translate them into concrete questions and related technological solutions. The commercial prospects of the new solutions are subsequently founded on proper market research and feasibility studies.

In addition to organising theme meetings and workshops, market research and feasibility studies are conducted. Where necessary, research institutions are engaged or lecturers and professors are linked to companies, and investors to start-ups. Ultimately alliances are created between the various actors based on which innovative products and services can be generated. In this way the Kennisalliantie Z-H brings benefits to government institutions, research institutes and

entrepreneurs.

The Kennisalliantie Z-H is now an independent platform for cooperation between Educators, Explorers, Enterprise, and Executives in which membership is free. Its independence renders it suitable for acting as an intermediary. For this reason, Kennisalliantie Z-H project leaders are engaged in a wide range of complex, multidisciplinary projects to ensure that all relevant actors come into direct contact. Thanks to link between various disciplines, the Kennisalliantie Z-H acts as a crossroads where different worlds and cultures can meet and generate result-oriented collaboration, and indeed a bridge between theory and practice.

In the following practical examples, the Kennisalliantie Z-H facilitates and finances the process up to and including the formation of an alliance. Specifically, its contribution lies in funding and matching the parties by opening its network of contacts.

The Biopil: Measurement and testing of water and other liquids are important to gauge water quality or contamination levels. The disadvantages of many existing online sensors are

their sensitivity to dirt and the fact that they are often unsuitable for prolonged measurements. In addition, no suitable sensors are available for a number of important measurements.

To address this problem an affordable, wireless, mini measuring system has been developed: the BioPil. The measuring principle (for which a patent is pending) is based on measuring colour differences of indicators impregnated on a very thin strip of plastic wrapped on a coil. Indicators are available for measurements such as pH, dissolved oxygen, glucose, inorganic ions, proteins, hormones and all kinds of cell metabolites. The BioPil allows these indicators to be used in a continuous measuring system.

The members of the Alliance which cooperated to develop this system are: Bioception BV (owner of the BioPil® concept); Delft Measurement Systems, Job Kneppers; Ontwerp en Realisatie, Erik Postma Ontwerpbureau and Groen Agro Control, TNO/Holst.

The Composite Bed: Healthcare institutions are extremely labour intensive. Beds must be moved and cleaned on a regular basis and are used intensively. The existing healthcare bed has the disadvantage of being difficult to clean, awkward to move around and detrimental to workers' postures. Furthermore, it occupies a lot of space when not in use.

This is the reason for the development of lighter beds made of composite materials. As there are many variations and target groups, a subdivision has been made into short stay and long stay beds. The former is mainly used for outpatients or as a spare bed. With this bed, particular attention is paid to its weight and the use of space when in storage. The first design of this bed is now ready. As for the long stay bed, particular attention is paid to ergonomics and the possibility for modular bed construction. Work is currently underway on a feasibility study, market survey and the development of designs for the long stay bed. The final result will be a business model and a launching product. From that moment on, healthcare institutions and suppliers can start using and constructing composite beds efficiently.

5 companies, 1 Healthcare foundation and 2 universities cooperated as an "Alliance" in this project.

Partnership

The Kennisalliantie Z-H was formed by a number of different parties: 3 universities, various higher educational colleges, research institutions, private companies, the province, councils, representatives of the SME organisations and many others. Its very breadth characterises the platform as a unique organisation in the Netherlands. More than one hundred organisations within the membership work actively within the Kennisalliantie Z-H.

The 25 partners involved were: Deltalinqs, Erasmus Universiteit, Gemeente Delft, Gemeente Den Haag, Gemeente Dordrecht, Gemeente Leiden, Gemeente Rotterdam, Gemeente Westland, Gemeente Zoetermeer, Haagse Hogeschool, Hogeschool Inholland, Hogeschool Rotterdam, Kamer van Koophandel Haaglanden, Kennisinfrastructuur Mainport Rotterdam, Provincie Zuid-Holland, Shell Nederland, Siemens, Stadsgewest Haaglanden, Stichting Nieuwe Bedrijvigheid, Syntens, Technische Universiteit Delft, TNO, Universiteit Leiden, VNO-NCW West.

As described above, each partner in the management structure has its own responsibility for the projects the party is promoting.

Programming

For the implementation of this good practice, forming the partnership and ensuring political support were important success factors. The regional authority, local authorities and Chamber of Commerce all took part in designing the good practice. The programme was written by representatives of the Chamber of Commerce, firms, the province of South Holland and the Council of Delft.

Management Structure

All 25 partners named above were represented on the board of governors. Each member of this board is responsible for a certain project result. Governors from universities and research institutes are responsible for projects in research fields, governors from companies are responsible for development projects and governors from public institutions are responsible for government related projects. The organisational method results in effective communication between the partnership and management structure.

Marketing

The Kennisalliantie Z-H succeeding in involving 100 organisations through: 150 team meetings and workshops and 2 large, conference style events (2500 visitors per event), digital news letters sent to 3500 recipients and hardcopies of brochures, the project website, press coverage such as articles in related newsletters and newspapers, including national and interviews on local radio and television and presentations at related conferences.

Effectiveness

This good practice has been highly effective, with an important impact on the regional economy, and a noticeable improvement in co-operation between regional actors.



Figure 4.7: Closeup of computer motherboard

Using the ERIK indicators the Kennisalliantie Z-H scores excellent results and had a positive effect on the region of South Holland. It is important to notice that the good practice fitted strategically with the regional profile. Having been formed by a combined approach (both bottom up and top down), the good practice engaged partners from enterprise, academia and public authorities. As a result collaboration through Kennisalliantie Z-H has dramatically

improved the level of cooperation between actors and R&D institutions at a regional level, so much so that six new incubators/skills centres have been established in the region. The good practice has permitted the development of further ICT infrastructure and R&D opportunities for the South Holland region.

The Kennisalliantie Z-H has therefore played an important part in regional development by increasing and strengthening existing partnerships and bringing new actors together; by increasing support and infrastructure crucial for project sustainability; and by promoting and disseminating results at inter-regional level.

Innovation

The Kennisalliantie Z-H is innovative in its “funnel approach” whereby four target groups: entrepreneurs, research, education and government are brought together around innovative themes. Structured networking in clusters, where activities are carried out step-by-step following a defined process, is unique to the region, and indeed to other European regions. Innovative forms of cooperation are created among these target groups. A problem or idea is converted into a product or service through a dynamic process. New, fast-growing innovative businesses receive support and guidance. While not revolutionary, it has certainly proved very effective.

Sustainability and Transferability

The continuation of the project has been financed by the partnership since 2006. The parties pay a certain amount of money according to their own financial capacities (skill, number of inhabitants and impact in the province) and have continued to run the scheme in the same way as initially experimented within the RPIA. In this way the pilot has become a permanent regional feature.

Transferability of this project is completely viable as the approach is not of a complex nature and it is relatively cheap to implement. Regions should carefully choose their priorities, for example the strategic clusters on which to concentrate, the partners to involve, and the expert knowledge to which they have access. Once the project is adapted in this way to the specific geographical area the Kennisalliantie Z-H, and in particular the step-by-step approach, would be easily replicable.

Critical Success Factors

The large partnership involving so many regional actors helped the project to get underway and maintain steady success. Interaction between partners and cluster businesses was ongoing, and structured thematic workshops on each subject helped each group to identify areas where they could improve and innovate. This resulted in the participation of 12 SMEs and the creation of 32 new products, processes, and services related to business development.

Furthermore, the sheer economy of scale of the operation enabled project managers to reduce investment costs. The scale of people involved, with a participation around 100 organisations and 25 active partners from different backgrounds, allowed each participant to contribute financially and physically (with human capital) responding to specific needs of expertise. A large number of people could effectively be engaged and utilise an exclusive but extended expertise.

A further success factor is the in-depth knowledge of the territory and of the participating members. With this knowledge, and with the wide range of subjects present in the network, Kennisalliantie Z-H is able to correctly match potential partners.

Obstacles in terms of design or implementation

While a wide range of actors have been involved in the project, it is very hard work to find and keep cluster professionals, meaning actors with specialist knowledge for the clusters. It takes a lot of time and energy to build networks in the clusters. As such, more and more professional staff is needed to facilitate these processes.

Conclusions and Lessons Learnt

Three main lessons were learnt from this initiative and should be taken into consideration when planning future projects and programmes:

- The amount of human resources and financial resources actually needed for the creation of networks within clusters should not be underestimated;
- Business professionals have to be of a certain quality and they are not always easy to find;
- More focus on strategic innovations within the cluster, associated exploitation and selection of innovations that bring a better added value to the cluster is essential.

Contact details

Stichting Kennisalliantie Zuid-Holland
Oude Delft, 2611 CG, Delft
Tel: 00311 1528 40487
Email: info@kennisalliantie.nl
Web site: www.kennisalliantie.nl

5

Thematic Working Group: Services and Support to Start-Ups and Spin-Offs

5.1 Introduction and Policy Recommendations

Amt der Niederösterreichischen Landesregierung, Abteilung Wirtschaft, Tourismus und Technologie (Department for economy, tourism and technology of the Federal Government of Lower Austria) with support from IDEUM, Hans-Christian Jäger, in cooperation with the ERIK partner regions

Introduction

Under the umbrella of regional innovation policy the title “Services and Support to Start-ups and Spin-offs” covers a wide range of activities which can considerably differ from region to region. As a general definition, innovation is the development and marketing of a new product (product innovation), the development of a new production procedure (process innovation) or the introduction of new forms of business organisation.

As shown by the good practices in the ERIK database and further experience exchange and discussion within the ERIK network, the content of regional start-up/spin-off support with respect to innovation strongly depends on overall economic development in the individual region and the existence of a regional innovation strategy. More advanced regions with a comprehensive mass of public R&D organisations, higher education institutions and a strong economy often focus on new technology based firms (NTBF) and academic start-ups/spin-offs. On the other hand, economically underdeveloped or rural regions have to act and react according their situation, to their specific characteristics and resources and should avoid unproductive concentration on sophisticated start-up/spin-off support, which does not match current regional and entrepreneurial needs. They tend to foster innovative new businesses and entrepreneurship in the broader sense of “innovation”, due to limited critical mass of public R&D and limited potential in the field of NTBFs. This highlights the possible different degrees of innovation by distinguishing between “world novelties” and “firm novelties”. In the latter case a similar product already exists on the market but for the enterprise it represents an innovation which can improve customer satisfaction.

Nevertheless regions which lag behind can catch up with more advanced regions by transferring existing start-up/spin-off support tools from these more advanced regions to their own, of course allowing for adaptation according to regional characteristics and needs. In this

way regions can offer new and innovative start-up/spin-off support services for the region and potential entrepreneurs. “Avoid reinventing the wheel” is a popular advice given in this context, meaning why start again from scratch when we can benefit from the experience of others?

Although many differences exist between the European regions in terms of start-up/spin-off support in the framework of regional innovation policy, several common features can be identified regardless of regional typology. This chapter will attempt to identify and develop these features, with the ultimate aim of expressing a number of tailored policy recommendations for regional start-up and spin-off support.

The ERIK model of the start-up/spin-off process

New business creation represents a long lasting process which starts from idea generating and continues to sustainable growth, features which must all be taken into consideration when developing respective support services. The Thematic Working Group (TWG) “Services and Support to Start-ups and Spin-offs” has developed a simplified, linear process model. A short introduction of the model and a description of the single steps will be included here.

The straightforward step-by-step process comprises 5 consecutive steps and a sixth accompanying step of coordination and monitoring. In order to keep the model as simple as possible each support activity is assigned to just one step. Should the single activity or service be relevant to more than one step, it is listed under the most appropriate one.



Figure 5.1: ERIK model of start-up/spin-off process, elaborated by the TWG start-up/spin-off support

The 1st step “*Awareness raising and entrepreneurial education*” involves general education on entrepreneurship for students in schools and universities as well as researchers in universities and RTOs (Research and Technology Organisations). Information events and promotion campaigns also form part of awareness raising activities. These activities address the whole target group of potential academic and non-academic entrepreneurs without giving individual advice.

In the 2nd step “*Feasibility of start-up/spin-off*” the business idea is at a very early and conceptual stage. The identification and first description of the individual business idea is the main focus of this stage, which should conclude with a validation of the business idea and a first assessment of the individual person in terms of entrepreneurial ability.

The 3rd step “*Preparation of the foundation*” of the start-up/spin-off is the pre-seed stage and takes care of individual strength and gaps in a potential business idea. During this stage future entrepreneurs have the opportunity to test their business ideas through prototypes or temporary traineeships. Other important foundation stones laid during this stage are business plan elaboration, market and competitor analysis and clarifications on property rights and patenting.

The 4th step “*Foundation of the company*” includes services such as infrastructure with basic services (incubators) or venture capital.

The 5th step “*Support for start-ups/spin-offs*” is oriented towards support of established start-ups and initial growth during the first 5 years. Services may be provided in the form of continuous coaching, advanced training and qualification of the young entrepreneur and employees, as well as access to growth capital especially for academic and high-tech start-ups.

The accompanying step “*Coordination & monitoring of services according to the regional start-up/spin-off strategy*” accompanies the above steps and checks the consistency of support activities and services within the regional strategy. In this way the effectiveness and efficiency of public money spent on fostering innovation oriented start-ups and new technology based firms is ensured.

Lessons learnt and policy recommendations

The lessons learnt from the support of spin-offs/start-ups are structured according the ERIK model and based both on the experiences of the ERIK network members and on further literature. Each chapter pin points lessons learnt for support of start-ups/spin-off illustrated with good practice (GP) examples for innovation oriented start-ups/spin-offs and for NTBFs / academic start-ups and ends with policy recommendations. The ERIK database includes 10 Good Practice descriptions for start-up/spin-off support from 8 regions, mainly part of the Regional Programmes of Innovative Actions.

Awareness raising & entrepreneurial education



- Awareness raising – the earlier the better
- Entrepreneurship as inherent part of technology related courses
- Innovative start-ups create an innovation friendly milieu

Lessons learnt

“The promotion of entrepreneurship, its role in society and the opportunities it presents for personal gain, appears to be critical for facilitating economic growth. Policies geared toward enhancing the entrepreneurial capacity of a society (i.e., the skills and motivation to pursue opportunities) will have the greatest impact on the level of entrepreneurial activity” [Reynolds 2000].

In order to build the foundation for a higher number of successful high tech and academic start-ups it is essential to integrate topics of entrepreneurship into schools, RTOs and higher education institutions (HEI). These can be integrated with existing activities in order to establish a positive entrepreneurial culture among pupils and to develop their understanding on what innovation is and why it is so important for the regional economy. This awareness need not be limited to young students. The GP from the West Midlands “The over 50’s programme” demonstrates that elder people can also benefit from successful information campaigns on entrepreneurship.

Entrepreneurial education should not concentrate on theory. Instead it should provide practice oriented courses on entrepreneurship parallel to technology oriented classes. It is becoming more and more common to link awareness activities with incentives and feasibility checks, exemplified by the RPIA action in the Algarve “IDEAS - The University Spin-Off Ideas Competition” which awarded 12 prizes of support, training and incubators space to innovative ideas in various fields and by Hamburg’s “Idea Fund” addressed to young entrepreneurs for funding hi-tech business ideas in the pre-seed phase and “Seed Fund” for young hi-tech companies in the seed phase.

Clear target objectives must also be established with regional RTO and HEIs in order to create added social and economic value by exploiting public R&D results and knowledge. Examples include the formulation of target objectives such as the number of start-ups per year

or the share of income generated by technology transfer. So called technology brokers or innovation scouts in Scandinavian regions or the Lower Austrian “tecnnet – patent exploitation” (described below) follow this approach and are strongly linking to awareness raising with first feasibility checks on the exploitation opportunities of public knowledge an R&D results.

The ERIK GP and further start-up support activities all look to overcoming social stigmatisation of new entrepreneurs in case of failure of their start-up/spin-off. Promotion of entrepreneurship and the creation of a positive entrepreneurial climate must be highly penetrated into day-to-day life giving citizens the feeling that entrepreneurship and start-ups are “ordinary”. Articles in regional press and trade journals, TV reportages or further marketing of successful innovation oriented start-ups by regional and local level awards are examples for such promotion campaigns. A specific PR budget within regional start-up support programmes and formal media partnerships, as identified in Lower Austria and West Midlands, facilitate promotion activities.

As Reynolds [2000] points out: “The perceived social legitimacy of entrepreneurship makes a difference. Indicators such as “extent to which fear of failure acts as a deterrent to starting a new firm” and “respect for those starting new firms” indicate fundamental differences in social and cultural values between countries with high levels of entrepreneurial activity and countries where entrepreneurship is not an integral feature of everyday life.”

ERIK Network
Policy Recommendation

Provide awareness raising activities as crucial measures to increase entrepreneurial culture in the region

Innovative entrepreneurs are usually unconventional people breaking with traditional conventions. Dissemination of their new thinking is also a trigger for other people in the surrounding environment, such as former colleagues or former employers, family and friends, to look for new opportunities. The impact is even stronger if regional start-up support provides further awareness raising activities on the importance of innovation for the regional economy and in particular the opportunities of individual entrepreneurship.

Regional authorities are responsible for creating this innovation friendly milieu in the region as a positive climate for successful innovation oriented start-ups. One important brick of this milieu is avoiding labelling failed young entrepreneurs as social and professional losers by providing a social framework which acknowledges the experiences of young entrepreneurs as higher qualification even if the final result has been unsuccessful, as it is already done the USA.

Feasibility of start-up



- Local contact points for potential entrepreneurs
- Personality of entrepreneur and his/her “hunger to grow” are important success factors
- First proof of concept is the starting shot for core start-up process

Lessons learnt

The feasibility stage is a first evaluation resulting in an initial proof of concept of the formulated business idea with structured information on the idea, market opportunities and threats. As a result of this stage the USP (Unique Selling Proposition) with added value for future customers must be clearly defined and the financial practicability verified. In the case of technology oriented and academic start-ups, the technological feasibility of industrial production must also be proven.

Studies show that personalities and individual characteristics of entrepreneurs starting new businesses may be the most important success factors [Reilly Millikin 1996]. Thus, service providers have been known to offer introductory face to face consultation hours like “Capability Audits” or “Check your Opportunities” for people interested in founding their own company in order to have a first look at the business idea and the personality of the potential founder. As shown below, several of the GPs in the ERIK database follow this approach.

For a first “chat” with an experienced person on an innovative business idea the proximity between the potential entrepreneur and the contact point is of utmost importance in order to limit travel concerns, a challenge particularly for those located in rural regions. Established organisations with a positive image and local offices can be involved in such first conversations as was done in Alentejo’s “COMEÇAR - Entrepreneurship Support Offices”. In collaboration with other regional partners the Regional Development Agency with broad knowledge of the Alentejo region created local entrepreneurship support offices promoting and supporting entrepreneurship among young graduates in the sub regions, not only in order to create new jobs, but also to increase the attractiveness of sub regions and to encourage people to remain there. Within the “Vivernet” project Alentejo’s neighbour region Extremadura runs both physical and virtual business centres with a mobile task force team to reach the greatest possible number of regional targets.

Due to complex issues recognised in the case of high technology start-ups, respective service providers must have appropriate qualification skills to carry out feasibility checks. Especially in the field of high-technology and academic start-ups there are close links with overall awareness raising activities. For the first proof concept and – in the case of approval – further preparation, service providers must already have the respective knowledge for high-tech/academic start-up support.

The first direct contact with potential entrepreneurs is often initiated by the business idea competitions like the above-mentioned GP from the Algarve “IDEAS”. Its key innovative feature is the combination of different kinds of support given to the ideas promoters to launch the spin-offs: consultancy, offices at reasonable prices and specific training. Other academic oriented start-up initiatives like Hamburg’s “HEP – Hamburg Entrepreneurship Programme” and Lower Austrian Good Practice “accent” as part of the Austrian wide “AplusB (Academia plus Business) Programme” also follow the integrating approach and cover coaching for start-ups. This involves counselling and assistance during the actual start-up phase and also establishing the idea of entrepreneurship more firmly in academic theory and practice.

In the field of high-technology and academic start-ups studies have identified further success factors as combining technology, application and TT-transfer with “purer” research and a high need for business success [Prize 2004]. The greater the potential entrepreneur’s “Hunger to grow” [Ylöstalo 2004], the higher the probability of a successful start-up.

Consider the first proof of concept as the starting shot for the core foundation process



The longer the time-span from the first proof of concept till the foundation of the company the higher the risk of abandoning the start-up. Furthermore, the first proof of concept is an important indicator of the probability of company foundation. Once the feasibility study has been conducted the foundation process should be accelerated in order to avoid the risk that the results of the feasibility check become outdated and to prove the potential entrepreneur’s commitment to his/her new business.

The allocation of – in particular financial – support services for the start-up process should be concentrated on the phases after the first proof of concept with the increased probability of company foundation. Of course this does not mean that external professional support for the potential entrepreneur in carrying out the feasibility study should be overlooked.

Preparation of the foundation



- Providing high quality services requires high levels of knowledge among service providers
- Revolving funds with convertible loans instead of grants assure the commitment of funds managers and future entrepreneurs

Lessons learnt

Comprehensive preparation of the foundation of a new company represents the soil from which the eventual company can grow. This soil consists of helping the founder (or founders) to gain further qualifications, providing external complementary skills and financial support.

Due to the collapse of New Market, Venture Capital (VC) companies – once typical investors in young, innovative, technological companies – have almost totally withdrawn from start-up and seed funding. This is highlighted by Hamburg in the GP “Ideen- / GründerFONDS” (described below). It is also visible in Lower Austria where the lack of private seed funds hampers the creation of new technology and academic based start-ups. In order to overcome this market failure the Lower Austrian government established the “Pre-Seed Fund” (described below). The serious problem represented by the gap between the 3F-Financing (Family, Friends and Fools) and VC-financing has also been recognised by the Flemish government. Flanders has created the VINNOF fund which provides financing to innovative start-ups in order to close this gap during the pre-seed stage.

All three successful funds named here follow an integrated approach based on the philosophy that successful start-ups are not only driven by technology, but also by innovative marketing, knowledge acquisition and innovative business models with good management structures. All funds finance a broad range of support and qualification activities with flexible out-payments according to need and taking the imponderability of the early start-up stage into consideration. Accompanying coaching is compulsory in Hamburg and Lower Austria, and Flanders is currently analysing this issue.

Providing financial support in the form loans requires high customer orientation from fund managers and strong commitment from the future entrepreneur. If grants are provided instead this commitment cannot necessarily be assured. If the company is the loan can be converted into (silent) equity. On the other hand the loan can be converted into a grant if the foundation is not successful in order to save the young entrepreneur from bankruptcy. This coincides with the recommendations of Clarysse [2004] and Brooksbank [2001] that the focus during the pre-seed stage should be given to pre seed preliminary funding on a non-profit basis in order to give the new entrepreneur more flexibility. Nevertheless, as the three GPs show, with a substantial amount of public money for pre-seed funds it is also possible to attract private investment. Furthermore, revolving funds with loans allows long-term sustainability of such support tools.

Based on the identification of entrepreneurial and knowledge gaps through a capability profile of the future entrepreneur, the necessary training or coaching measures and partnership recommendations can be made. In order to assure a high quality of the respective support services the quality of the service providers has to be assured. In the field of qualification of service providers the Greek region Ionia Nisia has implemented the action “Tourism Start-Ups” to develop innovative services for tourism. In parallel with an innovative ideas selection procedure, a pool of local consultants was identified and trained to offer business support services to entrepreneurs in the development of innovative business plans. Corresponding training materials and guides were developed and made available to local consultants and entrepreneurs. Both this approach and that of Alentejo’s “COMEÇAR” are characterised by a

strong involvement of local actors to support innovative start-ups during the feasibility and preparation stages.

Beside the professional personal services and financial support there is a third important pillar for the preparation of foundation: networking and partner matching by bringing together complementary personalities and capabilities as well as establishing first industrial relationships. Well developed relationships with local businesses are high beneficial for new entrepreneurs as Prize [2004] has identified. Support for the cultivation of industrial collaboration and financial relationships can be provided by Business Angels or by informal meetings, for example “business brunches” or “after work meetings”. These events are more common in the UK than in other parts of Europe, though Hamburg’s Good Practice “HEP – Hamburg Entrepreneurship Programme” also supports the Business Angels approach.

In regions with high populations and R&D/knowledge density such events can be easily organised with a high number of potential participants. In rural areas the critical mass of the target group is often lacking. Regarding technology or academic based start-ups, the organisation of an opportunity forum with a supra-regional approach may represent one way of overcoming this obstacle.

Attract private pre-seed capital by initiation of substantial regional public funds

ERIK Network
Policy Recommendation

Start-ups suffer during the pre and early seed stage from a shortage of capital from private investors, put off by the high risk. This market failure can be observed in almost all European countries, especially in the area of research based start-ups. In order to overcome this obstacle political intervention through provision of public (pre-) seed capital is indispensable. Even a private share of less than 50% is often unfeasible in the first round of pre-seed and early seed stage funds. Only a first “feasibility check” – meaning successful start-up show cases supported with pre-seed capital and a prospective outlook on the revenues from these start-ups – can lower the barriers for private (pre-) seed investors and encourage their involvement.

Therefore, the structural funds regulation which requires a fixed share of private seed financiers from the very beginning of a (pre-) seed fund should be reconceived and applied more in a more flexible manner.

Foundation of the company



- Integrated support for pre-seed and seed with professional services, physical infrastructure and finance
- Proximity of high technology and academic spin-offs to research and technology organisations

Lessons learnt

After its foundation the start-up has an increasingly significant need for reasonably priced office space with basic secretariat services and production facilities. This need is additional to, rather than replacing, the need for professional services and financial support.

One example of an integrated approach comes from the “Vivernet” project in Extremadura which has established a business centre with two local incubators in order to facilitate the development of new businesses operating in the Information Society. Vivernet provides access to ICT resources for young, creative entrepreneurs and offers a broad range of services (information and consultancy, promotion of business support, logistical support). Additionally a virtual business centre found at www.vivernet.com has been established with a travelling team

which operates in the rural areas of Extremadura in order to provide services for ICT oriented start-ups over the whole region.

For high technology and academic start-ups company success is highly connected to their proximity to the research and technology organisation they come from. Heirman Clarysse [2004] identified “a strong correlation between being an academic spinout and collaborations with universities after start-up. Academic spinouts are based on knowledge and technologies developed within the university and the collaborations evolve naturally. In many cases, continued collaborations with the departments from which they spun out are necessary because at time of spinning-out, the technology is in such an embryonic state that further development requires faculty participation.”

Several exchanges during the ERIK study visits (e.g. Warwick University Science Park in West Midlands, Science Park of the Chalmers University of Technology Gothenburg in Western Sweden, TFZ Technology and Research Centre Wiener Neustadt in Lower Austria) underline these findings, as do interviews with researchers from universities and research organisations within feasibility studies for incubators and science parks (see [Jaeger et al 2001], [Jaeger 1999]). Academic oriented start-up initiatives like HEP in Hamburg or ACCENT in Lower Austria are fully aware of the importance of proximity as a success factor and thus work closely with incubators in proximity to HEIs and RTOs.

Financial support in the pre-seed stage and the seed stage of a start-up should be strongly interweaved in order to create financial continuity and, in parallel, to allow the funds to produce revenues after foundation. The above mentioned Good Practice Tools “Ideen- / GründerFONDS” (Hamburg), VINNOF (Flanders) and “Pre-Seed Fund” (Lower Austria) all follow this revolving fund mechanism. In all three regions you can find a strong link between the above mentioned tools and additional seed-capital instruments which allow a smooth foundation of the start-up and provide additional seed capital if necessary. For example, Hamburg’s GründerFONDS is designed to allow current investors to add further capital. While financing (pre)seed technology and academic start-ups must be done by specialised financial organisations, financial support for innovation oriented start-ups in the broader sense is often done by local banks with assumptions of liabilities or smaller (micro) loans with interest rates below market price. This can represent an important economic development activity, as in Alentejo’s “COMEÇAR” or Ionia Nisia’s “Tourism Start-Ups”.

ERIK Network
Policy Recommendation

Provide for comprehensive services and training actions

The earlier the stage of the start-up/spin-off, the more important the provision of advisory and professional services becomes. Without these services the potential entrepreneur faces serious problems in defining the most essential activities, in gaining new knowledge (on market issues, business management, links with future customers and other business partners) to improve the start-up process. This is shown from the ERIK GPs and is especially true if the entrepreneur has a technological background.

In some European regions innovation policy is still dominated by investment in buildings, laboratories, ICT and logistics. Show cases of successful innovation oriented start-ups support can help to change this attitude and to put more emphasis on soft support measures like the creation of start-ups or technology transfer in combination with financing and physical infrastructure.

Support for start-ups



- Build up in-house skills
- Continuous external mentoring with search for follow-up financing
- Image building as an important marketing support

Lessons learnt

Certain literature on the subject of start-ups defines Marketing, technical and negotiating skills as vital success factors for start-ups within their first years after foundation [Prize 2004]. “Hard business skills” will be required to manage the spin-out but not necessarily from the start. Successful spin-outs tend to develop ‘in-house’ capabilities for technical, financial, production, and marketing expertise. These skills can be acquired in various ways: Advanced training and qualifications, employing new personnel with necessary and complementary skills or hiring a fulltime “gun” (experienced managers e.g. in financing or markets) for a short to mid-term period. This idea is currently being implemented within the second RPIA in Lower Austria.

In addition to developing in-house skills, the mentoring aspect remains important for specific advice, for example administrative issues, or to act as door opener for necessary contacts to existing networks and clusters. The mentor can also provide important psychological support for young entrepreneurs. Mentoring can be done by private consultants, Business Angels or coaches from public institutions. The general rule is the higher the innovation and technology orientation, the more intensive the mentoring. Mentoring should also include the search for private follow-up financing in order to allow profitable growth and diversification of new technology based firms should the start-up not be able to survive with its own capital. Furthermore, mentors can help new technology based firms to disengage from the research and technology organisations they stem from and develop an independent business strategy with international orientation involving private support for seed-/growth capital and consultancy.

Very often young start-ups have difficulties with initial lack of reference customers for their new product or service. Successful product development by new technology and research based start-ups should be acknowledged by the public sector within innovative product competitions or awards. This does not only motivate new entrepreneurs but also provides promotional support for new products and is an effective instrument to make start-ups more attractive to venture capitalists and potential customers. In the field of general innovation oriented start-ups focussing on local or regional market with new services, promotion campaigns can be organised by the local community or regional government with, for example, consumer trade fairs or press articles.

Provide exit strategy for public support



Market failure during the first stages of the start-up process requires substantial public support, in contrast to later phase where private VC is more easily accessible as the degree of risk is reduced. Therefore, the first years of the new company with the initial pre-seed and the follow-up financing round mark the change from public support to private financing of innovation oriented start-ups.

Common frameworks for such exit strategies for public support are limiting public seed capital to 5 years or limiting use of public subsidised office space to between 3 to 5 years.

Coordination and monitoring of services according regional start-up strategy

Coordination & monitoring of services according regional start-up strategy

- Clear innovation oriented start-up strategy as part of an overall regional innovation strategy
- Forming partnerships between different service providers
- The overall impact of innovation oriented start-up support is usually mid or even long-term

Lessons learnt

“The strong association between entrepreneurship and economic growth suggests that governments at all levels should do all they can to introduce people to the opportunities afforded through entrepreneurship. To see the greatest number of people recognise and pursue entrepreneurial opportunities, aggressive efforts should be made to build the awareness of and ensure access to entrepreneurship among people of all demographic profiles. [...] Entrepreneurial capacity refers to the skills and motivation individuals need to take advantage of entrepreneurial opportunities. The development of entrepreneurial skills is identified as a fundamental policy priority. Education for entrepreneurship should be woven into the educational curriculum at all levels and the pursuit of entrepreneurial opportunity identified as a genuine, legitimate career option.” [Reynolds 2000].

Entrepreneurial motivation by financial support and professional entrepreneurship education and training, in combination with effective technology transfer, create the framework conditions for prosperous innovation oriented start-ups and new technology based firms. Regional policy must integrate these aspects into a holistic regional start-up strategy including vision, action, adoption and further development. Strategies for general innovation oriented start-up support should cover the whole region and involve local actors. However, with the creation of new technology and knowledge based firms it often becomes necessary to focus on prospering niche technologies or markets with the required regional mass instead of giving everyone a slice of the regional.

The diagram below highlights the importance of political issues in combination with innovation oriented start-up support. In fact integration of the project or programme into the wider policy context is rated the most important success factor. Among different actors regional authorities are seen as the most important for planning and implementation. This is due to their power to make innovative programmes happen and to create positive results.

The managers of the start-up GPs also emphasise partnership among different service providers as a crucial success factor. This is valid not only for single actions or programmes but also for the whole start-up infrastructure. In order to assure an effective and efficient start-up support system basic coordination activities (communication platform with relevant (semi)public service providers) with a strategic steering committee involving regional stakeholders is necessary. Clear rules among (semi)public service providers with clear key capacities and service tasks must be defined in order to avoid competition among them. This includes innovation and start-up oriented target agreements between regional authorities and public research or technology organisations/universities to create incentives for the exploitation of public R&D results and knowledge.

Not only coordination but also monitoring is necessary to assess the impact of regional start-up support and for adjustments to existing start-up policy and single programmes or

actions. However, support for innovation oriented start-ups, especially for new technology and research based firms, should be monitored under mid-term and long-term impact as Heirman Clarysse [2004] points out: “Start-ups need time to mature and to overcome the liability of newness. Previous research indicates that the earliest this might occur would be 3 to 5 years after creation, and more usually, not until the venture is 8 to 12 years old.” Thus, the time frame to measure growth should not be too short. For this reason it is currently difficult to assess the overall impact of GP results as in most cases the RPIA projects have only just finished.

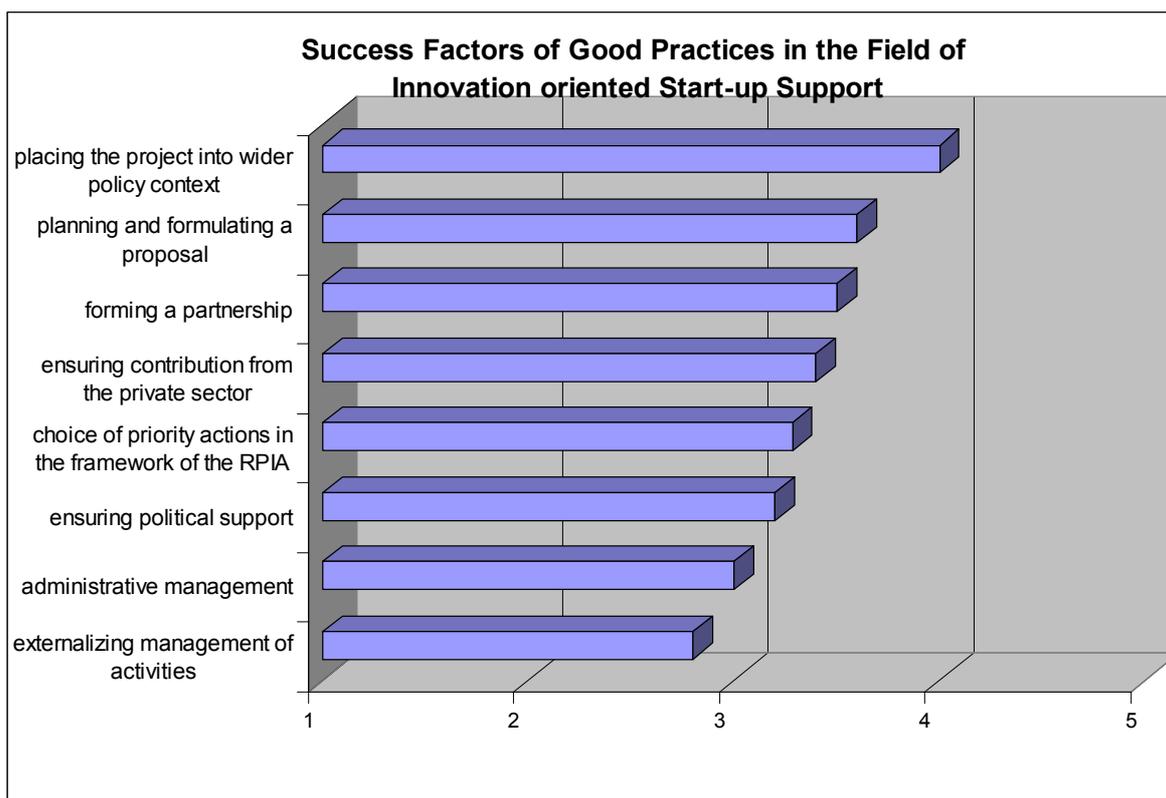


Figure 5.2: Success Factors

Develop a regional start-up strategy covering the whole start-up supply chain



Innovation oriented start-up support must be embedded in the overall regional innovation policy. However, the complete start-up support system is a process which should be built up step-by-step over time. In order to define the strategy and to introduce appropriate support activities, regional authorities first require a clear picture of “need” and of “existing measures”. Support services must also be built through coordination from the regional administration between service and financial providers. Services provided by individuals must be clearly defined and strongly interlinked.

Regional authorities play the role of coordinator, facilitator and stimulator. Public money should be invested in these roles over the whole start-up period. Regional authorities should not be afraid to test new ideas, as within the RPIA and similar regional actions. It is of utmost importance to manage flexible experimental actions in the field of start-up/spin-off support and to react immediately to changes. Thus, continuous monitoring of experimental support actions is a crucial part of management and influences highly on the success of innovative tools in start-up support.

Provide for adequate initial risk assessment when defining regional start-up support programmes

Innovation oriented start-up support, especially focusing on new technology and research based firms, contains a higher risk of failure than other innovation support measures. Regional authorities must accept that this risk exists but at the same time they should try to anticipate and avoid risk at any level. Therefore, it is necessary to pre-assess expected benefit of an experimental action. The potential benefit is determined by the expected impact on the region and by the probability of failure. With start-up/spin-off support the imponderability of the process influences the probability of failure. Therefore, the organisation in charge must gather sufficient information to adequately complete a pre-evaluation. The risk can be considered as a ratio of expected benefit to costs and can be taken as an indicator of whether it is worthwhile running the respective action.

Literature References

1. [Brooksbank 2001]: Brooksbank D and Thomas B: An assessment of higher education spin-off enterprise in Wales, *Industry and Higher Education*, 15: 415-420; 2001
2. [Clarysse 2004]: Bart Clarysse: Presentation during the ERIK Workshop in West Midlands, Jun 2004
3. [Heirman Clarysse 2004]: Ans Heirman, Bart Clarysse: Do intangible assets and pre-founding R&D efforts matter for innovation speed in start-ups?, *Vlerick Leuven Gent Working Paper Series 2004/04*
4. Jaeger 1999]: Hans-Christian Jäger: Gutachten über die Errichtung eines Technologie- und Gründerzentrums bei GKSS in Geesthacht (Feasibility study for a technology centre and incubator at the research institution GKSS in Geesthacht), February 1999 (internal paper)
5. [Jaeger 2001]: Hans-Christian Jäger et al: Machbarkeitsstudie Wissenschaftszentrum als Kristallisationspunkt des Wissenschaftsparks Kiel (Feasibility study for the science centre as focal point of the science park Kiel), final report, September 2001 (internal paper)
6. [Price 2004]: Liz Price: University Spin-outs: Benchmarking Best Practice across Europe (Draft); Enterprise Research and Development Unit, University of Lincoln, ATHENA Research Fellow; May 2004
7. [Reilly Millikin 1996]: Michael D. Reilly, Ph.D. and Norman L. Millikin, Ph.D. College of Business, Montana State University-Bozeman: Starting a Small Business – The Feasibility Analysis, August 1996
8. [Reynolds 2000]: Paul Dr. Reynolds, Michael Hay, William D. Bygrave, S. Michael Camp, Erko Autio: Global Entrepreneurship Monitor, 2000 Executive Report; Kauffman Centre for Entrepreneurial Leadership at the Ewing Marion Kauffman Foundation
9. [Ylöstalo 2004]: Lauri Ylöstalo, Director of the Otaniemi Science Park: Presentation of the Strategy of the Otaniemi Science Park (Helsinki) during ERIK study visit; May 2004

5.2 Case Study: Pre-seed Fund NÖ – Lower Austria

Support of Innovation Oriented Start-Ups in Lower Austria

The Lower Austrian Government has been supporting innovation oriented start-ups since 1988 when the first incubator was founded in the industrialised area of Wiener Neustadt. Within 20 years a network of 10 incubators and 7 service centres throughout Lower Austria has been developed under the trademark "RIZ". The incubators are mainly financed by the communities, while the regional government finances general awareness raising for entrepreneurship and provides information and start-up advice. The RIZ target group is largely innovation oriented start-ups but RIZ incubators are also open for general start-ups as local development activities.

In the 1990s entrepreneurship and start-up culture was a minor priority in Lower Austrian R&D and higher education institutions. No complete service supply chain for support of

innovation oriented start-up existed at this time, let alone a service supply chain for academic and technology oriented start-ups and spin-offs. However, with elaboration of the Regional Innovation Strategy of Lower Austria (RIS NÖ) from 1997 to 1999 the situation began to change. The mobilisation of new business with focus on academic and new technology based start-ups has become one of the 5 pillars of the Lower Austrian innovation policy. Since the presentation of the Regional Innovation Strategy in February 1999 the strong political backing and collaboration between relevant actors in the Lower Austrian Innovation System (as members of the RIS NÖ steering committee) have assured the implementation of the strategy. The Lower Austrian government in collaboration with respective technology and service providers has invested great effort in closing gaps in the service supply chain and in establishing appropriate advisory services and new kinds of financial tools.



Figure 5.3: Light or Energy emitted from an Innovation Facility

Mobilisation of academic and technology oriented / knowledge based start-ups must start in academic organisations in order, on the one hand, to raise awareness on opportunities among researchers and university graduates and on the other to identify existing public research results for potential exploitation. Therefore, in 1999 the GENIUS initiative was jointly initiated by the regional government, the regional chamber of commerce, regional public R&D and higher education institutions and further service providers. Focusing particularly on the R&D and technological sectors, this initiative aimed to bring together service offers, such as awareness raising and information provision, at an early stage and to organise idea competitions with further coaching of single innovation oriented start-ups. Today the GENIUS initiative is linked to RIZ activities and provides start-up support over all sectors, even in schools. During recent years the GENIUS partners have undertaken intensive inter-regional exchange on start-up support and

European wide good practices, for example within the PAXIS Initiative and the ERIK network.

In order to foster high-tech and academic start-ups the *accent Gründerservice GmbH* (Accent) was founded in 2005 with a range of shareholders and partners from the regional administration, public R&D and higher education organisations, financing institutions, other services providers and private firms. Accent is the first contact point for researchers interested in entrepreneurship. The organisation provides consultancy and coaching for start-ups both in the pre-seed stage and after foundation for up to 18 months in total. Within the regional network Accent also makes available the RIZ incubation infrastructure and facilitates access to finance for young entrepreneurs.

One Accent shareholder is Tecnet capital (*Technologiemanagement GmbH*), a key player in the service supply chain for academic and technology oriented start-up support. Among its activities Tecnet proactively visits R&D organisations and systematically screens public R&D results to clarify how they can be best exploited. This service, called *Patent-und Technologieverwertung* (patent and technology exploitation), is not only limited to the analysis of exploitation opportunities but also includes elaborating and accompanying appropriate exploitation strategies ranging from patent applications via licensing or selling existing patents to start-ups. The revenues of these activities are reinvested in applied and collaborative research in order to foster the technology and knowledge basis for further academic and technology oriented start-ups in Lower Austria.

Thanks to the activities of GENIUS, accent and Tecnet capital, a considerable increase of entrepreneurial culture and knowledge on business opportunities and start-up requirements in R&D and higher education institutions has been witnessed. Thus, insufficient awareness and lack of basic entrepreneurial knowledge is no longer a barrier for successful start-up activities in the region. The supply chain of professional advice and consultancy for start-up preparation has been substantially improved over the last 7 years, to a large extent by the introduction of the innovative financing tool 'Pre-Seed Fund'. This tool is described below in more detail as a case study of the ERIK Thematic Working Group "Services and Support to Start-ups and Spin-offs".

The 'Pre-Seed Fund' is operated by the NÖBEG, a public private partnership bank which also provides seed capital for start-ups in technology oriented sectors for up to 10 years. Tecnet equity also provides venture capital for the seed and early start-up stage of high tech and growth oriented firms closing the gap between pre-seed and growth capital. In comparison to the seed capital, Tecnet equity takes higher risks, based on the expectation of respective growth potential and as "lighthouse start-ups" for the Lower Austrian scene of academic and technology oriented start-ups.

Entering the growth stage of enterprises, it is still difficult in Austria to find the appropriate private venture capitalist for young and growing companies. Thus, the Lower Austrian Government with its partner organisations provides growth capital for technology and knowledge based firms. One example is NÖBEG who offers growth capital for innovative and growth oriented firms in the form of silent equity up to 10 years. PONTIS Venture Partners Management GmbH, a partner of Tecnet capital also offers venture capital for technology companies. With public-private partnerships and good practice cases for successful financing of start-up growth, the Lower Austrian government is mobilising private venture capitalists to pay more attention to regional growth oriented start-ups.

It is insufficient for Lower Austria to limit support activities to the region dimension as Vienna, geographic centre of Lower Austria but an independent region, has been and remains the traditional and current hub of public R&D and higher education for Lower Austria. As a result of strengthened collaboration with Vienna in the field of start-up support, the Vienna Region, consisting of Vienna and parts of Lower Austria, was named a PAXIS region of excellence by the European Commission in 2002. Currently the Vienna Region also fosters cooperation with South Moravia (CZ), Bratislava and Trnava (SK), Győr-Moson-Sopron County (HU) and Burgenland (A) under the CENTROPE brand which demonstrates how academic and high technology oriented start-up support can an inter-regional task for gaining critical mass and strengthening regional competitiveness.

The continuous improvement process of the Lower Austrian service supply chain for innovation oriented, especially academic and technology oriented/knowledge based start-ups has been a joint action by all actors in the Lower Austrian innovation system over the last 10 years with important impulses from European Commission programmes, especially Regional Innovation Strategies Projects and Regional Programme of Innovative Actions which co-financed the development of the RISNÖ strategy and the 'Pre-Seed Fund'. Lower Austria is currently running its second RPIA with an action line "advanced Pre-Seed Management Service" continuing the 'Pre-Seed Fund'.

‘Pre-Seed Fund’ - Project Description and Objectives

The ‘Pre-Seed Fund’ was part of the Lower Austrian Programme of Innovative Actions RIS++ NÖ and was carried out as a pilot action between February 2002 and October 2004 with a budget of around 1.4 million € (10.7% private funds, 44.65% ERDF and 44.65% regional funds). Today the Pre-Seed Fund is part of the mainstream regional programme of innovation support.

The Pre-Seed Fund finances entrepreneurs with innovative ideas at an early stage in their technology oriented start-up or spin-off, before the creation of the company, and offers consultancy and coaching to the entrepreneur in accounting, fiscal, legal and patent related issues. The Pre-Seed Fund fills a market gap where traditional are reluctant to provide funding due to risk assessment difficulties. These financial institutions would also certainly not provide coaching services.



Figure 5.4: Lower Austrian Parliament and the Lower Austrian Government

Alongside the continuous coaching, the Pre-Seed Fund

provides loans (up to 200,000 euro per start-up) specifically addressed towards potential entrepreneurs’ individual needs, such as market research, prototype development, partner searches etc. Payment of the loan is made in instalments according to flexible mile stones based on the status of the start-up and taking the imponderability of the early start-up stage into consideration. Rather than repaying the loan, entrepreneurs can convert it into sleeping equity.

The aim of this fund is not only to accelerate the pre seed stage for technology and knowledge based firms but also to enable a higher quality of start-ups and a higher “likelihood of survival”. Having technology and knowledge based start-ups as its target group, the Pre-Seed Fund also represents a tool with which the Lower Austrian government can help position itself as a leading region for technology and innovation.

Description of Activities

During the Innovative Action RIS++ NÖ, 7 projects were financed from 40 applications submitted. In general the projects had only achieved background patents and a first legal step towards company creation (legal registration). No concrete market analysis was available and proof of concept (technology, market and organisation) had not yet been completed.

The target group were top young entrepreneurs with innovative and technology oriented business ideas (2% of young entrepreneurs) during the pre-seed stage who would settle down with their company in Lower Austria. With the extension of the Pre-Seed Fund to 5 million euro following the successful Innovative Actions, the focus for funding provision for new entrepreneurs is now specifically concentrated on technology and knowledge based start-ups.

Applicants had to complete a pre-defined application form in which they were asked to specify contact details, the amount of funding requested (including from other organisations - intermediaries), the project content, costs a time-plan and information on their company. They

were also requested to sign a sworn statement. The projects were evaluated on the basis of an evaluation matrix following specific criteria and the following procedure was followed:

1. Assessment of the applications: Specialists for NÖBEG, tecnet and the Lower Austrian government (see chapter “Partnership” for more details) assess the applications. Each application had to meet at least the following 3 criteria: (1) it should be technologically innovative; (2) it should be at a very early stage (pre-seed) idea; and (3) it should have potential for growth.

2. Granting of the loan: After selection NÖBEG grants a loan to be used during the pre-seed phase, a phase generally lasting 6 months. The applicant and NÖBEG then sign a loan contract. The payments are made in several instalments and based on the fulfilment of milestones agreed individually with the applicant. Some typical milestones are: definition of the IPRs, development of a prototype, first production run, company creation. Once the company is created, follow up financing is secured through other financial instruments (seed capital, venture capital, etc.). The average size of the loan is between 100,000 and 200,000 euro. This load generally represents 1/3 of the total funding and is often combined with funds from other intermediaries.

3. Coaching: NÖBEG and /or Tecnet provide the entrepreneur with a consultant for advice on accounting, legal, fiscal and patent related issues. Coaching costs are covered by the loan and amount to approximately 5-10 %. The consultant usually liaises with the entrepreneur twice a week. This is considered a win-win solution. Not only does the entrepreneur, who often has limited experience in managing and administrating a company, benefit from being able to focus on more technical issues related to business development, but NÖBEG also has a tool to ensure that the company is properly managed and that hence, the loan is properly used. In addition, it helps to give added confidence to the entrepreneur, limiting the risk of abandoning the project in the face of difficulties. This represents an example of process innovation among intermediaries as financial institutions usually do not provide such a service to entrepreneurs.

4. Reimbursement of the loan: The loan is repayable 3 years after the creation of the company. After that time, the loan can either be reimbursed to NÖBEG (with a 12% yearly interest rate remunerating the high risk of the pre-seed stage) or transformed into participation in the newly created company (silent participation or with voting rights). If the project has failed, the entrepreneur and NÖBEG negotiate an alternative arrangement. In the worst case scenario the total amount is lost for the fund.

5. Reinvestment in the Pre-Seed Fund: All the money returned to NÖBEG (either through loan reimbursement, the remuneration of the shares or the selling of the shares) are reinvested in the fund. At the time of writing the fund is close to zero as the money has been invested but no returns have yet been made.

Programming

Before designing the Pre-Seed Fund, the Land Niederösterreich carried out a market study to analyse whether similar instruments existed in other regions and what approach could be of interest for the Lower Austria pilot action. The survey took a closer look at Abruzzo (IT), Oxford and Scotland (UK) and at the German EXIST Seed programme. The conclusions showed firstly that within the pre-seed stage a flexible financial instrument with some accompanying coaching is required, especially for academic and high-technology start-ups. Secondly, they highlighted the difficulty of calculating risk at this stage, limiting participation of private investors and business angels (market failure). Thirdly, as start-up stimulation is important for the public sector, a funding approach involving non-refundable subsidies is usually followed.

Management structure

The Pre-Seed Fund is financed by the regional government of Lower Austria and managed by NÖBEG in strong cooperation with the government. The regional government provides the capital to NÖBEG who is then responsible for the administration of the pre-seed cases. The decision on the funding of business ideas is taken by a jury composed of the representatives of the Lander and of NÖBEG. This procedure allows a flexible and quick decision process.

Financing of young and mature companies is NÖBEG's core task and they have a team of qualified, experienced staff. High quality management of the cases can therefore be assured

Partnership

The Pre-Seed Fund is public-private and complementary partnership of the Lower Austrian Government (who initiated and co-financed Innovative Actions) and of NÖBEG (in charge of financing regional companies). Today an additional partner, tecnet capital (company specialised in risk capital), also provides support.

NÖBEG (<http://www.noebeg.at/>) comprises 2 special banks – NÖ Bürgschaften (guarantees) and NÖ Beteiligungsfinanzierung (shareholding). The shareholders are private banks and the Lander of Niederösterreich which holds 5% of shares in NÖBEG and provides guarantees on loans. NÖBEG's mission is to assist companies in funding company development activities, such as company creation, succession, investments, growth and export. NÖBEG's products focus on supporting of regional SMEs and their major target groups are business founders and existing SMEs.



Figure 5.5: Science and Technology - Microscope Lenses

Tecnet capital (www.tecnetag.at) is 100% funded by the Lander of Niederösterreich. Tecnet capital's mission is to assist scientists, founders and entrepreneurs in the process of development and commercialisation of new innovative ideas. Tecnet capital focuses on: funding innovative and technology oriented companies, managing technology projects, patent and

technology exploitation as well as the business share of the Accent Gründerservice GmbH (30%) focusing on start up creation and VC Seed Funds by tecnet equity.

For the identification of potential start-ups for the Pre-Seed Fund further collaboration exists with GENIUS (<http://www.genius.or.at/>) – a regional platform supporting business creation through business plan awards, personal contacts and intermediaries.

Marketing

Due to the strong focus of the Pre-Seed Fund on academic and high technology oriented start-ups, the marketing focus did not include widespread advertisements on support possibilities in, for example, newspapers or magazines. Instead, a targeted promotion of the 'Pre-Seed Fund' was carried out within R&D organisations, higher education institutions and also by addressing tecnet capital and GENIUS partners, both in the form of personal contact through visits to the respective institutions and more general information events. Furthermore, a 'Pre-Seed Fund' advertisement was inserted into several homepages of the network partners (NOEBEG, tecnet, regional government). A total of 180 potential entrepreneurs were addressed during the pilot action.

Obstacles in terms of Design or Implementation

Following the design of the Pre-Seed Fund, the purpose was to bridge the gap between the idea and the foundation in a very early stage of a business idea (even 12 to 24 months before the planned foundation of the start-up). Experiences from the pilot action and other start-up support activities have shown that in this very early stage business ideas are so vague that a first reliable feasibility check is impossible. This results in a high probability of cancelling the start-up and disproportionately high waste for start-up support measures. Although the Pre-Seed Fund is designed to cover risks in the pre-seed stage of high risk start-ups, following the pilot action it was agreed to concentrate the 'Pre-Seed Fund' support on a time-frame of 6 to 12 months before the planned foundation of the company.

European Commission regulation requires a minimum of 30% private shareholding in the Pre-Seed Fund alongside ERDF financing. However, the acquisition of private money as a support instrument for the Pre-Seed Fund for the early stage was difficult, due to the very high risk factor. Lower Austria is currently carrying out additional investigations in order to discover whether it is possible to overcome the obstacle of private initiative, even in case of substantial public co-financing, and if so how? The results of this investigation are due in mid-2007.

Although the Pre-Seed Fund places special emphasis on providing additional management know-how for the potential entrepreneur in the form of coaching by external experts, the provision of additional professional management capacity in the pre-seed and seed stage needs further improvement. Therefore, the provision of temporary management staff will be tested as part the new Lower Austrian Programme of Innovative Actions RIS3+ NÖ.

Effectiveness and Added Value

For the 'Pre-Seed Fund' an in-process monitoring concept through compulsory coaching was established as an inherent part of the overall fund. The coaching allows easy identification of changing framework conditions for the start-up and can lead to changes in projects presented. For example, some business plans were adapted to include new research and/or market findings. A comprehensive ex-post evaluation of the 'Pre-Seed Fund' to be carried out by external experts is planned for 2007. It will examine, among other factors, return on investment, increased turnover of supported companies and new job creation.

Within the RPIA action line 7 start-ups were founded and 20 new high skilled jobs were created with an estimated public amount of 30,000 euro per job. The number of new jobs created within the first 5 years after establishment is expected to increase to approximately 120.

The overall impact of the action line at regional level has been an increased awareness of start-up culture and of the economic importance of innovation oriented start-ups in the respective research and higher education institutions, with an increased demand for pre-seed support. As a consequence the Lower Austrian government has increased the funding dedicated to the Pre-Seed Fund.

Innovation

Closing the remaining gap in the support of start-ups/spin-offs: The Pre-Seed Fund provides loans to individuals as potential entrepreneurs at a stage where, due to the high risk, no offer from private financing institutions exists.

Focus on high tech start-ups with high potentials: Start-up support in Lower Austria was previously dominated by general support without specific focus on high technology and very innovative young entrepreneurs. Now the Pre-Seed Fund, together with regional initiatives of the "Technopol Programme", is promoting Lower Austria as a high tech location and offering new opportunities for researchers and experts in existing companies to start their own technology oriented business.

Integrated service: Funding is completed by compulsory coaching provided by a consultant to help the entrepreneur in creating his/her company (accounting, fiscal, legal and patent related issues). This initiative is innovative in that intervention is usually limited to funding.

High flexibility of service: The 'Pre-Seed Fund' shows not only high flexibility with respect to the loan repayment according to project progress, but also offers the entrepreneur the chance to convert the loan into silent equity or equity with voting rights in order to increase the equity ratio and thus the creditworthiness of the young company. Should the start-up be unsuccessful, appropriate solutions are elaborated to avoid the insolvency of the founder as private person.

Sustainability and Mainstreaming

The action line was implemented in 2 phases, both financed by the RPIA: an experimental phase which absorbed 895,000 euro, the purpose of which was to test the feasibility of a Pre-Seed Fund, and the setting up of the Pre-Seed Fund itself with an amount of 500,000 euro (at this stage). Due to the success of the Pre-Seed Fund and the positive feedback from young entrepreneurs, financing institutions and research organisations, the Lower Austrian government has already integrated the Pre-Seed Fund into the mainstream regional programme. The seed capital is provided by the Lower Austrian government. Co-financing from the Structural Funds is used for complementary consultancy services. Once the experiment proved successful, the private sector was ready to finance the fund to the level of 30%.

In the future there will be stronger link between the Pre-Seed Fund and other regional funding instruments for innovation oriented start-ups/spin-offs. These instruments were established in parallel to the pilot action of the Pre-Seed Fund and are thus linked to it: tecnet equity (Venture Capital/Seed Fund for technology orientated start ups in Lower Austria) amounting to 18.3 million euro and managed by tecnet capital; and PVP I Fund (Venture Capital Fund for innovative Austrian start ups with high growth potential owned by public investors in Austria, among which tecnet capital company and EIF) amounting to 30 million euro and managed by PONTIS Venture Partners Management GmbH).

Furthermore, complementary services for the Pre-Seed Fund will be tested in the future, for example providing business founders with the managerial assistance of so-called temporary managers as well as funding of the proof of concept for the business ideas in the pre-seed

phase. These services are carried out as a pilot action within the new Lower Austrian Programme of Innovative Actions RIS3+ NÖ.

Critical success factors for the sustainability of the 'Pre-Seed Fund' are:

- The Pre-Seed Fund was initiated and is still accompanied by the regional government of Lower Austria who also co-financed the pilot action. Thus, from the beginning there has been a full commitment and strong political support. Setting up the Pre-Seed Fund in Lower Austria in this way would not have been possible without regional political support;
- Critical mass of knowledge sources like universities and research centres in the region or access to such resources in neighbour regions (like Vienna for Lower Austria);
- Professional and experienced fund management;
- Integrating of financing and professional consultant services;
- In the long term strong collaboration and links between different actors and their services in the field of start-up support with public-private partnership assured sustainable success.

Transferability

The need for more intensive financial and coaching support for innovative start-ups in the pre-seed stage does not only exist in Lower Austria but also in other (European) regions, as shown by exchange within the Networks STRINNOP, PAXIS – START, ERIK and its successor ERIK+

The pre-seed tool is not restricted to the framework and specifics of the region Lower Austria but is valuable for support of the pre-seed stage of innovation oriented start-ups in general. Thus, the pre-seed tool can be transferred to other regions with limited adjustment according to the regional framework, for example clarification of responsibilities, establishment of the pre-seed fund in the innovation supporting infrastructure, assuring the sufficient political backing and allocation of the financial resources from public and private side.

Contact details

Irma Priedl and Martina Ebner
Amt der Niederösterreichischer Landesregierung
Abteilung Wirtschaft, Technologie und Tourismus WST3
Email: Irma.priedl@noel.gv.at or Martina.ebner@noel.gv.at
Websites: www.wirtschaftsfoerderung.at or www.ris-noe.at

5.3 Case Study: Idea and Seed Fund - City of Hamburg:

The Regional Start-up Strategy in the Free and Hanseatic City of Hamburg (FHH)

1,730,000 people live in the city of Hamburg today, the highest population level since 1974. However, the overall concept of "Hamburg - The Growing City" means much more than a growing population. The goal is to transform Hamburg into one of the most fascinating cities in the world. Hamburg's function as a metropolis will be expanded and its international appeal will be reinforced, above average growth in the economy and employment sectors shall be

promoted, the number of inhabitants shall be increased, quality of life and the sustainability of the city shall be secured.

The Senate of the FHH has developed an overall programme for this legislature including: economic growth and creation of jobs, support to universities and research centres, support for families, international appeal, strengthening of the metropolitan region, suitable provision of work and living spaces and improved transport infrastructure.

In order to secure economic growth and the creation of more jobs, Hamburg concentrates support on its c.120,000 SMEs, which can be considered its economic backbone. In this respect, many programmes are also addressed to young entrepreneurs. Furthermore, activities focus particularly on innovative fields in which competence networks are created. Among those are: aviation, IT and media, logistics, life science, nanotechnology, renewable energies and foreign trade. Hamburg is considered the major foreign trade and logistic centre in Germany and the trade hub between Europe and the Far East, and Central and Eastern Europe.

With regards to support for universities and research centres, Hamburg has engaged to strengthen its position as a business location, above all by enhancing the quality of its research and education activities. Furthermore, in the future Hamburg's universities should stimulate innovative developments in the economy more than is currently the case and so contribute more effectively to the development of private economy.

It is not only political players that are involved in the implementation of Hamburg's overall concept. Considering, for instance, the Regional Innovation System, representatives from politics, research, science and economy are involved in joint initiatives and projects, thus Hamburg can lay claim to an effective network of "key players".

Promotion of innovative entrepreneurship

Innovation and business creation are among the FHH's main priorities. This has led to the creation of a well established chain of innovation support actions ranging from awareness raising, to filing and exploitation of patents. In this context the City of Hamburg engages in supporting innovative entrepreneurship at many levels and with many different actions, particularly in the scientific and technical sector. These actions can be subdivided into three main branches:

Higher education competitions and activities

Every year business idea competitions for students are organised to promote creative thinking and engagement in natural science and technology from a young age. Prominent examples are:

- *Juniorwettbewerb* (Junior competition; www.juniorprojekt.de);
- *Daniel Düsentrieb Competition* (www.daniel-duesentrieb-preis.de);
- *Jugend forscht* competition, (young people do research; www.jugend-forscht.de).

Entrepreneurship education

Hamburg's universities offer various courses promoting entrepreneurship, such as "International Management and Entrepreneurship" at the Hamburg Distance University or the "Master of Arts Entrepreneurship" at the University of Hamburg. Some examples of successful programmes are:

hep - Hamburger Existenzgründungs Programm (Hamburg Entrepreneurship Programme; www.hep-online.de/cms/) - The "hep" supports the creation of start-ups and businesses from Hamburg universities and research centres and assists them until independence. This programme is an initiative of the universities of Hamburg and of their research, economy and

political partners. Its focus lies on technology-oriented start-ups and businesses in the field of innovative services.



Figure 5.6: Hamburg port

hep is addressed to students of all branches, graduates, scientific assistants, university technicians and lecturers working at universities or research centres. In particular, it deals with R&D-related aspects, the exploitation of the universities' resources and know-how, patent-related legal issues, the procurement of contacts and clients, and the creation and maintenance of a network of companies and partners from economy and science. The programme offers young entrepreneurs consulting services for issues related to start-up and business creation. Thanks to its large service offer, hep is in the position to assist young entrepreneurs from the development of a business idea over the start-up phase to the acquisition of financial resources from third parties.

hep-plus - Endorsement and enhancement of hep activities since 2007: hep-plus, financed by the initiative EXIST III (Existenzgründungen aus der Wissenschaft; www.exist.de) of the Federal Ministry of Economics and Technology broadens and supplements the existing hep activities, addressing the same target group. In the framework of hep-plus there are five special sub-projects:

- Gründerwerkstatt HAW (start-up factory of Hamburg University of Applied Sciences) addresses young entrepreneurs who need a working environment rather than just laboratories. With the factory being on campus, they can have access to both. Furthermore, a series of project-related qualifications are offered to participants.
- Campus Seed motivates start-ups in fields with little entrepreneurship awareness. By means of workshops and events held by different faculties the project intends to awaken the entrepreneurial spirit of students and scientists.
- Ing-Up provides technology oriented start-ups access to laboratories with high-quality equipment. As above, project-related qualification are offered to participants.
- Summer School is an annual intensive course held during semester breaks for students or scientists who are planning a business start-up. The courses include basic knowledge in fields of entrepreneurship and more specific work on the participant's business idea.
- hep-jump intends to facilitate the professional and personal development of young entrepreneurs. Jump offers its members a combination of entrepreneurial experience and individual support.

Hamburger Innotech-Preis (Hamburg "Innotech" Award): The annual INNOTECH Award is a long term project striving for advancement of innovative business ideas in the fields of technology and services. Participants can win prizes with a total value of around 30,000 euro. The winner of the first prize is awarded the "Wolfram-Birkel-Sonderpreis" of 5,000 euro.

Hamburger Initiative für Existenzgründungen und Innovationen (Hamburg initiative for business creation and innovation): This initiative was started by over 100 private and state-run

Hamburg institutions with the aim of increasing incentives to entrepreneurship in the area. Its main focus is assistance and services to young companies and start-ups, as well as a commercial education and contacts in order to reduce the risk of failure.

Innovation finance

In addition to national support programmes like the “*HighTech-Gründerfonds*” (www.high-tech-gruenderfonds.de) or “*EXIST-Seed*” (www.exist.de), Hamburg as a business location provides numerous financing programmes to local enterprises. Some are dedicated to the promotion of clusters, especially in the industry sectors aviation, life sciences, IT and logistics. In the following, only measures addressed to technology-oriented enterprises are described:

Gründerjobs (business creation jobs): The financing of Gründerjobs is part of the Hamburg entrepreneurship programme. Graduates and scientific assistants from universities or research centres willing to create a business from a technology-oriented business concept or service idea are granted start-up financing during the promotion period. Applications can be submitted by individuals or groups willing to create their business in Hamburg.

Financing R&D-projects in SMEs: This programmes aim to reduce development risks for SMEs in implementing product and process innovations. The funding precondition is a feasible idea for an innovative product or service with realistic market chances likely to create new jobs.

Case Study - Idea and Seed Fund

Due to a shortage of financial resources for high-tech project ideas and high-tech business start-ups, the Innovation and Technology Department of the State Ministry for Economic and Labour Affairs, in charge of the RIS++ Hamburg programme, decided to extend existing support and financing for young entrepreneurs and young high-tech companies with two complementary financing tools:

- an Idea Fund targeted at young entrepreneurs to fund pre-competitive high-tech business ideas in the pre-seed phase;
- a Seed Fund to fund young high-tech companies in the seed phase.

Project objectives

The Idea Fund and the Seed Fund support innovative start-ups at an early financing phase. By providing active management support and helping to close the existing gap in finance in the pre-seed and seed phase (“from the idea to the business”) the projects should increase the number of innovative business start-ups, as well as improve their success and growth chances. A further objective was to make the Idea and the Seed Funds “sustainable” by ensuring revolving resources.

The target beneficiaries of both funds are young entrepreneurs with high-tech business ideas and young high-tech business start-ups in the Hamburg region.

Description of Activities

The *Idea Fund* supports the feasibility evaluation of technology-oriented business ideas in key technological sectors which can lead to marketable and sustainable products, and therefore to sustainable high-tech start-ups. Financial support is granted on the basis of expense vouchers which amount to 50,000 euro. A follow-up support of up to 50,000 euro can be granted in particular cases.

Ideas are chosen through a selection process in which the proposal is discussed and presented on two occasions before the final decision on financing is made. This selection

process is carried out, according to specific economic criteria, by an independent committee of three people: one representative of TuTech Innovation (Idea Fund's operational manager), one representative of MAZ level one (Venture Capital-firm managing the Seed Fund) and one external expert. Despite this two-step process, the time needed from project application to approval is a maximum of 6 weeks.

The Idea Fund is managed by TTI (www.tutech.de). Together with Hamburg Innovation and all University institutes of the City of Hamburg, TTI forms a "transfer tandem" between science and economy. In its Competence Centre Entrepreneurship, TTI advises young business creators on all business-creation related matters. Furthermore, TTI offers a whole series of services to young entrepreneurs to support them from the development of a business idea up through the start-phase and the acquisition of financial resources.

While business ideas in their pre-seed phase are supported through the Idea Fund, innovative start-ups are dedicated a *Seed Fund* which grants an intensive support and strong financial backing until they are supported by venture capitalists or other institutions.

The Seed Fund fills the gap existing between the company start-up phase and first financing with own capital. For this reason investments are only made to support companies in their seed-phase which usually lack the experience of classical financing with their own capital. This may be because the management team is not confirmed or lacks experience, the business model and business plan have not been finalised or because a proof of concept / market / product is not sufficient to mobilise private capital in this early, and therefore risky, phase.

Through this investment, which can reach up to € 500,000 as equity capital for shares (50% loan with interest from public funds and 50% own capital from private funds), enough liquidity should be made available for the company to cover financial needs during the whole seed phase. The financing sum is subdivided into instalments, paid upon achievement of pre-determined milestones, such as: number of jobs created; improvement of the management team; achievement of technical targets e.g. the production of prototypes; patent submissions or certification achievements; acquisition of pilot clients or evaluation partners.

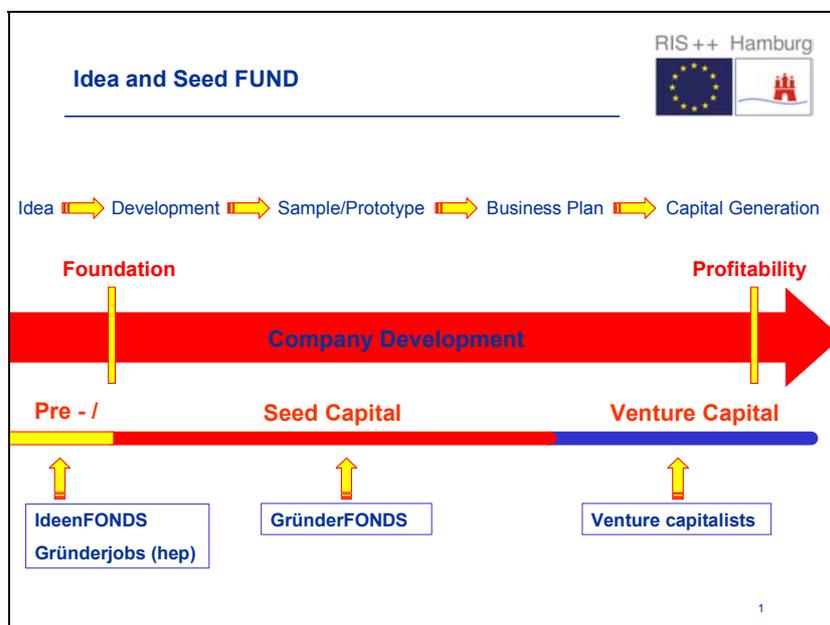


Figure 5.7: Idea and Seed Fund Process

The Seed Fund is managed by MAZ level one GmbH (MLO). MLO specialises in financing and supporting young technological businesses. The company was founded in Hamburg in 2000 as the result of a management-buy-out from a technology transfer organisation of the City

of Hamburg (MAZ - *Mikroelektronik Anwendungszentrum Hamburg GmbH*; specialised in developing technology oriented ideas from the microelectronics sector to high-tech enterprises). MLO is a participation and consulting company focusing mainly on very young technology-oriented companies in their seed and early stage phase offering both financial support and a series of support services to prepare the company for first venture capital financings or selling to industrial partners. The MLO team has a longstanding experience in technology start-ups and own business creations and disposes of a broad network of partners.

The Seed Fund is return-oriented and particularly targeted at companies acting in horizontal technology fields such as: microelectronics, micro-system techniques, photonic, nanotechnology and IT. It reflects the importance of these fields for the Hamburg region and their effects on regional industries working on aeronautics and space technology, medicine and biotechnology.

MLO usually acquires minority shares but does not take up a role in the company's management. Instead its shares are supervised through intensive coaching during the seed phase, for example through participation in the advisory or supervisory panel. Furthermore, MLO provides the same services as an incubator. This allows the management team to focus on creating a solid structure for the company and preparing the 2nd financing phase. These services are provided directly by TTI.

In terms of participant conditions and criteria, applicants submit a draft business plan which provides an idea of the expertise and of the validity and sustainability of the project. The corporate entity should not yet be created or should not be older than six months. The company should clearly show a unique patentable know-how able to attract sufficient demand. The people in charge of the business should fulfil the minimum qualification criteria and show the necessary motivation to successfully run a business. In their role of shareholders, these people invest capital in the new business but they also directly profit from business growth.

The selection process within the Seed Fund is based on the same criteria as professional venture capitalists. Before purchasing shares, MLO carries out an in-depth diligence analysis. This ensures examination of all the business investment criteria, particularly management and staff qualifications, technology risks and development and market potential. The plausibility and feasibility of business ideas are analysed, considering particularly available markets and competitors. If necessary, external experts carry out feasibility and product analyses.

The decision process on company participation has many different stages. An investment plan is prepared by the investment team and forwarded to the management board. The final decision is taken by an investment committee formed by three scientific and economic experts: a business-oriented university representative (professor in electro-technology), an investment manager from a local Venture Capitalist (technologist) and an investment manager from a Venture Capitalist located in Düsseldorf (entrepreneur). This procedure ensures that only high-quality investments are made.

Programming

Setting up the *Idea Fund* was a joint effort in Hamburg, between the BWA, Innovationsstiftung Hamburg and TuTech Innovation. The main features of the Idea Fund were already detailed in the RIS++ Hamburg proposal and could therefore be quickly implemented.

The Idea Fund is financed by the Free and Hanseatic City of Hamburg and managed by TuTech Innovation GmbH and has a total budget of 1 million euro.

The set-up of an investment fund like the *Seed Fund*, on the other hand, is a complicated formal procedure. This is especially true for meeting ERDF regulations and when synergies between the two funds are to be generated. In addition, it remains difficult to mobilise private capital to finance the early and therefore risky phase (seed phase) of a company.

In order to close this financing gap an idea competition was launched. The call for proposals for the creation of a Seed Fund in Hamburg was published at the end of June 2002.

One month later institutions experienced in the field of investment submitted 8 fund concepts. These concepts were selected in a two-step procedure following defined evaluation criteria (especially the requirements of the European Investment Fund). The 2 finalists presented their fund concepts to the RIS++ Hamburg Steering Committee which made the final selection at the end of August. The concept chosen was the GründerFonds (Seed Fund) by MAZ level one GmbH. Detailed planning of the concept continued until January 2003 when the contracts were signed.

Looking back, the chosen approach seems ideal for the implementation of such a financing tool in a short period of time. It took only 7 months from the announcement of the idea competition to the signature of the contracts. It is probably not possible to go through this process any faster.

The Seed Fund had a total budget of 6 million euro.

Partnership

TTI and MLO have a good network of contacts with regional academic organisations, research centres, business creation centres, public organisations, and existing networks in Hamburg in the fields of life sciences, nanotechnology, optical technology, IT and media. Both organisations work together with experts on tax and juridical matters and with specialised human resource consultants.

MLO has access to a broad network of banks, financial organisations and venture capitalists. Furthermore, MLO is member of the German Private Equity and Venture Capital Association.

TTI and MLO co-operate closely with one another. Not only are they located in the same building, but they also exchange information and opinions on interesting cases and participate in investment committee meetings. This allows MLO to identify potential new businesses in a very early phase.

Marketing

The Idea and Seed Funds were and still are marketed through different initiatives, including events, posters and flyers, newsletters, press releases, communication with the partners and news on other websites, such as www.mazlevelone.com and www.tutech.de.

Obstacles in terms of design or implementation

There were no serious obstacles to design and implementation. The shared opinion that the lack of financial support to companies in the pre-seed / seed phase had to be compensated meant that the projects benefited from support from all over the political and business spectrum. Furthermore, the necessity to set-up, implement and test the funds as well as start investments within the relatively short RIS++ Hamburg programme meant that actors worked hard and efficiently to make it happen.

However, for the duration of the RIS++ Programme, the planned transition of projects from financial support through the Idea Fund to financial support through the Seed Fund succeeded in only one case. This was partly because many companies supported through the Idea Fund could not be granted support through the Seed Fund as they did not match the demanding business growth potential requirements necessary for the admission. Further, companies receiving financial support through the Seed Fund became aware of the Idea Fund too late, when they already were too advanced to match admission conditions i.e. the company had already been created.

Effectiveness and Added Value

The overall results expected from the Idea and Seed Funds in the framework of the programme RIS++ Hamburg were all achieved.

The results of the *Idea Fund* were measured with the following indicators: number of supported projects; number of start-ups created in the FHH; number of jobs created. By the end of May 2005 (end of the RIS++ Hamburg programme): 102 ideas and applications for financial support had been submitted and forwarded to the allocation committee for evaluation. Limited funds and economic and technological selection criteria allowed the fund to support only really promising ideas; 16 business ideas had been considered eligible; 70 jobs had been created; Approximately 10 patents had been filed; 80 cooperation projects had been carried out. Since May 2005, 13 more ideas have been submitted for financial support. 3 of these ideas were considered eligible.

Every year, innovative companies submit about 200 business plans which are pre-evaluated by MAZ within the *Seed Fund*. Due to the high VC standards – patentability of the technology, scalability of the business model, growing market – and the economic selection criteria, less than 2% of the business ideas submitted are pursued. By August 2006, the Seed Fund had approved 10 investments, some in co-operation with other investors. In total, 22 million euro had been invested in young businesses, demonstrating a significant leverage effect and 69 new jobs had been created. Further investment is under negotiation. Meanwhile, over 10 private investors have taken a share in high-tech start-ups whose creation was only possible through the Seed Fund. These include international venture capitalists, business angels and medium-sized venture capital companies.

Innovation

- Coordinated support measures for innovative start-ups: The Idea and Seed Fund concept includes both coordinated support measures and funding which extend from “idea generation” all the way to business start-ups.
- Focus on innovative technologies: RIS++ Hamburg focuses on key technologies such as life science, micro and optoelectronics, aviation and nanotechnology. With regards to start-up support, this means that the first part of the programme focused exclusively on high-tech project ideas and foundations and that these measures were deliberately meant to differ from measures taken in the field of general business development.
- Seed Fund - Public-Private Partnership: It is unique that the concept is based on a public-private partnership. Private and public actors financially contribute to the seed sector leading to a win-win situation. The fact that public funds by the City of Hamburg are combined with resources of the Structural Fund of the EU is also new.
- Idea / Seed Fund – public finance was used as revolving resources instead of grants.

Sustainability, Mainstreaming and Transferability

Since the set-up and implementation phase of both funds great attention has been paid to their self-sustainability. For this reason they were organised as revolving funds. All businesses receiving financial resources from the Idea Fund agreed by contract to pay back part or all of their subsidies once their enterprises were up and running. These resources are reinvested in promising business ideas of the next entrepreneurial generation. The Seed Fund allows investors to gain above-average interest on their capital by buying, supervising and selling shares. The income derived from shares is partly distributed among the companies in charge and partly re-invested in the fund.

As not every business is expected to be successful, in both cases some of these sums will not be paid back and the rest will be refunded with a considerable delay. Thus, the Department for Innovation and Technology is currently developing a concept for the temporary financing of the Idea and Seed Fund. At the time of writing the concept is ready for implementation.

In terms of transferability, an Idea Fund supporting project ideas in the pre-seed phase can be easily set-up in other regions. Both the work and financial efforts are affordable. However, the set-up and implementation of a Seed Fund is more complicated and implies above all a good financial basis, the acquisition of which – both from public and from private organisations – can be difficult. For this reason external funding, such as EU programmes, is very important in the initial phase.

Contact details

Goenke Kerstin Tetens , Head of the Innovation and Technology Unit	
Free and Hanseatic City of Hamburg, State Ministry for Economic and Labour Affairs	
Alter Steinweg 4, D-20459 Hamburg	
Phone: +49 40 428 41 1365	Fax: +49 40 428 41 2347
Email: goenke.tetens@bwa.hamburg.de	Web address: www.bwa.hamburg.de

6

Thematic Working Group: Innovation Finance

6.1 Introduction and Policy Recommendations

Erik Bunis, Managing Director, LTC AB and Stefan Lind, Project Manager, LTC AB

Difficult access to finance is one of the most common barriers blocking the passage of innovative products and services to the market. One of the reasons for this barrier is that loans to new and innovative companies, and indeed to existing companies involved in development processes, are considered by private and public financial institutions to be of high risk. A second reason is that venture capitalists and banks often avoid investments in companies situated outside the most expansive European regions. In fact, venture capitalist companies and credit institutes are often managed by executives from outside the region itself and are thus guided by central directives and only have knowledge of metropolitan regions.¹⁶

Regional policies can play a key role in enhancing information on and actual access to innovation funding. The ERIK Network Thematic Working Group (TWG) Innovation Finance has concentrated on measures promoting new methods for attracting capital for innovation and business development across the whole innovation “chain”. The TWG represents a step towards formulating a common regional position based both on experiences from the Regional Programmes for Innovation Action (RPIA) and from the mainstream structural fund programmes, as well as local and regional initiatives to foster an innovation culture.

The innovation process can be described as a chain in which interacting actions concerning intellectual capacity, technical or structural knowledge and capital can enable or promote the realisation of an idea. The TWG Innovation Finance has not focused its work on start-ups. Instead it has widened its scope, acting as an umbrella over various innovative tools and themes, and has taken into consideration existing enterprises, particularly SMEs concerning, for example, regeneration, conversion to high-tech sectors and internationalisation.

The mission of the ERIK TWG Innovation Finance has therefore been to identify and analyse: *innovative ways to finance innovation*.

Rationale

It is well known that levels of growth in Europe lag behind other countries, for example North American development figures show an average difference of 0.6% over the past five years.¹⁷ The only areas of Europe that can compete in levels of GDP growth are the new

¹⁶ As stated in good practice “Trenfi”, currently subject to research at the Centre for Regional Science at Umeå University

¹⁷ The Swedish National Institute of Economic Research

member states of the European Union. However, they start from a lower level and the economic impact on a European scale is not yet enough to improve the unfavourable position. Growth rates are, of course, negatively effected by changing market conditions and structures. In fact, globalisation is also one of the greatest threats to the classical European development model. Skilled labour forces and high technological implementation in the manufacturing industries are overruled by the fast development in the BRIC league – Brazil, Russia, India and China. The ability to handle new ideas and develop them into new business also depends to some extent on history. Until the introduction of the Euro regulations and institutions European banking was strictly regulated nationally and was mainly based on domestic markets. The free flow of goods and capital with the internal market have also changed the financial institutions but the European banking system remains nationally regulated and the free flow of services on the financial market have not yet been implemented. This may hamper the innovation financial support system.¹⁸



Figure 6.1: Kalmar Science Park comprises 30 companies involved in biotechnology, ICT and environmental technology

The impact of the Basel II¹⁹ regulations on the banking system have been investigated by the Commission, DG Enterprise, in the study “How to Deal with the New Rating Culture: A Practical Guide to Loan Financing for Small and Medium Sized Enterprises, May 2005” Trends show more traditional loans and less equity capital products being provided for SME’s due to the new rules.

However, negative overall trends must not be allowed to obscure the fact that some parts of Europe are characterised by strong innovation. Many companies that started as SME’s in European regions, such as IKEA, Boss and Ferrari, today belong to a group of leading global actors. Some member states and regions are leaders on a world level in terms of innovative expenditure. Finland, for example, invests over 20% of its Structural Fund resources in knowledge and innovation and, along with Austria, Sweden and Denmark, is widely recognised as a leader in innovation.

Other parts lack this innovative tradition and need new mind sets to increase innovative processes. The development model to which European countries now turn to must be focused on innovation. In most countries innovators are now supported by special programmes relating to, for example, technology transfer, clusters and new companies, all of which have been dealt with by the ERIK Network. The TWG Innovation Finance focuses on the innovation process itself and the financial problems that occur when innovation goes through its different stages, mainly within SMEs.

Experience from the ERIK network shows that identifying a time line is a key issue for innovation finance. Although different regions face different obstacles, the time line is the same and by a joint European approach in this area we all would benefit in the process of innovation.

¹⁸ Financial innovation and the golden ages of international banking: 1890-1931 and 1958-81 Stefan Battilossi, business History Unit, London School of Economics.

¹⁹ Basel II: International Convergence of Capital Measurement and Capital Standards: a Revised Framework, June 2004

The illustration below (Figure 6.2) shows the different stages in the ERIK Innovation Finance time line.



Figure 6.2: Basic time line for innovation finance

The *Idea* stage is the starting point for innovation and mainly focuses on evaluation and securing the ownership of the innovation (Intellectual Property). The innovation has its origin in a research environment, a company or a private inventor. In the Idea stage there are often possibilities for the inventor to get initial funding from the public sector. If the innovation comes from a company it can be financially self supporting as there is need to secure the intellectual property and to hold the information within the company as long as possible. However, there may be a need for external experts and developers that to SMEs are quite expensive.

The *Prototype* stage is essential to find the possibilities and design of the innovation, both physical products and services. Often the prototype stage is needed to find the right production environment or methods. In the Prototype stage the amount of financing varies, depends largely on how advanced the prototype is and the level of innovation. In general, however, there is a lack of funding in this stage as the public sector is limited by regulations and financial resources and it is too early for the private sector to see the possibilities of a return of investment.

The *Production* stage focuses on developing the production environment, quite often with heavy investments in tools and "machinery".

The *Market intro* stage is strongly connected to the Production stage as an introduction to the market requires support from flexible production. The Market intro stage often sees large investments in marketing and PR and presents some risk as the innovation life cycle can differ.

In the *Production* and *Market intro* stages there are often difficulties in accessing public funding with the restrictions mentioned above. Only the strongest innovations can find venture capital.

The two final stages, *Growth* and *Expansion* are quite similar and combine marketing issues and the expansion of organisations and production facilities. These stages need heavy financing. In these stages there is a stronger interest from the private sector but there is a continued need for public involvement as many companies, especially SMEs, have little experience and need guidance.

In particular, innovative enterprises often find themselves in an empty gap when leaving the product/service development phase and trying to acquire resources for market establishment.

Obstacles and opportunities in Innovation Finance

The TWG Innovation Finance focused on financial issues in the innovation process, taking into account the different phases demonstrated above. It became clear that a number of innovations fail to reach the market stage due to lack of venture capital. This trend seems to intensify in Europe where the markets are more reluctant to feed innovations with capitals in the first phase.

The phase between founding a company and getting a product into the market has been neglected by European and national policies, influencing the low growth rates described above. In the USA, on the other hand, programmes focus on bringing products to the market and

making money. One federal initiative is the Small Business Innovation Research Programme (SBIR) which provides SME's with up to 100,000 USD in support for innovation development and market introduction.²⁰

In these quite early stages relatively small amounts of financing is needed for the companies and yet the risk is often too high for private investors and the exit stage too far away. The managing costs for venture capital funds are often too high in comparison to the investment made. On the other hand when it comes to public financing legislation on direct financing limits engagement since the European legal system stops almost all direct support to enterprises. This results in a gap that is hard to bridge

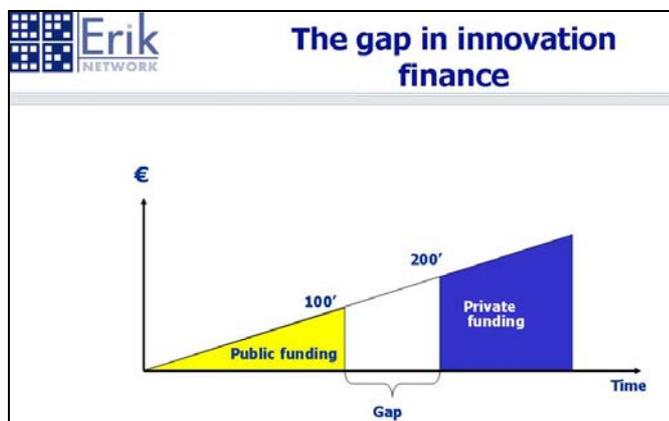


Figure 6.3: The gap in innovation finance

without new innovative ways to finance innovation, as illustrated in the Figure 6.3.

Studies, including one performed in Kalmar (Sweden)²¹, have shown that if we put more public money into innovation, we get more out in the long run. The regional net profit of enabling seed-finance is thus greater than the money put into the system. However, most often public profit lies in direct taxation of employees and this part of the taxes lands at national level. The link to regional growth is often proven later in the development of the enterprise, for example in the expansion phase when new investments are directed to production factors like buildings, machines and training we can see more visible signs of regional growth. Overall, we can recognise a desperate need to highlight new combinations of co-operation between different actors such as private-public, private-private and public-public sectors enabling seed money and other forms of financial resources for innovation finance.

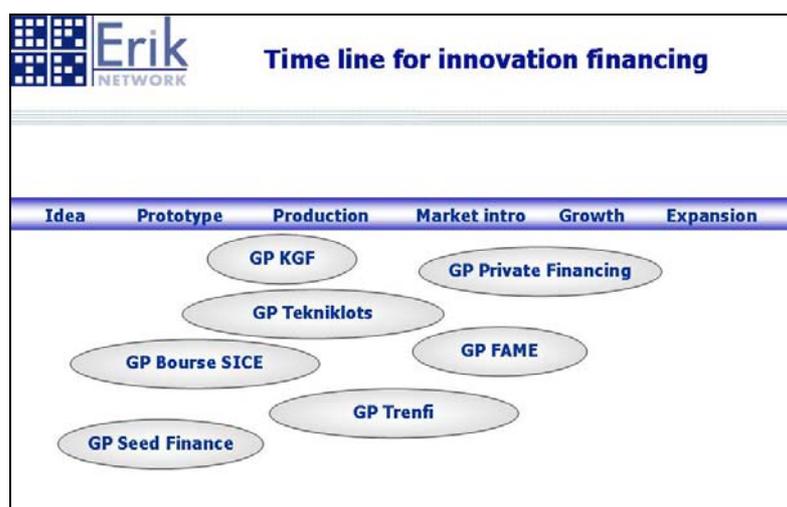


Figure 6.4: Time line for innovation finance with ERIK Good Practices

²⁰ <http://www.sba.gov/sbir/indexsbir-sttr.html>

²¹ Innovation Builder – an analysis of the seed finance structure in Kalmar County and its implication on regional growth, Lars Hjelm 2006

During the ERIK Network activities we have identified, evaluated and investigated good practices (GP) from participating regions in Europe where Regional Programmes of Innovative Actions have been implemented. The good practices have shown that European regions have indeed experimented in potential new ways to strengthen innovation finance. The policy recommendations presented in this publication are based largely on these experiences. In the following picture the good practices are placed where their main focus lies in the Innovation Time line. Some could in fact be collocated in a number of steps of the time line, but in this case have been placed them where their main focus lies. Further details are found below.

Policy recommendations

Promotion of good working environments - Places where people can meet to exchange ideas and find opportunities

Bringing people together on a more personal level increases probability for financing as it increases trust. Investors are more likely to finance innovation if they have met the person, got to know them and their business. The good practice presented in this publication “Efficient Promotion of Private Financing” from the region of Epirus in Greece provides an example of this with the organisation of visiting schemes for Business Angels and Corporate Investors and matching events for Venture Capitalists (for more details see below). A web site or a “one stop shop” with contact details for venture capitalists, development banks and other funding institutions is also useful as a “virtual” meeting place. In the good practice “Tekniklots” a network of organisations was established to support innovation, the entire network can be addressed with only one telephone number or e-mail and there is a guarantee that the right resource for the specific question will be used. The network’s common knowledge and financing can be optimised. Quite often the owner of the innovation is already known by someone in the network thus enabling a quicker response and deeper trust.



Figure 6.5: Videum Science Park: Småland med öarna’s fastest growing knowledge environment

In the same way, personal contacts and acquaintances still help to gain “risky” capital. Without prior knowledge of the person, gaining financing through initial contact remains difficult. This was emphasised by Swedish entrepreneur Mr Werner Hilliges during the ERIK Network

Study Visit in Jönköping. Successful examples of his innovative business include “SafeTool” (advanced products and information systems for security in the construction industry) and “CombiTeam” (specialising in “Mechatronics” - modern and mature electronics in traditional mechanical products). He maintains that a person who is already well known and has implemented a number of successful initiatives is more likely to be awarded financing to develop further businesses. During the same visit, the point was supported by a regional company “Huskvarna Prototyper AB”. Once owned by a multi-national company who wanted to sell (with potentially serious damage to the regional economy), workers staged a management board take over. This was made easier by the fact that a well-known, respected person in the region was part of the team and helped gain trust for loans.

ERIK Network
Policy Recommendation

Fund Matching Events in Collaborative Working Environments

Programmes which concentrate on creating spaces, where people with business ideas can meet people with financial resources, where they can get to know each other and have time to present and develop their ideas. Funding could be provided to prepare, supply and hold monthly events in varying formats, perhaps divided by innovative sector, in “collaborative working environments” (environments which provide collaborative services to make possible the development of worker-centric, flexible tools, enabling natural collaboration among a diversity of agents) where regional actors both new to the scene and already known can hold constructive, well organised networking. These events would have to be well organised in terms of content and choice of participants in order to increase probability of matching.

Support to Simplify Complications

It is widely recognised that the process of gaining financing is too complicated and bureaucratic. Small enterprises or budding entrepreneurs often do not have the skills necessary to affront this process and need simplified, easier access and quicker measures. Overall complicated legal, technical and administrative requirements are often a road block. This is true at regional level, for example when requesting bank loans, and at European level, for example participation in the PRIA, both in terms of project preparation to receive funding and of financial administration throughout the project. Experiences show that SMEs had real trouble adhering to the regulations.

It is unrealistic and unoriginal to propose that rules and regulations are simplified. Public and private institutions may try to do so, indeed the European Commission has stressed that the 7th Framework Programme for Research and Technological Development has been simplified in administrative terms. However, some level of bureaucracy is and will always be necessary. Therefore, inexperienced entrepreneurs need support to face these “obstacles” and overcome them.

This idea is illustrated by the good practice “FAME” in the region of Alentejo which stimulates investment in micro companies. The team offers expert support to participants to complete the application form. This is a simple, yet highly effective tool which may make the difference in a company’s decision to apply for credit. The same is true for “*Bourses pour Porteurs de Projet Innovant*” developed in Languedoc-Roussillon who insist that the grant is conditional on a specific partnership agreement between the project leader and a support structure (incubator or business nursery). It is also visible in the good practice “TRENFI” (case study in this publication) who ran mentorship development programmes. During the programme regular meetings were held between programme management, Venture Capital companies, credit guarantee funds and other funding bodies. At these meetings problems and solutions concerning the theme were widely discussed.

Fund the Provision of Support Services

ERIK Network
Policy Recommendation

Programmes which allow funding of support and consultancy from experts on gaining funding for innovation on specific European and regional programmes and opportunities. They should have the expertise to make complicated bureaucracy seem simple to those seeing it for the first time and to supervise the successful completion. This could concern the creation of support structures or the improvement of existing ones. It should come as a form of training and support rather than doing the job for them so that the entrepreneur is able to go it alone the next time.

Public-Private Partnerships and Changing Culture

How can we overcome the problem of participation in financing innovation from the necessary public and private actors in the region? Experience shows that, while public authorities may be willing to invest, private institutions are more cautious. Some good practices have experimented with new ways of encouraging this participation. In the “Tekniklots” project, described above, private entities were involved from the start of project development.

The same is true in the case of the Scottish Co-investment Fund (SCF), a £45m equity investment fund set up by Scottish Enterprise, and part funded by the ERDF, to increase the amount of risk money invested in ambitious Scottish companies. Unlike a standard Venture Capital fund or a business angel, the SCF does not find and negotiate investment deals on its own. Instead, it forms contractual partnerships with active Venture Capital fund managers, business angels and syndicates from the private sector. In these partnerships the private sector partner finds the investment opportunity, negotiates the investment deal and offers to invest their own equity. If the opportunity needs more money that private sector partner can provide, it can call on SCF to “co-invest” on equal terms. The SCF would become part of the investment syndicate. This means that private sector investors can bring more money to deals, while spending less time finding that same money.

Encouraged private participation is also seen in attempts to develop methodologies and pilot projects to change attitudes towards regional investments and to promote new mechanisms for financing innovation. One example is that of “TRENFI” where citizens were given the opportunity to become shareholders in regional companies, thus promoting a culture of commitment and responsibility for regional economic actors.

ERIK Network
Policy Recommendation

Fund Measures to Change Private Attitudes

Offer incentives for private companies to participate in regional development through financing innovation. Finance measures that not only provide initial capital for public administrations to fund innovation but also provide capital for testing financial mechanisms which see the direct participation of regional actors in programmes and indeed in the companies themselves. Select company best practices and use them as a positive benchmark for other companies, both on a regional and trans-regional basis throughout Europe. Benchmarking can be facilitated with a European database of good practices and public mentors that support the companies.

Shorten the Innovation Finance supply chain

Although resources from the European Commission are dedicated to finance innovation at national and regional level, the supply chain (the chain of resources and organisations that money passes through on its way to the “innovation”) does not always “add value”. Often regulations on how the money can be used limit direct participation from SMEs, and indeed in

some programmes public money only can be consumed by public stakeholders and facilitators. If more of the money reached the companies or the “innovation” directly we would see a direct increase of growth.

More money directly awarded to companies for innovation often gives the boost needed for real innovation. As discussed earlier, the programmes under the US federal initiative U.S. Small Business Administration allow public funding up to 100,000 USD in direct support for innovation development and market introduction. However, if such money is not supported by administrative possibilities from facilitators (public or semi-public organisations acting as go-betweens for companies and venture capitalists), there is a risk that the most eager innovators get the money rather than the best innovative ideas. The good practice “KGF” shows one way to shorten the Innovation Finance supply chain. One of the key innovative features in the KGF was the decentralised decision making process which enables fast and accurate assessment of business cases. The idea was created in a local context. Once established it was able to use the regional network to get decision makers on the same track. Therefore, there should be a balance between money spent directly on innovations and money to facilitate and select innovation for funding.

Balanced supply chain for innovation finance



Dedicate part of the funding for direct access by the companies and balance the amount that will be used by administration and selection of innovative projects to finance. Make it possible in different programmes to have a joint partnership to facilitate and bring both public and private financing together. Strengthen the possibilities to use the money in the companies and develop the links of innovation finance to JEREMIE.

6.2 Case Study: TRENFI “Promote new mechanisms for financing innovation” - Mellersta Norrland, Jämtland and Västernorrland County

Strategic Regional Context

The region of Västernorrland is situated in the centre of Sweden and has 7 councils with total of 244,000 inhabitants covering 21,700 km². This amounts to 11 people per km², compared to national average of 22. There are two main urban areas: Sundsvall-Timrå-Härnösand which has the largest population concentration in northern Sweden, and Örnsköldsvik the main industrial area. The largest council is Sundsvall with 93,000 inhabitants. 75 % of the territory is covered in forest. Rural areas are large and sparsely populated and notable differences are visible between the coastal area, which is more densely populated, and the rural inland regions.

The main sectors in the region were once the industries of forestry, pulp & paper and hydropower. Today the IT sector, business services, renewable energy, biotechnology, hydraulics and component manufacturing for the processing industry are showing substantial growth rates.

Västernorrland has both advantages and disadvantages in terms of economic growth that any development policy has to take into account.

Competitive advantages

- An increase in start-ups and high rates of survival;
- Rich in natural resources and strong industrial tradition;

- Strong in the sectors of energy, manufacturing and processing industry;
- Skilled workforce within renewable energy and biotechnology.

Disadvantages

- Long distance to main markets leading to higher transportation costs;
- Shortage of venture capital and commercial loans for SMEs;
- Vulnerability in areas dominated by large companies where few new jobs are created;
- The private market is too small compared to the total labour market.

Threats

- Decreased population and increased regional concentration in urban centres;
- Lack of possibilities for the SME to compete internationally;
- Low diversification of industry structure and further dependence on a few large industries and their investment decisions;
- Formal governmental hindrance in development of sustainable financial infrastructure.

Concerning the issue of innovation finance, an important component for the creation of micro-companies and the growth of SMEs in a region is the market for venture capital and credit lines. The supply side, access to venture capital and credits, is closely linked to the demand side, to the quality of the business plan, to market access for products or services, to the skills of the entrepreneurs and to the collateral offered in the business project.



Figure 6.6: Huskvarna Prototyper Premises - ERIK Study Visit Jönköping (6th – 7th November 2006)

However, due to a steadily decreasing population, decreasing work force and decreased demand for real estate and production facilities, the market for venture capital and credits in less favoured regions in Sweden is not effective. As venture capitalist companies and credit institutes are often managed by executives from outside the region, they are often guided by central directives and attitudes from metropolitan regions give low value to the existing property or real estate in the rural region, as demand is decreasing and the risk for default on credits is high. For instance, when an industrial centre is built in a small community in a less favoured region, the market value will immediately be significantly lower than investments for production of the centre. Regions are thus experiencing a negative trend in which most investments are directed towards metropolitan areas. The issue is currently being researched at the Centre for Regional Science at Umea University.

Before the TRENFI programme, the lack of financing mechanisms was a great challenge both for new and existing companies. Venture capitalists and banks often avoid investments in companies outside the most expansive regions in Sweden. Furthermore, the citizens in the region are today reluctant to invest in regional companies. As the value of real estate and

production facilitates is decreasing due to limited demand, the region has a great challenge in attracting new businesses and skilled personnel. No companies, banks or individuals want to invest in the long term because there is no foreseeable profit. The only exception to this situation can be found in the few urban centres, where investments are still profitable. Based on experiences from the RIS+ and the earlier RITTS 022 programme, councils and regions that had reached a critical mass of companies within a certain branch have developed models for the provision of venture capital and skilled labour.

Innovative steps to be taken to improve the supply of venture capital and credits in the region had already been identified as: strengthening the region's commercial attractiveness in order to encourage venture capital and loan institutes to invest in regional companies; developing methods to increase the number of venture capital operators and the availability of venture capital in the region; promoting regional ownership and co-operation with actors outside the region.

The regional authority made a large effort to prepare the TRENFI action line. Key regional actors were initially invited to contribute to the planning process. Several regional stakeholders, including civil servants, businessmen and politicians, then attended 2-3 study visits to other European regions to learn and gather information on good practices. The European Commission services were also consulted. After approximately one year, the team in charge of preparation had enough substance to form an action line with a clear demand side and activities with some amount of risk involved.

The "Programme for Innovative Actions" for Västernorrland and Jämtland was approved in 2001 and included one action line for financing innovation

Political Context

The County administrative board of Västernorrland is a public administration that dates back to the 17th century. At that time its primary duty was to oversee tax collection. Its roles and duties have since undergone extensive changes and tax issues are now not among its responsibilities. Each of Sweden's counties has a county administration that functions as the right hand of the Swedish Parliament and the central government and is responsible for ensuring that their policies and decisions are implemented. The responsibilities of the county administrations cover a range of issues that embrace specialist areas in the day-to-day life of the community as a whole. Everything, indeed, from the issue of individual driving licences to major issues affecting the inhabitants of the whole region. County administrations also have responsibility for coordinating work in connection with EU structural funds. The modern role of the Swedish county administrations includes: seeing that national targets are attained; coordinating the varying interests of their counties; promoting the development of the county; setting targets to be attained at regional level; ensuring that the rule of law is not infringed.

The lack of venture capital and access to financing innovation is an issue of high political importance, and is central to the Västernorrland regional development strategy. For instance, the region has volunteered as a pilot region to use objective 1 structural funds in regional investment funds. Only two regions in Sweden have pilot region status for financing innovation.

To address some of the disadvantages and threats identified, at the end of 1999 the county administrative board of Västernorrland and the county of Jämtland decided to work together on the problem of financing innovation and how to build a structure facilitating finding grants and loans for SMEs. The action line was supported by the Governor and by the Mayors of the councils from the very beginning. As this action line shows, this strong support continues.

Project objectives

The action “Financing Innovation” within the TRENFI programme investigated and promoted new and innovative mechanisms for financing innovation in SMEs. The less favoured regions in Sweden suffer from lack of venture capital and lack of loan capital due to the high risk of business failure and lesser growth expectation of companies in the regions compared to major cities. For this reason venture capitalists avoid the region and banks are reluctant to issue loans to SMEs. Therefore, the objective of the action was to launch, test and validate new mechanisms aimed at preventing the negative trend within areas of venture capital and access to loans for SMEs.

An important focus was to promote changes in attitudes, mainly the reluctance among venture capitalists and loan institutes to invest in less favoured regions. Additionally, through the financing mechanisms citizens were given the opportunity to become shareholders in regional companies. Therefore, the objective was to promote a culture of commitment and responsibility for regional economic actors, to contribute to stronger regional identity and sustainable growth.

The main beneficiaries of these actions were growth companies, management and employees, venture capital companies and creditors within and outside the region, young female entrepreneurs, young immigrants and SMEs in agro-related business.

Description of Activities

The main purpose of the action was to develop methodologies and pilot projects to change attitudes towards regional investments and to promote new mechanisms for financing innovation. The action line included the following activities:

- Investigation and analysis of the current situation and disseminated results;
- Promotion of changes in attitude in terms of credit lines and valuation of production facilities and property;
- Investigation and development of models for local ownership;
- Empowerment of the demand side of the market for venture capital and credits.

The action particularly concentrated on four stages:

Stage 1 - Preparation: Preparatory arrangements were made for mentorship development programmes and training schemes for board members for attracting venture capital and credit. This included finance training in the SMEs, and especially their Executive boards. During the programme regular meetings were held between the programme management, members from VC companies, credit guarantee funds and other actors in the area of financing innovation. At these meetings problems and solutions concerning the theme were widely discussed.

Stage 2 - Programme Development: An important challenge in the region was the access to finance and venture capital for new entrepreneurs who were not already known by the actors of the innovation system or loan institutes. The TRENFI programme secretariat arranged a series of meetings with the organisations responsible for financing new entrepreneurs and issuing business loans in order to investigate the situation. After several meetings, including study visits to Spain and Germany in which innovation support actors also took part, a programme reflecting a combination of user needs and good practices from other EU regions could be developed. The focus of development efforts was on the design of loan guarantee programmes for selected target groups such as young immigrants or young female entrepreneurs. The mechanism was to “unlock” bank loans by issuing loan guarantees. The leverage of this mechanism was 1:10, that is 1 euro of guarantee money unlocked 10 euro in loans. However, the guarantee fund project had difficulties after 2003. This is partly because national legislation makes it difficult to

award guarantees and partly because it was difficult to convince local entrepreneurs to finance the fund because of changes in regulations on security for bank loans.

Stage 3 – Contacts: This stage concentrated on developing contacts with venture capitalists outside the region with the aim of promoting inward investments and knowledge exchange. This work was done mainly by selected senior industrial leaders, proven entrepreneurs and regional investors and venture capitalists together with the governor of Västernorrland. Political and policy support were important elements for making the right connections and gaining interest from venture capitalists outside the region. The contacts were made through several different approaches: inviting investors from within and outside the region to regional meetings; inviting representatives from the region to meetings in other cities including Stockholm, London, Milan and Seville to meet with investors and promote the region. In parallel, the group worked with funding a new mechanism and investment fund “*Investa företagskapital*”. The Investa fund provides equity for small but growing industrial companies with a market outside the region. The fund never takes the position as majority shareholder and prefers to syndicate with other funds or private investors. This fund is up and running with a total budget of 11 million euro.

Stage 4 – Testing: Test new financing mechanisms in the region. During the programme pilot actions were organised to test and find possible mechanisms for financing innovation in the region. The following pilot projects were developed and tested:



Figure 6.7: Abstract photo of the Reichstag Dome in Berlin, Germany

The credit granting association in Örnköldsvik: The objective was to start a credit granting association to solve the lack of bank credits for those who were not guaranteed by owner funds or increased securities. The association was developed as a local tool for SMEs to create financial solutions for growth companies and to contribute to an increased “we” thinking among SMEs at local and regional level.

Enterprise Jämtland, today INIBIZ: The objective of this project was to promote transparency in the business development process, from idea to actual business. The project promoted a creative environment and added value to the regional industry by bringing ideas and capital together at the same time as bringing new, unproven, entrepreneurs together with people with senior business experience. The entrepreneurs could benefit from experience

without having to pay actual cash for advice; payment was instead in shares or future royalties on income or profit. One project objective was to create and sustain a meeting forum for entrepreneurs. The project also analysed regional needs and the demand for venture capital and knowledge and matched venture capital operators and networks contributing to company development. Some examples include the Enterprise Jämtland business angel network and Enterprise Jämtland value added network.

The project resulted in a formal structure and organisation for Enterprise Jämtland, that later evolved into an investment and consultant company named INIBIZ. INIBIZ maintains an active network with business angels. In fact the business angels are the owners of the company and of several spin-off companies which create added value for SMEs and entrepreneurs. An enterprise board has been developed and integrated with a network of dynamic entrepreneurs.

Business Angels Network: The objective of the project was to enhance the positive effects of Business Angel activities in the region, especially in terms of how to deploy skills, knowledge and financial resources. The project 1) carried out a study which analysed and described business angels activities in the region, 2) created a network organisation and demonstrated forms of cooperation, 3) created and demonstrated tools for matchmaking with intermediaries in the region and 4) disseminated results and knowledge concerning business angel activities in the region in combination with marketing of the methodology. The result is the foundation for a functional network of Business Angels.

Network for Decreased Transaction Costs: The objective of this project was to decrease transaction costs by developing a network of trade union representatives with specialist knowledge in venture capital and fund raising. Trade unions are the only actors throughout the country who have a representation of individuals with knowledge on the economy in different enterprises. Hundreds of trade union representatives have been taught, for example, how to act as a board member in an enterprise. If these resources can be used to reduce the number of investment objects, the transaction costs for venture capital companies can be reduced, which also could lead to greater interest in investment opportunities in northern Sweden.

Venture Capital for Rural Areas: The project goal was to establish a new kind of local marketplace where venture capital/savings can be transferred from those who have money to those who want to use it. The project tried to develop a model that takes "human, environmental and ethical values" into account when making investments or savings. The new market place would raise knowledge on cash flow and its importance and would influence the attitudes of traditional banks and financial institutes. Although the idea was good and politically correct and the management of the project was sound, the results did not create visible impact in the region because of the small scale of activities carried out, for instance providing micro loans not exceeding 2,000 Euro.

Venture Capital in a Regional Context: The project's objective was to enhance the regional environment for establishment of venture capital companies or development of new mechanisms for financing innovation in a broad sense. The project studied a number of selected schemes in the EU. They also worked close together with European Investment Fund (EIF) and their advisory services. Good practices were identified in other EU countries that already used different schemes to solve problems in financing innovation. The information was brought forward in this project was used at national level as well as in the programming of the regional structural fund operations. The report was an important element in helping the region to qualify as one of two Swedish pilot regions for venture capital and structural funds.

Partnership

In the programme development phase, the following organisations actively took part: Business and Innovation Centre Mid Sweden BIC Mid; County Centre for Technical Innovation (LTCK); Chemical Technology Centre (KTC); EDU – Education and Distance Centre; Federation of Private Enterprises in Jämtland; Federation of Private Enterprises in

Västernorrland; Chamber of Commerce in Västernorrland; County Board of Jämtland; County Board of Västernorrland and the University of Mitthögskolan.

Today this group has developed further to include more regional actors in the field of financing innovation, particularly the new financing mechanisms, such as Investa and Västernorrlandsfonden. These actors represent the majority of the stakeholders related to financing innovation in the region, industry, industry associations, university and the public services as well as the regional authority. The stakeholders contributed mainly with information on demand and behaviour in different demand segments. For instance, a researcher looking for an investor has different needs to an entrepreneur in tourism. The group reflected many different opinions and represented a communication channel for actors proposing projects. The triple-helix approach proved to be very successful and the action line was approved and supported by all actors involved.

In the execution phase, all major actors involved in promotion of regional venture capital and schemes for financing innovation also contributed to the action line, namely: 2 Regional venture capital operators involved in projects; 1 Bank looking into possibilities to create a seed fund; 2 Credit guarantee associations; 25-30 Business Angels forming a network.

Programming

As mentioned above, a huge amount of preparatory work went into planning this action. The regional administration dedicated time and effort into understanding fully not just regional needs and characteristics, but also the European state of the art in terms of related initiatives.

With regards to project selection, the TRENFI programme used a call procedure, with fixed closing dates. With this call procedure, there was an element of competition among the regional stakeholders. Projects could be selected from the entire region. Response to the two calls in the action line was very positive and the requested proposals exceeded the budget. Following the calls, 24 proposals were presented. 12 were approved by the steering committee according to the criteria in the work plan and the ability of consortium the project to carry it out. Another important criteria was project management, only the best managed proposals were approved.

Management Structure

To establish an effective transfer of know-how between strategies and consensus reached within the mainstream ERDF work, 2 representatives from the Objective 1 steering committee were appointed to the Innovative Actions steering committee. The steering committee had 6 regular representatives: 3 from the private sector, 1 local councillor, 2 from the County Administrative Boards and members of the Objective 1 steering committee. The chairman and vice-chairman of the group were representatives from the County administrative boards. The group also had 6 personal deputies (3 from the private sector and 3 from the public sector). They took an active part in steering committee work but did not take formal decisions if the regular member was present.

By setting up the steering committee with this broad representation, the programme ensured a broad view from the region's different areas and businesses. It proved that including representatives from the industry in the steering committee ensured that the opinions of the target group were always available. All decisions related to selecting projects in the action life were made in consensus.

Marketing

The action line was initially marketed through 5 seminars covering the entire region. Some 150 participants in total attended these seminars. Following the seminars, the action line calls

were published in 5 major newspapers and on a web site. There was also a helpline to call for support.

Effectiveness

Overall, the GP was very successful. Almost all projects successfully reached their objectives according to the work plans.

An important question is how to create and sustain a system for financing innovation. The main issue for future programmes could be to benefit from the momentum created in TRENFI and continue to develop methodologies and pilot projects to change attitudes towards regional investments and to promote new mechanisms for financing innovation. The GP results have increased discussion and planning among councils for increased access to innovation finance for SMEs. Additionally, a sustained dialogue with banks and investors was launched. However, work is still needed to really change the attitudes of the banks, more concrete incentives, such as risk-sharing funds or funds for syndication and co-investment, should be developed.

In addition to the initial objectives the following activities were performed:

1) SME managers, officials and politicians made several study visits to regions as Northern Italy, Austria and Southern Spain during the programme period. These study visits contributed to a regional dialogue on future efforts in financing innovation and SMEs and entrepreneurs' needs. The study visits lead to participation in the CRESCENDO IRE Thematic Network focused on innovation finance. Over two years of operation, its ten regional members and



Figure 6.8: Glowing Fibers Underwater

observers studied different financial instruments available for firms, the factors that influence SMEs' demand for growth finance, and its regional supply, and the role of the public sector in providing financial tools for small companies. Widespread difficulties in financing smaller investments which need to be addressed by public authorities were identified. CRESCENDO also mapped the elements that make up a regional financial system. The network outlined the concept of a 'regional finance supply chain' which comprises appropriate sources of finance and related support; integrated in such a way to cater for evolving finance needs in growing companies. The members tested a series of mapping and benchmarking tools which were further developed to support regional authorities in assessing the quality, extent and degree of integration within their local SME finance supply chain.

2) One of the projects established communication with the European Investment Fund (EIF). The discussions resulted in an EIF advisory service, financed by resources outside of the programme. The aim of this advisory service is to get to know the region and identify suitable actors for further collaboration. This has resulted in the region becoming a pilot region for Sweden and one of two Swedish regions involved in the JEREMIE initiative.

The main impact of this action lies in the improved cooperation between different actors. Within this cooperation, two new venture capital funds have been launched with co-financing from the structural funds. This is the first pilot in Sweden with this kind of financial structure. Furthermore, ALMI, a regional agency for entrepreneurship development with access to small loans, has increased the number of issued loans to SMEs.

Innovation

The action presented projects and results which had not yet been tested in the region. In particular, the pilot project to create a credit guarantee association was the first credit guarantee mechanism in the region. The activities to gather and promote exchange among venture capitalists were also without precedent. This action was innovative in terms of ideas, processes and activities.

Sustainability and Transferability

During the action the important question of how to create and sustain a system for financing innovation was raised. In addition to creating a momentum which future programmes can benefit from and build on, the action strategy on improved financial infrastructure and improved general access to innovation finance for SMEs has now become a key issue in the regional growth programme and at a political level. Several processes and initiatives have been maintained. Both a regional discussion and strategy forum and two networks of business angles and investors have continued. Measures will also be undertaken through the regional growth programme and in the programming of objective 2 and 3.

During the TRENFI programme 2 business angel networks were created. Both are still active, one within the above mentioned INIBIZ. The region has also joined the CRESCENDO Network, which may lead to sustained activities. The action created an informal "Investment discussion forum", that continues even after the projects have finished to suggest and disseminate improvements in the regional system for financing innovation in a dialogue with regional industry, regional authorities and the government.

The management structure and the approach on how to create a discussion forum could be transferred to other regions. The approach to have a large number of projects from the entire region, selected by a call process in order to reach a critical mass, is also transferable. The combination of massive information to all stakeholders and a call procedure, only selecting the best ideas, was very successful and could be implemented in other regions.

Critical Success Factors

The single most important success factor was the large number of participants in combination with highly experienced personnel involved in the different projects.

The wealth of projects made it possible to create a regional forum for venture capital and financing innovation issues. This forum also brought the views of industry and academia into the process. The scale of the entire process reached a critical mass and made it possible to have an impact of the regional strategic planning, which led to improvements in the continuing regional development process. The impact also reached the central government administration, leading to the region becoming a pilot region for the use of regional development funds for financing innovation.

Obstacles in terms of design or implementation

In Sweden the different actors within the field of financing innovation are used to working more or less alone within their area of expertise. This represented a problem that had to be addressed and solved at the beginning of the project. After closely discussing opportunities and threats, in several one-to-one meetings and a handful of seminar meetings, some realised that increased cooperation could lead to more success and more profit. The key to convincing the investors to cooperate was the future outlook of developing regionally managed funds and decreasing risks.

Other important areas that need to be addressed in the near future are:

1) It is important that the results from successful regional projects reach national government level, so that rules or legislation that is counterproductive to regional development can be changed. For example, Swedish national regulation does not allow regions to use regional funds to set up investment funds. Only the central government can do this. Preparation and decision on regulation and legislation is the responsibility of the central government, the ministries and the parliament. For cooperation to be successful it is necessary to improve the cooperation mechanism as well as the “cooperation spirit” between central government actors and different actors in the region.

2) Most Swedish banks have a centralised view or “knowledge base” for how to assess risks and issue loans and credits. Therefore, investments in less prosperous areas are often compared to similar investment in prosperous regions. The result is that managers in the less favoured regions deny loan requests more frequently, due to lower expected return and higher risk. Venture capitalists and credit institutes, often managed by executives from outside the region, are guided by central directives. This overall issue should be further analysed and mechanisms for improvements should be developed. This “escape of investors and creditors” is one of the most important and unsolved issues in regional development. However, this action highlighted the importance of strategic handling of this issue in combination with other legal or regulatory issues, such as tax regulations and depreciation rules.

Conclusions and Lessons Learnt

Overall, the GP was very successful. Almost all projects successfully reached their objectives according to the work plan.

The interest in participating in the TRENFI project was extensive from all over the region. A critical mass of high quality interested actors with an ability and will to contribute was created across the entire region. Overall, the scheme improved discussion and collaboration on innovation finance among actors in the region and between the region and other national actors. Good contacts were also made with the EIF which is now supporting the region with participation in the JEREMIE initiative. Finally, the GP has had a major impact in the development of the regional growth programme as the region has qualified projects as ‘very successful’.

Within TRENFI a credit guarantee association was started and this could be one way to fund seed capital. Currently this fund is experiencing problems partly depending on central governmental legislation and banking roles.

Contact Details

Ulrika Appelberg, Deputy Head of Industry Department
County Administrative board of Västernorrland, SE-87186
HÄRNÖSAND, SWEDEN
Ulrika.appelberg@y.lst.se
www.y.lst.se

6.3 Case Study: Efficient Promotion of Private Financing – Epirus

Strategic Regional Context

BIC of Epirus, in charge of the running of 'Efficient Promotion of Private Financing', was founded at the end of 1996 and for the first 18 months received 50% of its funding from the EU and 50% from local partners. Since then BIC of Epirus has become a self funded non-profit organisation.

The aim of centre is: "The promotion of activities regarding a Development Centre for Innovative Enterprises, at no expense". This aim is achieved through the provision of innovative services to local enterprises and bodies. The centre's actions focus on raising awareness and spreading information to existing enterprises, promoting cooperation among different actors and supporting entrepreneurship through EU and national programmes and initiatives.

Epirus is located in the northwest of Greece. The region is a mountainous area of 10,170 km². Epirus has around 350,000 inhabitants and a population density of around 33 people per km², compared to a national average of 76. The distribution of the GDP by sector in million drachmas in 1994 was: primary sector 53,271, secondary sector 85,233, and tertiary sector 213,678. The substantial contribution of the tertiary sector is less evident in its share of employment (33.8%). The most dynamic sectors of activity are food and beverage, with strong networks in agriculture, wood-processing and non-metallic mineral products. The main exports are dairy and food products, marble, and craft products. Tourism and rich water resources also play a significant economic role.

Despite significant competitive advantages and opportunities, the future of the region is put at risk by various weakness and threats. The most competitive advantages of the region are:

- The geographical location of the region and strong growth possibilities (the new link-gate with Western Europe, mainly through Igoumenitsa port where the Egnatia motorway ends);
- Ioannina and the other urban areas on the broader (management – trading centres – educational centres – hospital care) and their development possibilities (Regional – International Growth Pole);
- The University of Ioannina and the Technological Educational Institution of Epirus which are primary actors for R&D promotion and economic diffusion of innovative activities;
- The rich natural and cultural environment.

In terms of weaknesses regional development is inhibited by:

- Current geographical isolation from the rest of the country (mainly due to the mountainous region of Pindos) and the mountainous areas;
- Low development level (it has the lowest per capital GDP in the country and one of the lowest in the European Union);
- Strong inter-prefecture inequalities and the isolation of the mountainous and distant regions;
- Lack of international and interregional links.

The possible threats facing region are mainly related to the fact that, due to the lack of employment opportunities, many young people leave the region to live and work in other metropolitan centres. This leads to a lack of experienced personnel in key positions within the firms and a lack of new entrepreneurs. Another threat is the small dimension of and number of

employees in firms, limiting possibilities for networking and creating synergies. Furthermore, while in recent years a great effort has been made at European level to change the entrepreneurial culture, broaden “business horizons” and suggest issues and methods to the central policy makers in order to assist and reinforce entrepreneurship in general, such effects are more visible in capitals or areas closer to policy making centres. As such, Epirus is a region that faces and feels changes relatively late. Moreover, no instruments for pre-seed innovation finance currently exist in the region. The Science Park has only been operational for 3 years so it is still too early to have developed such instruments.

However, the competitive positioning of Epirus is gradually changing due to the development of new infrastructures and transport networks, the expansion of university infrastructures and the establishment of the Technology Park. These combine to create a new regional environment and can play a role in increasing innovation and addressing the weaknesses and threats outlined above. This is especially true for the University of Ioannina, one of the most active and fast growing universities in Greece

Political Context

Innovation is at the top of the regional policy agenda. However, innovation promotion and support cannot be developed without wider awareness and mobilisation of companies, entrepreneurs, private capital, local actors and policy makers. In addition, the language used for innovation must be comprehensible to these actors, all of which must play a role with their ideas and participation. In this context, it became critical to boost innovation towards enhanced entrepreneurship in the Region. The RPIA presented an opportunity to move in this direction.

Project objectives

The RPIA in Epirus aspired to promote innovative entrepreneurial activities in the region. The programme not only looked into the future through the foresight initiative and the new investment opportunities, but it also used existing action lines in other programmes supporting innovation.

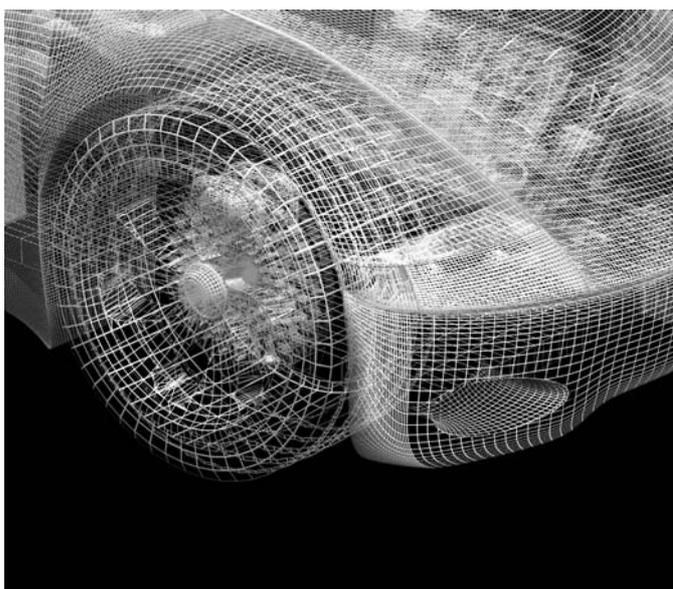


Figure 6.9: Innovative Design - Detailed wireframe of a car

The objectives of ‘Efficient Promotion of Private Financing’ focused on allowing innovative and sometimes risky actions, to be developed thanks to support for entrepreneurship through innovation and the promotion of private investments in the region. Local entrepreneurs much adapt to the new era and new market conditions but small enterprises often have no luck in expanding their activities due to limited financial capacity. This project offered them the unique opportunity to get closer to methods to which they most probably have never previously had access. As a result, a large number of SMEs responded to the call for proposals in order to take advantage of this opportunity.

The regional authorities of Epirus, the local actors and the private sector joined together in order to develop new innovative methods and techniques for the support and creation of SMEs. This initiative is mainly focused on the development of a concrete strategy that will speed up innovative thinking and innovation in the region. This is ensured through the collaboration of the local actors and the use of both existing infrastructures as well as future ones.

The project beneficiaries were small medium enterprises in the region, entrepreneurs, and potential financiers. The companies taking part in the activities were from different sectors such as food production, tourism, manufacturing, energy and service (as shown below).

Description of Activities

'Efficient Promotion of Private Financing' was carried out in three sub-actions:

1. Creation of a guide for innovative investment opportunities in Epirus: This action produced a "Guide on Innovative Investment Opportunities in Epirus", seen as an appropriate business tool to efficiently promote private financing. The Guide provides information related to:

- The local economy and the innovative character and performance of existing local enterprises in three sectors: tourism, transport and ICT;
- Legal framework regarding the procedures for enterprise start up;
- Guidelines for business plan elaboration;
- Potential ways to finance investments in innovation;
- Human resource management and training potential;
- Useful contacts related to entrepreneurship development.

2. Visiting Schemes for Business Angels and Corporate Investors: This action line saw a study on a methodology for the organisation of Visiting Schemes and Matching Events among venture capitalists and local entrepreneurs. This methodology was envisaged as the basic tool for attracting potential business angels and corporate investors to the region. Specifically the study focused on:

- The procedure of business innovation financing by private capital sources in the three above mentioned sectors: Tourism, Transport and ICT. Information and awareness raising related to new methods of financing at regional level, such as: 1. The New Economy Businesses National Fund "TANEO" body; 2. Bank services; 3. Private companies; 4. Personal contacts among entrepreneurs and Business Angels or Venture Capital companies.
- Information and documentation on the main private capital investment funds operating in Greece and abroad, such as Venture Capital and Business Angels funds (unique bodies created in Greece to promote these services and which cooperate with Banks).
- The methodology and tools used for the visiting schemes and matching events, such as: 1. Contacts with Venture Capital and Business Angels companies and bodies both in Greece and abroad; 2. Participation of banks in final meetings; 3. Contact with local enterprises in order to familiarise them with the idea and encourage their participation; 4. Production of relevant informative and divulgation material.

3. Two matching Events for Venture Capital Companies: This action line saw the organisation of 2 Venture Capital forums.

The first was held on the 21st of March 2006 and was divided into two sessions. The first session saw presentations on Venture Capital in Greece, the role of the New Economy Fund (TA.NE.O –national fund which cooperates with banks to provide funding and information) and the role of Business Angels and Corporate Investors in promoting private financing. It presented a Proof of Concept in the form of a tool for improved exploitation of research results, and

examples to illustrate the information in the form of services and products from six private venture capital funds.

The second session involved 17 preliminary meetings which took place in the Science and Technology Park of Epirus among pre-selected local entrepreneurs and venture capitalists in order to investigate the potential for funding “dynamic” business ideas. 27 companies were involved and were representative of activities as diverse as food production, clothing production, wind energy production, agro-tourism, air conditioning unit production, Hotels, metal processing units, quarries, vehicle repair and photographic image development.

The final choice of the entrepreneurs supported by the project was based on the following important criteria: Business idea viability, innovation performance, growth rates, company size, and direct economic support received by companies through existing programmes.



Figure 6.10: Off Shore Wind turbines

The second Venture Capital Forum was held on the 16th of May 2006, on the 2nd day of Innovation Week. Innovation Week, as a part of the RPIA, offered the unique opportunity for key local actors and enterprises to meet with foreign and local bodies and actors working in the fields of innovation and entrepreneurial development. In addition to the Venture Capital Forum, a number of events took place during the week such as, the local B2Europe Protocol Signature, a photo exhibition under the theme “Innovation”, the presentation of material, actions and studies elaborated during the project, as well as results derived from the programme.

As with the first forum, this second Venture Capital Forum was divided into two sessions. During the first session topics presented included: Regional Economies & Innovation Policy in Greece and other regions; New Economy Enterprises and Venture Capital such as existing initiatives in Greece for new economy enterprises and the promotion of venture capital funding through cooperation with banks; New entrepreneurial actions through public-private sector partnership which have been inserted into Greek policy measures at national level, but not yet implemented in Epirus; Trade Zones; Tools for development at regional level, such as public-private initiatives, EC funds and the new Development Law at Greek national level; the first Tourism Cluster in Epirus.

During the second session of the forum a meeting took place in the Science and Technology Park of Epirus between a local entrepreneur and a venture capitalist who had met during the 1st Forum in order to define a business cooperation framework. The choice of these particular actors was due to the initiative of venture capital companies themselves, according to their areas of interest.

The Open VC Forums were the beginning of the process of offering the information needed to stimulate more local enterprises. Follow up concerned the preparation of business plans and

the organisation of individual meetings. At the time of writing, 27 business plans have been elaborated. All business plans were submitted by experts in the region and were judged by a programme Committee. The most innovative ideas in the regions were selected in order to assist with the Matching Events. Each entrepreneur had the opportunity to meet corporate investors and venture capital companies in order to present and discuss potential cooperation opportunities based on these plans. Each meeting was held in the premises of BIC of Epirus. After this, both sides were able to meet each other without specific intervention from BIC Epirus.

Some examples of on-going business consulting in specialised issues are *Skandalis Fotis "Villada"*, a tourist business where consultancy was provided to develop a strategic framework for its service promotion and *Tourist Cluster: Rural Areas Enterprises' Network in Ioannina Prefecture*. These 2 cases developed a close relationship with BIC of Epirus and meetings are often held for issues such as updating their website infrastructure or receiving useful information for further development or investments (funding opportunities, EC projects, etc.) available throughout Greece.

Partnership

The most important actors were the Bank of Ioannina "STOXOS", the Chamber of Commerce of Ioannina and the Credit Guarantee Fund for Small and Very Small Enterprises. The Chamber of Commerce of Ioannina assisted BIC in contacting regional enterprises. The Bank of Ioannina and the Credit Guarantee Fund for Small and Very Small Enterprises also provided efficient information on services and funding methods. Partners came from key local actors, private business angels and corporate investor firms. All local actors provided contact with entrepreneurs who wished to be involved in this process.

Programming

The initial project idea resulted from research and from previous experience in terms of development and innovation capacity from key regional actors. Former actions and projects highlighted the necessity to bring new development methods into the area. However, none applied specific actions towards entrepreneurs. It had been shown that business angels and venture capital investment tools are sufficiently and successfully used in European countries. Similar projects had never been implemented in this region and as such all key actors and development bodies reached to the conclusion that this was a potential solution.

The programme was developed on the basis of this information by an external consultancy company who plans and implements various actions in the region. BIC of Epirus also had a significant role during this phase in terms of research, data collection and mobilisation of local key actors.

Management Structure

The formation and operation of the Innovation Policy Interface Committee built synergies for entrepreneurship through an effective combination of policies, which was then absent in the Region of Epirus. The Committee consisted of 15 members representing: the Region of Epirus, all BICs operating in Greece, the University of Ioannina and the Science and Technology Park of Epirus. In addition, innovation management experts participated in the scheme. The Committee met approximately every 3 months and every 6 months they produced a 10 page report highlighting the threats and opportunities created for innovation policy and promoting synergies. Through the committee, 3-5 (number depending on project needs) working groups were created to work on the collection of information on an on-going basis.

Marketing

The on going progress of the project could be followed up through the continually updated web site (www.bicepirus.gr/enti) showing all relevant details regarding project actions implemented until its completion (Conference, Workshops, final meetings of the Working Groups, etc).

All key actors participated in efforts for awareness raising and building consensus within local enterprises. These were: the Chamber of Commerce, the Region of Epirus secretariat, development agencies, the Prefecture of Ioannina, councils, the University of Ioannina, and the Science & Technology Park of Epirus.

Effectiveness

Innovative projects offer a unique opportunity to the local community to get in touch, to use new types of investment opportunities, and to build relationships with the correct people to achieve this. This project can certainly have an important impact on the regional economy. More entrepreneurs can access information on tools concerning their business and they can access it easier and quicker.

All the objectives defined in the initial preparation stage of the programme were fully achieved, as shown by the following table and the detailed presentation of each action deliverable in the Final Progress Report available on line at: www.bicepirus.gr/enti/en/progress_report/default.htm

Quantitative targets	Initially defined	Achieved
Specialised Working Groups	6	6
SMEs which consultative supported	60	80
Studies	10	12
Guides	2	2
User manuals	3	3
Workshops	6	8
Trainee Entrepreneurs	120	156
VC Forum	2	2
E-commerce portal	1	1

Table 6.1: Achievement of Quantitative targets

The project was the first step towards bringing partners such as regional agencies and authorities together with the business sector, banks and private investments. This initial step has changed the “philosophy” among entrepreneurs towards new corporate investments opportunities. They have realised the necessity to cooperate with others, by using their potential and capacities in order to help competitiveness and viability. As such a lot efforts are currently taking place in order to stimulate both parts (Investors and Entrepreneurs) to participate in partnerships like these.

The present project represents the beginning of a process of increased cooperation and support. Hopefully will it be possible to continue assisting their efforts due to EC funding opportunities and National Legislation Framework.

Innovation

The specific action constitutes the first regional initiative to approach and attract potential business angels and corporate investors to the region of Epirus. In particular, the specialised Guide for Innovative Investment Opportunities in Epirus was previously totally absent and thus represents an innovative and extremely useful basic tool for local actors and entrepreneurs.

There had also been no previous initiative in the region to bring corporate investors together with small and medium regional enterprises willing to expand and develop.

Sustainability and Transferability

The project has helped towards the planning and reinforcement of new types of funding (Business Angels, Corporate Investment, etc). These investment alternatives currently concern private equities and public organisations. Following this project a new public body is now promoting such services to enterprises providing low loan rates, easy access to services, less paper work, etc. The body is called TANEO (New Economy Fund) and cooperates with Banks (either Public or Private) all over Greece. As far as the region of Epirus is concerned, TANEO cooperates with the Bank of Ioannina “Stoxos” (Cooperative scheme Bank) and provides local enterprises with all relevant information about investment and funding issues. It is currently too early to provide specific data on their success rates and they have only been active for under a year. However, the creation of this fund is an important achievement in itself.

In addition, looking ahead in the new programming period (2007-2013) BIC Epirus is keen to build on the work done and to implement more innovative projects for the region and local SMEs. BIC are currently running other projects (RIS Mersin-Turkey, RIS Serbul-Bulgaria, and Equal Initiative – Phase II) through which entrepreneurs can contact actors in other countries in order to assist them in creating a field of cooperation, for example related to export activities.

In order to develop this project, former experience and know how from other Greek regions – such as Central and Western Macedonia - were taken into consideration and adapted to the specific situation in Epirus. Therefore, this project idea is already somewhat the result of a transfer exercise.

The model for the diffusion of information could be used in similar regions, such as the other Greek mainland regions. Indeed the whole process could be easily adapted to other regions taking into account their specific characteristics.

For instance, the Matching Events, the Venture Capital meetings and conference with widespread participation (banks, corporate investors, entrepreneurs, etc), could be adapted in Greek regions, especially those which are geographically distant from the metropolitan centres, and other regions throughout Europe.

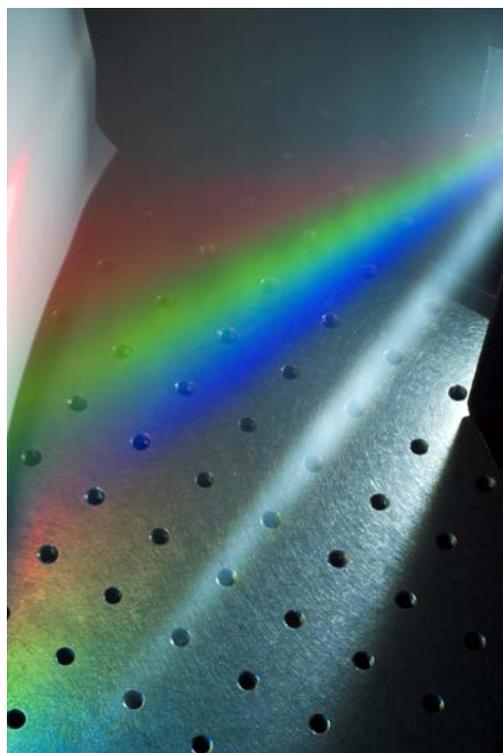


Figure 6.11: Light and steel Structure

Critical Success Factors

As this was the first time that such an action was implemented in the region, the local community had never had the opportunity to be part of actions and awareness raising methods which assist them in moving forward in innovation and development. This is due to the regional characteristics, it being an isolated area, with low development rates and limited private initiative towards cooperation beyond its limited border.

One of the main project success factors was the high level of private sector participation. Private banks and local private companies cooperated efficiently since better terms in loans and services were being provided for enterprises. This issue resulted not only from long discussions between private and public sectors, but also from a central governmental policy to reinforce private initiative. The project managed activated the “mobility” factor in the region. Through the meetings, awareness raising actions, Workshops and public information days, entrepreneurs and public authorities were brought closer and had the opportunity to discuss issues related to innovation and development under the Private initiative. It is strongly believed that changing culture in a region – in all aspects – is essential, and that this initiative managed to kick-start such a change.

The procedure was an important success factor. Through guidance and supervision local companies were offered the chance to identify new administrative methods and less complicated bureaucratic patterns. As such, new types of entrepreneurship were born, while new ideas on Investment issues were raised among these private meetings between entrepreneurs and Corporate Investors.

Obstacles in terms of design or implementation

Being the first time that the local community had dealt with issues such as business angels or corporate investors, they were not initially aware of all the possible obstacles to be affronted. The idea of business angels or corporate investors is still relatively new to the Greek reality.

The main factor negatively affecting project implementation was the introversion of local entrepreneurs, mainly due to the geographic isolation of the region. In fact, this is an issue which continues to raise its head but it is hoped that as people change and new ideas are born with continued efforts in this direction, the Region of Epirus itself will also develop and become more innovative and creative. Additionally, the awareness raising methods used (seminars, workshops, press, media, information brochures) help in assisting towards this change.

Conclusions and Lessons Learnt

It is a little early to measure long term impacts of the project, for example the number of jobs created or the impact of the project on the speed of innovation in the region. Further, the Matching Events have not yet seen the creation of Business Angels networks, a new concept in this region. However, with continued commitment and monitoring these figures should become available and the impact should be visible.

All key actors and bodies as well as local entrepreneurs got closer to the idea of using Business Angels and now realise that it is difficult to finance innovation in any other way than using private methods and that high risk reduces willingness to undertake new investment. These issues were clearly set during the project and discussions held managed to present new solutions. It is clearly shown from studies and presentations that Venture Capital investments, particularly in high technology, have increased throughout Europe in recent years. Therefore, local entrepreneurs have the opportunity to deal with new terms and investment capacity never affronted before.

Contact Details

Katerina Filippou, Managing Director.
BIC of Epirus (Business and Innovation Centre of Epirus).
SCIENCE & TECHNOLOGY PARK OF EPIRUS, UNIVERSITY CAMPUS.
45110 IOANNINA, GREECE
Website: www.bicepirus.gr

7

Annexe: ERIK Network Partners

Regione Toscana



Tuscany is located in the centre of Italy and covers a total surface area of 22,992 km², making it the fifth largest region in Italy. Tuscany has a population of 3,528,225 inhabitants with population density of 153 in. /km² and a current demographic growth rate standing at -0.3 / 1000.

Tuscany can lay claim to a dynamic, diversified economy based around a market covering 7% of the Italian population and over 350,000 companies. The Gross Domestic Product (GDP) in 2004 stood at 83,285 million euro, with a growth rate of 1.1%. The Tuscan economic system is characterised by the size and geographical / sector based distribution of manufacturing plants, organised

into 12 industrial districts. Industry in Tuscany continues to specialise in traditional sectors, such as: textile and clothing; leather and shoes; marble and tiles. However, the Tuscan industrial system is not only composed of manufacturing. A number of high tech segments, such as pharmaceuticals and biotechnology, ICT and optic-electronics, show high rates of growth, as do businesses linked to the agro-food industry.

The Regione Toscana is the authority responsible for the representation of the regional territory as a whole. The Sector for Innovation and Research in the regional government has an annual budget of around 45 million and a staff of 22 people. Since 2002 over 600 regional projects have been financed under various programmes (SPD, RPIA, CIPE) and the sector has participated in 25 European projects, 6 as coordinator.

The Regione Toscana is committed to developing a knowledge-based society and the Sector for Innovation and Research works towards this particularly through technology transfer and reinforcing partnerships between the main innovation actors. The operational tools include clusters and networks, promoting relations between the worlds of science and industry, benchmarking and foresight activities.

For more information and to access the database of regional and European projects: www.innovazione.toscana.it (currently in Italian only)

Regione Emilia Romagna

Emilia-Romagna is located in the north-east of Italy in the centre of the country's most productive area. It accounts for 7% of the geographical territory, 8% of the Italian population, nearly 9% of national GDP and 12.6% of national exports. Emilia-Romagna is considered one of the most dynamic regions in Europe. Its GDP level, rate of employment and degree of labour market participation position the region among the first places in the EU. With over 420,000 enterprises (1 / 10 inhabitants) the region demonstrates a strong entrepreneurial attitude.

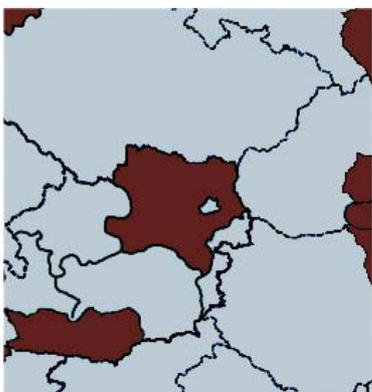
The main industrial clusters are: automatic and packaging machinery, motorcycles and automotives, food and processing machinery, textiles, ceramic tiles, bio-medical industries, agricultural machinery and metal electronics. The research sector relies on a wide range of technical and scientific resources and competencies including six universities: the University of Bologna, Ferrara, Modena-Reggio Emilia and Parma, the Piacenza unit of the Milan Polytechnic and the private Università cattolica del Sacro Cuore, again based in Piacenza.



Emilia-Romagna is co-leader of the Erik Network through the coordination of Aster. The Aster consortium includes the regional government, universities, important national research centres such as CNR, ENEA, INAF and INFN and the Union of Chambers of Commerce and Industry and Entrepreneurial Associations. Aster aims to support, coordinate and develop the network of industrial research and technology transfer in Emilia-Romagna.

Emilia-Romagna is strengthening its position as a knowledge based economy: private and public actors believe in the increased importance of research, development and innovation for industrial competitiveness. Thus Emilia-Romagna has endorsed a R&D and innovation policy focused on promoting industrial research, technological development and technology transfer. The regional policy for research and innovation promotes closer interaction between businesses, research institutes, universities and centres for technology transfer, and is based on the Law for Innovation and its implementing programme, the PRRIIT (Regional Programme for Industrial Research, Innovation and Technology Transfer, started in 2003).

Niederösterreich



Niederösterreich with 19,174km² is the largest area in Austria and has 1.56 million inhabitants. The region is located in the Northeast of Austria with a direct boarder to the Czech Republic and to Slovakia (total 414 km).

Its main economic sectors are mechanical engineering, metal processing, wood, food, chemistry and oil, as well as rubber and plastic. In the northern area agriculture and forestry are also strong. Niederösterreich's GDP per capita amounts to 21,044 euro (2004) with an average annual GDP growth rate of 3.6% in the period 1997 to 2002.

Together with Austria's capital Vienna, a separate federal province located in the centre of Niederösterreich, and Burgenland, Niederösterreich forms the Vienna Region, characterised by formidable economic dynamism with strong benefits for Niederösterreich. The Vienna Region shows the strongest concentration of research institutions and universities in Austria.

Niederösterreich is well known in the context of regional innovation due to continuous improvements its Innovation System which started 10 years ago with RIS Niederösterreich. In the meantime, substantial progress has been achieved in innovation performance of the regional firms, especially SMEs, by increasing need orientation and quality of the regional support services.

The department for economy, tourism and technology of the Lower Austrian Government – responsible for coordination of the Regional Innovation System – considers inter-regional exchange and collaboration crucial success factors for the improvement of its own innovation system. Therefore the Lower Austrian Government has been engaged in numerous inter-

regional innovation projects/networks since years and coordinates the Thematic Working Group “Services and Support to Start-ups and Spin-offs” within the ERIK Network.

Within ERIK the department is supported by Hans.-Christian Jäger, IDEUM consultancy, who has been working for Lower Austria since the development of the Regional Innovation Strategy and has broad experience in the field of regional innovation policy.

West-Midlands

West Midlands is situated at the heart of England, bordered to the west by Wales. The region covers an area of 13,000 km², with a population of 5.3 million inhabitants and a density of 410 people per km² (slightly higher than national average). The West Midlands has an extensive canal and transport network (roads, motorways, railways) to rest of England and abroad with the Birmingham international airport. The region is also a key area, connecting England to Wales. The West Midlands contributes 8.2% of the UK's total GDP and, in per head terms, it is positioned 7th out of the UK's twelve regions. The economic structure is diverse. There are around 46,000 people employed in agriculture (1.9%), 530,000 in industry (21.6%), and 1,700,000 in services (72.7%). The manufacturing industry is the most prolific employment sector (23% work in this sector).



Coventry University Enterprises Ltd (CUE) is a wholly owned subsidiary of Coventry University Higher Education Corporation and is the vehicle through which all commercial, income work is generated. Operating in a regional, national, European and international context, CUE Ltd supports corporate aims, and seeks to maximise the commercial potential of the University's expertise and resources. CUE Ltd has long focused upon innovation, design, high performance automotive engineering, health, the environment and ICT as areas of expertise. Through this activity it has to date supported many thousands of SMEs through specific projects and support programmes.

As a Technology Park, the 'TechnoCentre' is a nationally recognised and groundbreaking incubator centre able to support and house a mixed range of award winning businesses within the fields of technology, design and ITC. The park specialise in: Business Innovation and technology transfer support, ICT business support, International Trade Assistance, Entrepreneurship and business support, Project financing and management, Foresight/ Scenario planning, Exchanging best practices, Regional and European innovation policy and Events management.

Småland med öarna (Småland and Islands)

The region of Småland and islands are strategically located in South Eastern Sweden. The eastern area is an integrated part of the Baltic Sea region and the western area is centrally located between Sweden's three largest cities. The region is comprised of 4 counties and 34 councils in an area of 33,333 km², 9% of the nation's total 410,335 km². With 800 thousand inhabitants, 8% of the nation's 9.1 million inhabitants, the population density stands at 24 inhabitants/km², compared a national 22 inhabitants /km². The region's major cities have a diversified range of services and university environments.

The economy in Småland is largely concentrated around the manufacturing industry. Cross-county cooperation within clusters exists within a number of strong industry branches, such as aluminium, timber, and heavy-duty vehicles. The islands of Öland's and Gotland's economies are more characterised by agricultural and tourism but in recent years, cluster-like

networks have also been established here. The coast and islands also offer excellent opportunities for wind power and bio-fuel production. The conditions for tourism are excellent but still heavily seasonal and dependent on the wellness of the Baltic Sea.

Economic development points to increased internationalisation, increased specialisation and diversification and an increasingly blurred boundary between production and service industries. Renewal and diversification of businesses takes place foremost in the university areas and companies establishing themselves often have high levels of knowledge and innovation. The challenge is to spread this renewal to other areas of the region. Economic renewal is especially important for Småland and the islands in the context of regional challenges in terms of its ability to compete with other regions for company establishments and workforce.



Småland and Island is a formal region only in a NUTS 2 context. In reality it consists of four different counties with their own political and public administration. The authorities co-operating in ERIK+ are the Regional Councils of these counties: Kalmar, Kronoberg, Jönköping and Gotland.

Aragón



The Aragonese Autonomous Community is located in the northeast of Spain and it covers a total area of 47,720 km². It includes three provinces: Zaragoza, Huesca and Teruel, Zaragoza being the capital of the region. There are 1,204,215 inhabitants in Aragón, which represents the 2.95% of the national population, and a density population of 25.2 inhabitants/km² (one of the lowest in the European Union).

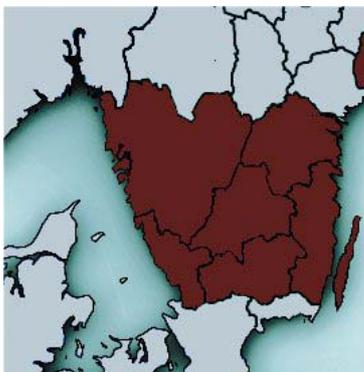
Zaragoza is geographically located in a strategic position that provides connections to the most important consumer cities in the Northwest region of Spain: Madrid, Barcelona, Bilbao and Valencia.

The contribution of Aragón to the national GDP is 3.4%. The region is characterised by a strong industrial tradition. The most relevant industrial areas are the automotive industry, energy sources, metal, machinery and electrical material.

Total R&D spending in the region stands at 0.71% of the GDP (compared to 0.94 in Spain). In terms of innovation expenditure Aragón is in third position in the 17 Autonomous Communities in Spain. Aragón hosts an important University (University of Zaragoza) with well trained researchers and the region also hosts important technology centres and innovation support institutions.

The Technological Institute of Aragón (ITA) is a public technology centre created in 1984 which promotes technological possibilities for regional SMEs. The staff has experience in promoting National and European R&D projects, in managing regional programmes, in technological innovation and industrial quality. The institute finds itself within the regional system of science, technology and industry. Aside from ITA, the other organisations in the regional system which promote innovation are Aragón Institute for Engineering Research (I3A), the Institute of Carbon-chemistry (energy and environment), the Institute of Materials and the Research Laboratory for Combustion Technologies and CEEI Aragón.

Västra Götaland



Västra Götaland is one of the largest regions in Sweden with an area of 24,000 km², 49 cities, towns and councils and 1.5 million inhabitants. Göteborg is Sweden's second largest metropolitan area with more than 800,000 inhabitants. Västra Götaland is also Sweden's leading industrial region. The automotive industry is the largest sector and includes Volvo, SAAB Automotive and Pininfarina Sweden. Other large industrial sectors are wireless communication, IT, engineering, pharmaceuticals, media-tech and bio-medicine, petrochemicals, wood, paper and furniture.

The Region is prominent in the area of research, carried out at universities, R&D institutes and large companies. With more than 5 % of GDP spent on R&D in 2001, the region was Europe's second most R&D intensive region and the top European region concerning business investments in R&D.

Region Västra Götaland has an elected regional parliament and is responsible for hospitals and healthcare, regional development, infrastructure and culture.

In recent years Region Västra Götaland has made large efforts to create a top level regional innovation system to support the creation of technology based and knowledge intensive companies. This Regional Innovation System includes promoting entrepreneurship at universities (e.g. Hot Houses, Venture Cup, Entrepreneur Schools), increasing public seed and conditional capital and providing qualified business support for start-ups through 11 business incubators. A Regional Incubator Network to connect these incubators was started in 2003

In 2003 Västra Götaland started the RPIA "Industrial Dynamics". The core of the programme was the action "Developing a world-class regional innovation system based on knowledge transfer to industrial SMEs". The two most successful concepts are "Regional Innovation System/Service" and "BETTER-courses". Both concepts are based on real demand from SMEs, use relevant knowledge and specialist resources from the whole region and reach companies in remote areas.

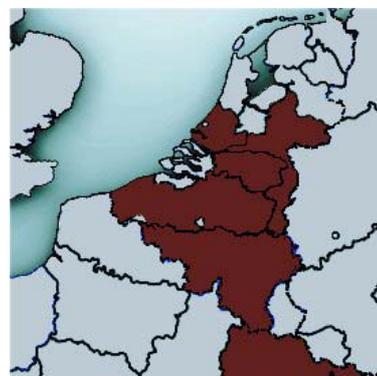
Flanders

The region, with its 6.0 million inhabitants (60% of the Belgian population), covers an area of 13.522 km², and lies in the northern part of Belgium in one of the most densely populated area of Western Europe, with 434 inhabitants per km². Flanders borders onto the North Sea, and is situated between The Netherlands and France.

Flanders is a key economic region within Europe. It owes this position to its central location in the Western European industrial area. It produces high quality, reasonably priced products which are mostly exported to the international market. An important advantage is the high level of education and multilingualism among the population.

The backbone of the economy is the SME. From a total of 417,000 companies, over 99% have less than 250 employees, 89% less than 10. Large companies (less than 0.5%) are usually part of a multinational group. About 70% of Flemish employment is generated in one of the following sectors: Chemicals/Pharmaceuticals, Metal products & machines, Electronics, Food products and Textiles.

Investments in new technology and re-orientation towards more favourable "niche markets" are



restoring confidence in these more traditional sectors. At the same time, typical "high-tech" technologies such as biotechnology and information technology (IT) are gradually gaining importance. Flanders also maintains a strong position in the transport and communication sector.

The innovative entrepreneur in Flanders can count on the support of the Flemish government through IWT, the Institute for the Promotion of Innovation by Science and Technology in Flanders. The organisation is the only Flemish organisation stimulating and supporting innovation and grants financial support to companies, research institutes and individual researchers. IWT also promotes innovation through, for example, searches for technological partners in Flanders and at European level throughout the IRC-network. IWT can also accompany each applicant to one of the 100 innovation centres in Flanders and help them to choose the most appropriate formula of support, including EU measures, especially the 6FP, or the best instrument coping with their specific need of the firm.

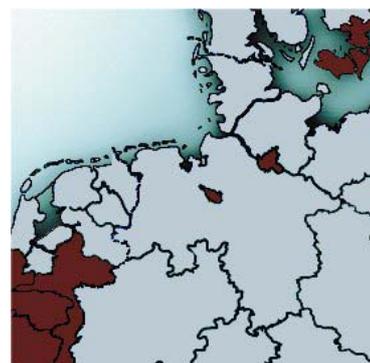
Bremen

The city of Bremen is located in the North West of Germany and has around 547,000 inhabitants. It is capital of Germany's smallest federal state with a population of approximately 663,000 in its two cities Bremen and Bremerhaven. It is a strong place for international trade, maritime shipping, logistics, automotive, aviation, aerospace and the food & beverages industry. Bremen is currently undergoing a structural change from a typical shipbuilding and port location to a forward-looking centre for business with high levels of technological expertise. As a business centre for northwest Germany, Bremen offers almost 300,000 jobs in many different industries.

The Bremer Investitions-Gesellschaft mbH (BIG Bremen) is the regional business development agency in Bremen. BIG provides several services to strengthen small and medium-sized enterprises including:

- Consultancy and support programmes for innovation, investment, marketing, foreign trade, design, environment industry, business start-ups;
- Information on location, real estate and housing;
- Financial loan programmes.

One important task is to implement Bremen's innovation policy. The Regional Innovation Strategy concentrates on sustainable implementation of ICT in all relevant industrial sectors by supporting technology development and implementation of these technologies. The main topics of Bremen's regional programme "InnoVision 2010" are attuned to the relevant science and technology topics and combined with activities in the main and growing industries in Bremen (such as logistics and aerospace). In the context of Bremen's economic development activities, cooperation framework contracts with big companies are of growing importance for the regional economy. Moreover, investment in R&D for new technologies is of great significance. Bremen supports intensive transfer of knowledge from academia to economy.



South-Holland

Most of the region is situated beneath sea level, causing concern about the effects of on-going climate change. The land has been conquered by land reclamation so water pumping engines and polders are essential elements. South Holland is densely populated with 1227

inhabitants per km², leading to high ground prices. The region is mainly urban with cities such as Rotterdam and the Hague and many smaller cities.



With a gross regional product of € 204 billion and a 21% share of the total employment, South Holland can be described as the engine of the national economy. Its economy is sometimes described as the trinity of Mainport, Greenport and Brainport. Mainport is the port of Rotterdam, the largest in Europe and 1 of the 3 largest in the world. Greenport stands for the greenhouse horticulture in the West and East. Brainport refers to the knowledge based economy, with 3 universities, dozens of research institutes and legal institutions in the Hague.

Knowledge intensive services, including ICT services, consultancy, accountancy, insurance and creative services, account for 22% of total employment. The region has a mid-table position on the European regional innovation scoreboard, partly because many companies operate in sectors not defined as knowledge intensive, such as the industrial complex of Rotterdam port.

1.6 million people work in South Holland, 9% of them in industry and 34% in services. As the national government is settled in The Hague, the government sector is also large. The unemployment rate is relatively low at 6.2 %, though this percentage is higher in the cities.

The Provincial Council is responsible for the councils within its borders. Its mandate is to manage “a metropolis of 3.5 million inhabitants”, and to fulfil an intermediary role among councils. The province consists of a 55 member Assembly, which is elected by the inhabitants of South Holland. The province takes on tasks considered necessary for its citizens’ interest. It implements national policy and legislation on spatial and economic development, water management, public transport, roads and waterways, environment, nature conservation, youth care, recreation and tourism.

Valencia



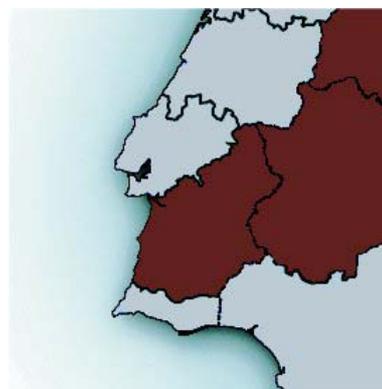
La Comunitat Valenciana (Autonomous Region of Valencia) fills an area of 23.255 km². It is situated on the eastern seaboard of the Iberian Peninsula. La Comunitat Valenciana borders with Catalonia to its north, with Aragon and Castilla-La Mancha to the east and with Murcia in the south. It has 485 kilometres of coast. The total population of the region stands at 4,202,608 people. The density of population is 179 inhabitants per km², largely concentrated in the coastal area.

The region is divided into 3 provinces (Castellón, Valencia and Alicante) and 541 councils, of which 9 host 42% of the total population of the Community (Alcoi, Alicante, Castellón, Elche, Elda, Gandía, Sagunto, Torrent and Valencia). The capital city of the region is Valencia (761,871 inhabitants). It is 352 kilometres away from Madrid, capital of Spain.

Within the industrial structure of la Comunitat Valenciana, the most important sub-sectors are textile, leather, shoes and the clothes industry, wood and furniture, pottery, glass and concrete, chemical products and food. At the present time, the Valencian industrial sector is characterised by a predominance of small and medium-sized enterprises (SME), and by its territorial concentration. 65% of all industrial business is located in just 5 areas.

Alentejo

The Alentejo region lies to the South of Portugal, bordered in the North by the Tagus River and to the South by the Algarve mountain ridge. The region is bordered to the east by the Spanish regions Extremadura and Andalusia and to the west by the Atlantic Ocean. The Alentejo area covers 27,323.9 km², corresponding to approximately 1/3 of the national territory. It is mainly characterised by flat countryside but the mountain ridges of Ossa, Portel, Grândola and Monfurado reach 600 metres. The São Mamede mountain ridge, the highest in the region with an altitude of 1000 metres, lies in the extreme North.



The resident population in Alentejo stands at 535,000. The birth rate is 8.4/1000 (inferior to the national figure), the death rate is of 14.2/1000 (higher than the national average) and child mortality rate corresponds to 3.6/1000 (inferior to the national average). The region shows a population density of 19.6 inhabitants per km², much lower than the national figure of 112.4 6.

At economical level, services register the largest number of companies, the tourism sector being the majority of these. The industrial sector follows, with relevance for agro-food and traditional qualified agro-food products and, in third place, we find agriculture and fishing. The region has been increasing its expertise in terms of promotion of innovation and ICT.

ADRAL – *Agência de Desenvolvimento Regional do Alentejo*, S.A. is a regional structure established in June 1998 with 68 partner shareholders, both public and private, with experience in every sector of economical, entrepreneurial, social and development activities, geographically spread and deeply acquainted with regional reality. The agency is established in the form of a Joint Stock Company, with an initial fully paid-up share capital of 499,000 Euro and the philosophical principle of this company corresponds, in practice, to those of non-profit bodies.

One of ADRAL, S.A.'s major tasks is co-operation with all local, regional, national and international actors, promoting common initiatives and joint projects. Its social object is: "to promote the regional development of Alentejo and strengthen its economic and productive base, in co-operation with other organisations and bodies in Alentejo, Portugal and other EU countries, which have a similar objectives."

Western Macedonia

Western Macedonia is situated in North-West Greece, bordering with the regions of Central Macedonia, Thessaly, Epirus and the regions of Bitola (F.Y.R.O.M.) and Korce (Albania) to the North. While covering a total surface of 9,451 km² (7.2% of Greece), it has a total population of just 302,892 inhabitants (2.9% of the country's total). The region occupies 21st place among the poorest regions in the EU15: in 1996 its GDP stood at 62% of EU average. The unemployment rate is the highest among Greek regions but has shown recent signs of improvement. The secondary sector (47.5% of regional produce) is vital for the regional economy, mainly due to mining activities, electricity production (70% of country's total power is produced in the Region) and the fur-leather sector. The recent development of the tertiary sector (currently 39.1% of regional produce) has also been important, concerning mainly financial and insurance agencies, but also transport and storage facilities. The primary sector, although important for the regional economy, demonstrates low levels of productivity (13.4% of regional produce). The Region has one operational Industrial Area and another under construction.



R&D services limited, due to the – until recent - lack of universities: only 3.5% of the country's total research foundations are situated in the Region. Among them, the Technological Educational Institute has been an important partner in supporting regional educational efforts. The newly established University of West Macedonia (U.o.W.M), with its headquarters in the capital city of Kozani, is helping to boost research and innovation in the Region, providing added value to development efforts of the local and regional population. The Department of Energy Engineers was already operational as part of Aristotle's University of Thessaloniki (A.U.Th.). A.U.Th. is an active partner in many projects of the

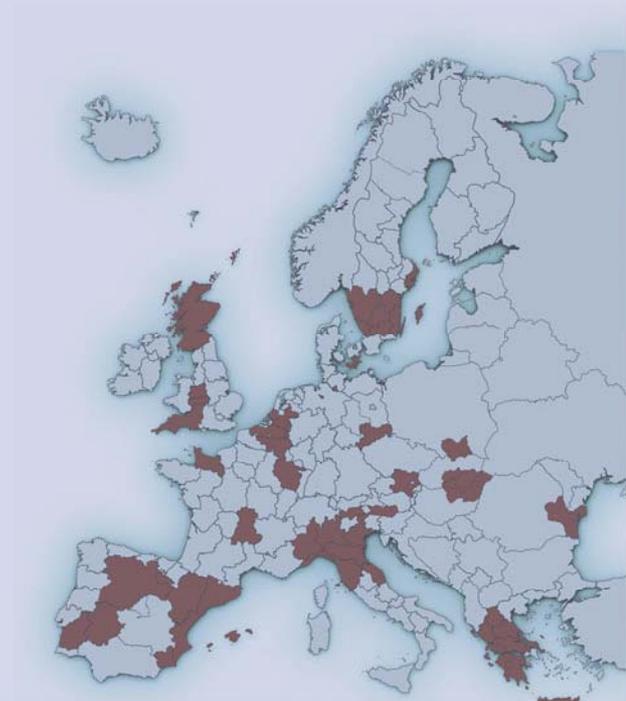
European R&D Framework Programmes and the Regional Programme of Innovative Actions, on topics such as the role of innovation in regional development, the design of regional innovation strategies, regional knowledge management and the elaboration of tools supporting technological innovation. The U.O.W.M. is strongly linked to A.U.Th., also experienced in managing RIS projects.



Figure 7.1: Solar Panel against Blue Sky



www.eriknetwork.net
info@eriknetwork.net



**PROJECT PART-FINANCED
BY THE EUROPEAN UNION**