



Project no: CIT2-CT-2004-506242
Project acronym: IKINET
Project title: International Knowledge and Innovation Networks
for European Integration, Cohesion and Enlargement
Instrument: STREP
Thematic Priority: 7

Executive Summary of the Second Activity Report

Period covered: 15th October 2005 – 14th October 2006
Date of preparation: November 30, 2006
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**Official Commencement
Date:** 15th October 2004
Revision Draft 1

Executive Summary

- **project objectives.** The IKINET project aims to study the problem of the transition of the less developed regions in Southern Europe and in the new member countries, to the model of the knowledge economy and how to avoid their exclusion with respect to the most developed regions, which operate at the frontiers of technologies. In fact, nowadays, it is widely accepted that knowledge and learning are at the core of competitiveness, international division of labour and agglomeration and exclusion phenomena. Innovation generates winners and losers at the same time and depends on learning processes and knowledge creation and accumulation. Thus, learning brings about enormous opportunities for growth but also severe threats of exclusion and marginalisation, especially for the economic lagging regions in Southern and Central and Eastern Europe.
- **contractors involved.** Eight contractors are involved: Università di Roma "Tor Vergata" (coordinator), University of Wales Cardiff, Ruhr-Forschungsinstitut für Innovations- und Strukturpolitik – Bochum, Instytut Badań Systemowych – Polska Akademia Nauk – Warszawa, Joanneum Research Forschungsgesellschaft – Graz, Institut National de la Recherche Agronomique – Paris, Universidad Autonoma de Madrid, Applica sprl – Bruxelles. Coordinators of the various national teams are: R. Cappellin, R. Wink, S. Walukiewicz, P. Cooke, M. Steiner, A. Torre, A. Vazquez Barquero and J. Alfonso, T. Ward.
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- **work performed in the second reporting period:**
 - an analysis of the role of medium tech sectors in the European economy and of its major characteristics of these sectors (WP1).
 - an analysis of various theoretical issues on the historical emergence of clusters and milieus, the contrasting approach to innovation by large firms and small firms, the role of tacit knowledge in the process of knowledge creation within SMEs, the spatial character of the cognitive processes, the role of geographical agglomerations and the development of local networks, the different types of geographical and relational proximities and the concept of temporary geographical proximity, the role of tacit knowledge in the process of innovation, the management of the knowledge value chain in clusters of medium-technology SMEs, the role of social capital in virtual production lines, the creation of international knowledge networks in medium-tech sectors, the evolutionary-institutional character of knowledge networks and the governance of interactive learning networks (WP2).
 - preliminary policy indications, which emerge from the empirical analysis of the six sectoral clusters, from the analysis of the theoretical issues on which the project focuses and from the discussion with the regional stakeholders in the two diffusion workshops (WP4).

RESULTS ACHIEVED

- a) Medium tech sectors have **different characteristics** than high tech sectors. Technology in these sectors is characterized by an high complexity, as products are made by an high number of heterogeneous physical components requiring specific knowledge.
- b) Innovation processes in SMEs and in medium technology sectors, differently from large firms and high tech sectors, are characterized by a greater importance of informal and interactive

learning processes with respect to internal R&D activities. Innovation has a gradual character and consists mainly in improvement of existing products, services and processes. The process of innovation in medium tech sectors is driven by an intensive interaction between the suppliers and the customers, due to the high **specificity** of the need of the customers and the fact that products in the medium-tech sectors are made by **many specific components**. The fragmentation of the production process and the high specialization of the firms explains their small size and leads to a very strong interaction with the external local environment, made by an high diversity of private and public, local and non local actors.

- c) The empirical and theoretical investigations clearly showed the need to follow a differentiated approach to support medium-technology SMEs, which may be distinguished into **three different groups**: conventional medium-technology SMEs, knowledge-intensifying SMEs and knowledge-intensive firms.
- d) Knowledge creation only apparently has **an a-spatial character** and cognitive sciences clarify that the process of knowledge creation works in a localized framework and that is the main factor leading to the spatial agglomeration of innovative activities. In fact, according to this literature, the process of knowledge creation has a combinative and an interactive character and a closer geographical proximity and/or a greater cognitive proximity facilitate the combination of complementary pieces of knowledge and the interaction between various complementary actors. Therefore, innovation processes should not be analysed neither promoted only within firms as they would fail without taking into account various forms of innovation interdependencies with various actors.
- e) The sharing of information and the development of various forms of interaction between SMEs lead to a process of interactive learning and the gradual development of **“tacit” knowledge**. While codified knowledge could be interpreted as a stock or a resource, which can be transferred in the markets, tacit knowledge is linked to action and it can be interpreted a complex set of capabilities, which are localized or idiosyncratic and cannot easily be transferred. In particular, tacit knowledge refers to competencies which explain both the production capabilities of the firm as also the relational capabilities, which facilitate the tight integration of a firm with other firms.
- f) It may be argued that tacit knowledge for its **ambiguity** might be easier recombined, than codified knowledge, and it is a key element in allowing interdependencies in the process of knowledge creation. On the other hand tacit knowledge can not be transferred at long distance such as codified knowledge, as it requires personal contacts and a deep reciprocal knowledge. However, in some cases, the lack of geographical proximity may be compensated by adequate organizational or institutional proximity and organizations and institutions allow to transfer tacit knowledge at large distance.
- g) SMEs differently from large firms should not be considered individually, but represent a **regional complex system**, where the turnover, due to births and closures, the changes in the selection of partners are strong and there is an high interaction, due to the grouping of the various SMEs within larger industrial groups and to the existence of rather stable subcontracting arrangements between the various firms. Clusters do not correspond to the traditional local production systems or industrial districts and may have a rather different and evolving nature in the various regions. Clusters of SMEs often can not be defined within a limited local area and have a regional or even interregional reach, as the spread over contiguous regions separated by a rather long distance.

- h) Since interactive learning is the key process in knowledge creation and the access to tacit knowledge is crucial in SMEs and medium-tech sectors, **networks are an appropriate form** of organization, which facilitates the interaction and the flows of information and knowledge. Within networks nodes and links are constrained by the existence of spatial distance.
- i) Networks may have different characteristics. In particular, clusters should evolve toward the form of '**Strategy networks**', which are based on intended relationships and cooperative agreements between firms and other organisations. They imply forms of central coordination, the creation of procedures for the exchange of information, the codification of individual tacit knowledge and the investment in the creation of collective codified knowledge.
- j) The linkages between SMEs in the process of interactive learning within a cluster are often informal, rather chaotic and time-consuming. Interaction may become faster and strategically oriented by the adoption of the methodology of "**Territorial Knowledge Management**", which aims to consolidate the linkages between regional actors and to facilitate the flows of tacit and codified knowledge, by enhancing six factors: stimulus to innovation, accessibility, receptivity, local identity, creativity and governance capabilities.
- k) Medium size firms have developed vertical flows of tacit knowledge in their respective supply chain, but they need to be supported in order to develop horizontal linkages between different technologies and sectors, by participating to regional "centres of competence" focused on new fields of production, with the participation of firms and research institutions having complementary competencies. **Productive diversification** is not only beneficial for small and medium firms but it can also be very positive for the large OEM firm since it can rely on collaborating partners in more than a single sector, but always within the industry.
- l) Regional, national and European institutions are required in order to promote international forms of cooperation between SMEs both at the regional and at the international level. In fact, the development of international relations requires a more stable framework, than the market mechanisms or even multinational companies and private forms of bottom-up international cooperation may be capable to provide. Without any external support, SMEs in medium technology sectors are often unable to cope with medium-term internationalisation strategies, including new sales markets, knowledge acquisition, recruitment and relocation, and are restricted to short-term a reactive behaviour. Public and private associations can act as intermediaries by organising (or establishing joint participations at) international trade fairs, exchange programs, joint qualification schemes or participation in international funding programs. The creation of networks of "innovation platforms" or "centres of competence" may look as a promising solution to the above obstacles.
- m) A new mental change is needed as medium size firms are reluctant to internationalize their knowledge linkages or to promote new forms of **international interactive learning** with foreign partners, due to the fear to loose their proprietary know-how, which they believe that it represents their most important tacit competitive asset.
- n) While regional governments mostly think regional, firms think national or global. The **international extension of knowledge networks** of SMEs call for the identification of common objectives and projects with external partners, while maintaining a strong local identity. The papers elaborated on the concept of proximity by the IKINET project indicate that rather than only focussing on the geographical dimension, when designing support policies for industry agglomerations or clusters, organisations and regional governments should also take other learning and innovation factors into account. If interregional knowledge-flows are more important than intra-regional ones, policy is well advised to nurture the relevant dynamics. It is

necessary to find ways in order to combine regional public assistance with firm collaboration in projects that go beyond their own territory. For instance, regional policy should place greater emphasis on inter-regional cooperation between regions in the same country, where similar industrial clusters are located, as in the case of aeronautic industry.

- o) Medium size firms often rely only on forms of economic or commercial internationalization, which prove to be risky and short-sighted when are not accompanied by the development of **international linkages in the cultural and social field** with the cooperation of other local partners, research centres and regional institutions. The internationalization process of the individual firms is easier when it is accompanied by the support of the respective economic, social and institutional system.
- p) The different and evolving **institutional framework** play a key role in the process of innovation within the clusters considered. A rather diversified typology of institutions play a leading role in defining a long term strategy of innovation of SMEs within the different regions. Institutions and other forms of “social capital” play the role of immaterial infrastructures which organize the knowledge flows between SMEs within the clusters. Institutional solutions to overcome lack of resources by SMEs are regionally specific and influenced by long-term historical and cultural heritage within the region.
- q) The markets of the medium-tech sectors are under increasing pressure from safety and environment protection regulations. These **regulations** combined with standardisation and certification are main drivers of innovations and can be one of the most efficient instruments of the EU industrial policy in these sectors.
- r) The multiplication of players and layers of negotiation – international, national, and local – demands a different model of government, called “multilevel governance”, based on organisational structures of interaction and partnership. Research, Technology, Development and Innovation Policy (RTDI) is a field of concurrent legislation between various levels of government, and tighter vertical cooperation should complement an increasing specialization according to the subsidiarity principle. The regional government can play a crucial role in promoting cooperation and networks in regions where various clusters exists. Network-oriented also includes policy networks, which help to develop and implement regional strategies in the sense of multi-level governance.
- s) A broader support is needed, aiming to the creation of an European network of regional “**innovation platforms**”, integrating different technological skills according to fields of application and problem solutions and representing the nodes in the interregional and international flows of knowledge between SMEs.
- t) A policy of the knowledge economy based on the “governance” or “dynamic coordination” approach implies the use of different policy instruments with respect to those usually adopted in traditional innovation policies, such as:
 - public R&D
 - public subsidied to private R&D
 - public demand of innovative products and services
 - IPR in order to insure a monopoly power to innovators
- u) New policy instruments are those which aim to steer the knowledge networks and to:
 - create new nodes in the knowledge networks, such as the enhancement of innovative spin-offs from firms, the recognition of universities as a new actor in innovation networks, the promotion of diversity and attraction of new actors,

- create missing links by defining new procedures in the relationships between the local actors.
 - promote international links in order to avoid regional closure and lock-in effects,
 - invest in human resources, education and life long learning, in order to increase receptivity to new knowledge,
 - promote alignment and identity building by defining joint long term projects and a joint strategy.
 - accommodate the switching costs or adjustment costs implied by major changes in order to increase the flexibility of sectoral clusters and SMEs and accelerate the time of changes.
 - design and adopt new regulations, which may defend weak and dispersed interests and determine the conditions in order to aggregate scattered needs and demand and to create new markets for innovative products and services.
- **expected end results, intentions for use and impact. The project aims to:**
 - a) identify the key barriers to an efficient operation of knowledge creation and innovation networks not only within regional sectoral clusters but also at the interregional and international level within Europe, with particular reference to the relationships between the most developed regions and the less favoured regions in South Europe and in the EU candidate countries;
 - b) improve the indicators considered in the “European Innovation Scoreboard” with a selected set of new key indicators focusing on the structure of knowledge creation and innovation networks;
 - c) propose policy options and specific technology transfer measures aiming to enhance the integration within the “European Research/Knowledge Area”, not only of higher education and research institutions but also of small and medium sized firms (SMEs) specialised in traditional sectors, through stable and flexible networks enhancing their Europe-wide competitiveness.
- **plan for using and disseminating the knowledge**
 - a) May 2006: First Diffusion Workshop, Warsaw, organized by IBS- Polish Academy of Sciences, on: role of SMEs and regional institutions in knowledge creation and international co-operation, presentation of the results of the empirical analysis (WP1).
 - b) November 2006: Second Diffusion Workshop, Graz, organized by Joanneum Research, on: role of large firms in international transfers of tacit knowledge, presentation of the results of the theoretical and empirical studies (WP2)
 - c) June 2007: Final diffusion conference, Rome, organized by the University of Rome, on: national and European policies for knowledge creation and innovation, presentation of the results of research activities on a quantitative framework for innovation policy evaluation (WP3) and on policy recommendations (WP4).
- **project logo and project public website.**

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