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Role of regional policies in promoting networking and innovation activity of firms

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**44th Congress of the European Regional Science Association
Porto, Portugal, 25 – 29 August 2004**

**ROLE OF REGIONAL POLICIES IN PROMOTING
NETWORKING AND INNOVATION ACTIVITY OF FIRMS**

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Abstract: The success of firms and regions is increasingly defined by their innovation and learning capabilities. It has been emphasized in several studies that a local operational environment may have a positive impact on innovation activity of firms. From policy point of view, the relationship between firms and their local environment is an important research topic. The purpose of this paper is to explore whether there is a demand for regional policy makers in promoting innovative and networking activity of firms, and what are the appropriate strategies in this regard. The concept of innovative milieu provides a theoretical base for this study. The data used is based on personal interviews representing 30 high tech firms located in Jyväskylä Science Park in Finland.

The results show that the firms appreciate an individual-level approach by policy makers which enables them to take the real needs of firms into consideration. A developed service structure, that is planned to meet the demand of new and established firms as well as possible, is an essential part of the well functioning operational environment. Supporting contacts with service providers and experts from different fields and organizing collective meetings for firms are important targets for the policy makers. In the innovation process, a commercial view of external part is considered very crucial. The small advances which alternate between the development of the innovation process and networks among firms and their interest groups could form a favourable path towards an operational environment with efficient innovative networks.

1. Introduction

Today, entrepreneurship and innovation activity can be seen as key factors to promoting growth, increasing productivity and creating employment. According to this view, regional success and competitiveness result from the combination of favourable business environment, network systems and innovative behaviour. A concept of innovative milieu provides a basis for this study. An innovative milieu consists of a learning process stimulated by interactions among economic agents. This collective learning process improves the interactions between economic actors further on, enables increased efficiency of the subcontracting and reduces uncertainty in the innovation processes. The role of innovative milieu is interactive: it constitutes a comparative advantage and simultaneously, it receives positive spin-offs from innovation networks. (Ritsilä 1999; Camagni 1995; Maillat 1995.)

The relationship between firms and their local operational environment – especially from the point of view of innovation activities – is an important research theme. Growing attention has been paid to the role of external support in promoting the innovative activity of firms. The purpose of this paper is to evaluate the possibilities of regional policy makers to influence on the development of networks and innovation activity. The data used is based on personal interviews. The executives interviewed represented 30 high tech firms located in Jyväskylä Science Park in Finland. They were asked to evaluate whether regional policy makers can promote innovative and networking activity of firms, and what are the appropriate policies in this regard.

According to results of the interviews, the firms appreciate an individual-level approach by policy makers, which enables them to take the real needs of firms into consideration. A well developed service structure, that is planned to meet the demand of firms as well as possible, is an essential part of the well functioning operational environment. Supporting contacts with service providers and experts from different fields and organizing collective meetings for firms can be seen as favourable instruments for the policy makers. In the innovation process, a business oriented point of view in all actions of the external part is considered very crucial.

The paper is organized as follows. Chapter 2 introduces the concept of innovative milieu and the main components of the innovation process. Also, the role of public policies in the context of innovative milieu is discussed in chapter 2. Chapter 3 consists of description of the data and the research questions. This is followed by the presentation of the results in chapter 4. The final chapter 5 concludes the paper.

2. Innovative activity and networks

2.1 The concept of innovative milieu

The success of firms and regions is increasingly defined by their innovation and learning capabilities. The new theory of economic growth differs from the neoclassical theory especially in respect to the inclusion of technological change or innovations as an important source of endogenous growth. The contribution of innovation to economic growth of regions has been widely discussed in the literature. A variety of theoretical approaches have been developed, e.g. industrial districts, regional clusters, growth centres, systems of innovation and innovative milieus.

The framework of innovative milieu emphasizes local levels of innovation and synergy as key factors of regional competitiveness and growth. The territorial system, that combines in an effective way the economic and social players as well as political and institutional agents (synergy), generates a dynamic and collective learning process enhancing further learning and innovation (Ritsilä 1999; Camagni 1995; Maillat 1995). Camagni (1995) distinguishes three economic elements which characterize the innovative milieu. They are, as follows: 1) *district economies* which refer to the ‘industrial atmosphere’ capable of reducing the cost disadvantage of small firms with respect to large firms and especially, of helping them in their innovation process (e.g. educational capability); 2) *proximity economies* that reduce ‘transactions costs’ by facilitating the transfer of information and formation of face-to-face contacts; and 3) *synergy elements* that consist of imitation processes and interaction between different types of economic actors enhancing further learning and local innovation capability.

In the context of innovative milieu, a firm is not an isolated innovative agent but it is part of the milieu that makes it work (Aydalot 1986). The elements of the innovative

milieu reduce uncertainty and risks that emerge in innovation processes of firms. Moreover, the local labour market and inter-personal networks contribute to the learning processes because of the efficient transfer of tacit knowledge and immaterial assets among firms. These functions are important especially for the small and medium-sized firms whose own capabilities are insufficient. (Camagni 1995.) Small and medium-sized firms are less capable than larger firms to shape and influence their external environment, e.g. in their relationships with customers, suppliers, sources of finance and the labour market. This means that the smaller firms can experience their operational environment more uncertain than the larger firms. (North & Smallbone & Vickers 2001.) Therefore, a firm specific character of the relationship between the firms and their local operational environment should be recognized. However, a firm without sufficient internal innovation capability cannot create innovations even if the regional conditions are favourable (Kolehmainen 2003).

The role of geographical proximity of firms and the other economic agents in the formation of innovative milieu is important. First, the accumulation of human capital has a considerable impact on the local collective learning process, enhancing the productivity of firms and improving the external image and attraction of the region itself. Human capital is effectively created by people who have also possibilities to use their ideas in their own environment and to apply them into productive activities (Okko 2000). Second, the proximity facilitates the cooperation and the creation of informal contacts between local actors, and increases the speed of information flows. Third, the proximity allows synergies based on shared cultural, psychological and political backgrounds. In short, a concentration of rivals, customers and suppliers, and research and training centres promotes efficiencies, specialization and especially stimulates the innovation activity of firms. (Camagni 1995; Hansen 1992.)

The role of networks associated with the processes of growth and change can be defined in the following major areas (Acs 2002):

- the rate of introduction of innovations by a firm would appear to be more and more influenced by its capacity to cooperate with other firms
- the success of a new technology depends on adoption externalities
- network externalities are determinant in the selection of a technology

- key sectors are the providers of externalities through an array of untraded interdependencies and linkages
- proximity is a strong necessary condition to take advantage of externalities generated by others
- networking of firms is the result of attempts by firms to internalize externalities.

Fischer (2001) defines four groups of actors which can be seen as the main elements of the system of innovation. First, there is the manufacturing sector consisting of manufacturing firms and their R&D laboratories. The scientific sector is the second main element including a training component (educational and training organizations) and a research component (universities and other research institutions) that generate and diffuse knowledge. Third, the sector of producer services can take any of the following forms: financial, technical advice or expertise, physical (e.g. ICT-equipment), marketing or training. The last element consists of institutional sector which provides coordination for the different tasks of the firms. Two types of coordination are distinguished: market (by market institutions) and non-market coordination. The latter refers to the presence of formal and informal institutions that regulate the relations between the actors, enhance their innovation capacities and manage conflicts and cooperation. The character and interaction of these four elements are the key factors of the innovation process.

The policy actors may have a significant role in creating supportive and innovative environment for the elements of the system of innovation. The economic success of regions depends not only on how the firms perform, but also on how they interact with the other economic players. Thus, one major challenge is to promote co-operation between academic, business and government sectors that support the development and exploitation of knowledge. The intensity of local networks is directly connected with the efficiency of the transfer of information and know-how (Maillat 1998).

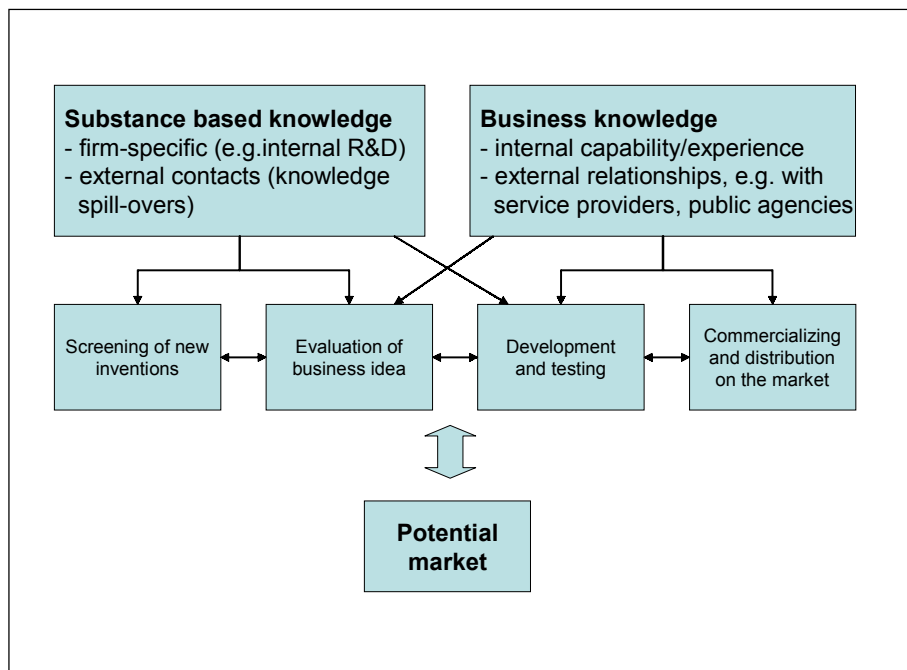
2.2 Innovation process

Innovation is a complex and multidimensional phenomenon that takes place in a certain organizational and economical context. The traditional views about innovation are based on the linear models (the technology-push and need-pull models). However, these

models are highly criticized today because the technological change cannot be seen as a linear phenomenon. According to the present view the innovation is seen as an interactive learning process where the feedback effects between the market and technology-related phases and the numerous interactions between science, technology and innovation related activities within and among the firms play a central role. (Fischer 2001.)

In this study, the innovation process is seen as a set of activities that are linked to one another (figure 1). This recursive process can be described as a chain of different phases: Starting with the evaluation and screening of new invention(s) followed by an analysis of the business idea and the development of the invention into the innovation, testing, commercializing and finally distributing the new product on the market. In the start-up phases of the innovation process the substance based knowledge has a major role, whereas the importance of business knowledge increases in later phases. Due to the market-oriented character of the innovation process the potential market for the new product has an important interactive role from the beginning of the process to the end of it. Also, at least two types of interaction can be distinguished. One refers to the product development practice internal to the firm, whereas the second concerns the relationships external to the firm, like cooperation with other firms, service providers, research institutions and public agencies. Under this process, the technological progress is dependent on how the actors interact with each other, internally and externally. (see, Fischer 2001; Niininen & Saarinen 2000.)

Figure 1. Innovation process



Typically, the innovation process is characterized by two features: uncertainty (risks) and accumulation. Besides the partly anticipated risk connected with usual business activities, the innovation process includes various risks whose joint effects cannot be known or calculated beforehand (Kautonen & Tiainen 2000). The firms can face uncertainty due to following reasons (see, Kautonen & Tiainen 2000; Camagni 1991):

- lack of relevant information due to abundance of information and costs of collecting it
- difficulties to evaluate beforehand the properties of inputs, components and technical equipment
- ability of firms to process and understand the information available is limited
- ability of firms to evaluate the results and effects of the alternative operations is also limited and thus, the possibility to choose an inappropriate technology increases
- consequences of different actions depend on the decisions taken by several actors in dynamic interaction process where the possibilities of an individual firm to control the others are minimal.

Cumulative character of technological change means that the ability to innovate is, at least partly, dependent on the existing structures and decisions taken by firms and re-

gional players in the past. The term used frequently in this context is a path-dependence: the innovation process is conducted by previous paths, network connections and learning processes. The path-dependence applies to the ability of both to the firms and regions to create and adopt innovations. This can also be seen as a restrictive factor in the innovation process. (Kautonen & Tiainen 2000.)

2.3 Role of public policies aimed at supporting innovativity and networking

The economic growth of regions depends more and more on the presence or the formation of a milieu favourable to innovation, which is based on the endogenous development capabilities. While the firm-specific factors are important determinants of innovation activity, technological opportunities and favourable local operational environment have a significant positive effect on innovation activity as well. Therefore, policy makers should focus on creating favourable atmosphere for the co-operation between firms and institutions (like financial, educational, science and technology institutions) that support the development and exploitation of knowledge (O’Gorman & Kautonen 2001). Innovation is a complex process that presupposes collaboration and linkage of several functions: fundamental and applied research, development, devising of prototypes, industrial investment, production start-up, marketing and adapting product to the market (Maillat 1998). Policies to stimulate the innovation process and to help overcome the barriers of innovation are needed.

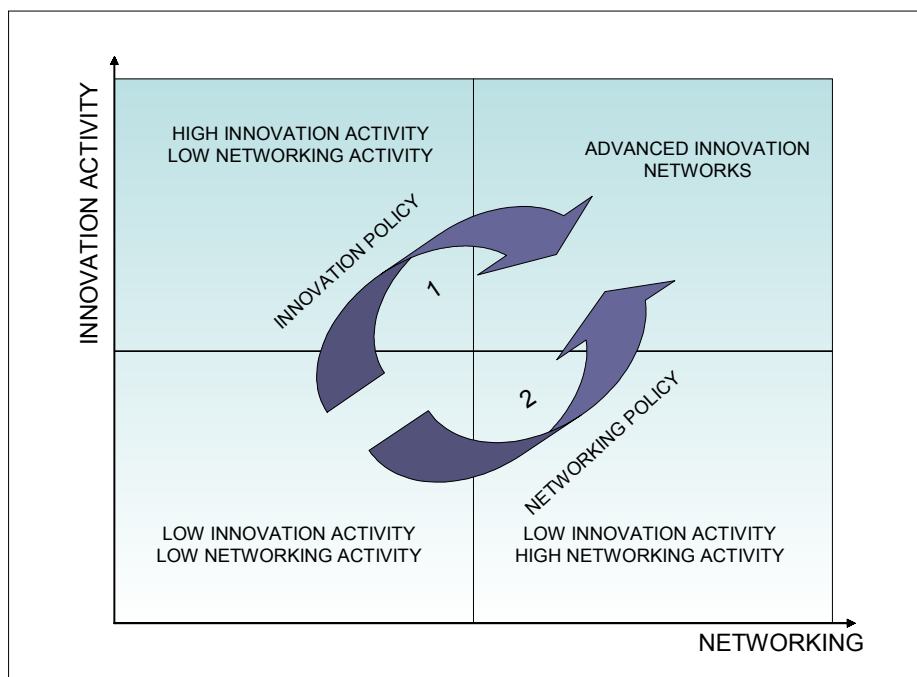
Figure 2 represents the development of favourable operational environment through innovation activity and networks between firms and their interest groups. Vertical movement can originate e.g. from the development of research environment or technological progress in the region. Thus, the development of knowledge infrastructure and accumulation of human capital are closely related to this process. Respectively, the horizontal axis represents social capital which develops through networks between different interest groups associated with the development of business knowledge and new business activity.

Four static positions can be defined on the basis of the figure 2: 1) low innovation and networking activity, 2) high innovation activity but undeveloped networks, 3) low innovation activity but well developed networks and 4) advanced innovation networks.

These abstract positions form two possible trajectories directed towards an operational environment with advanced innovation networks:

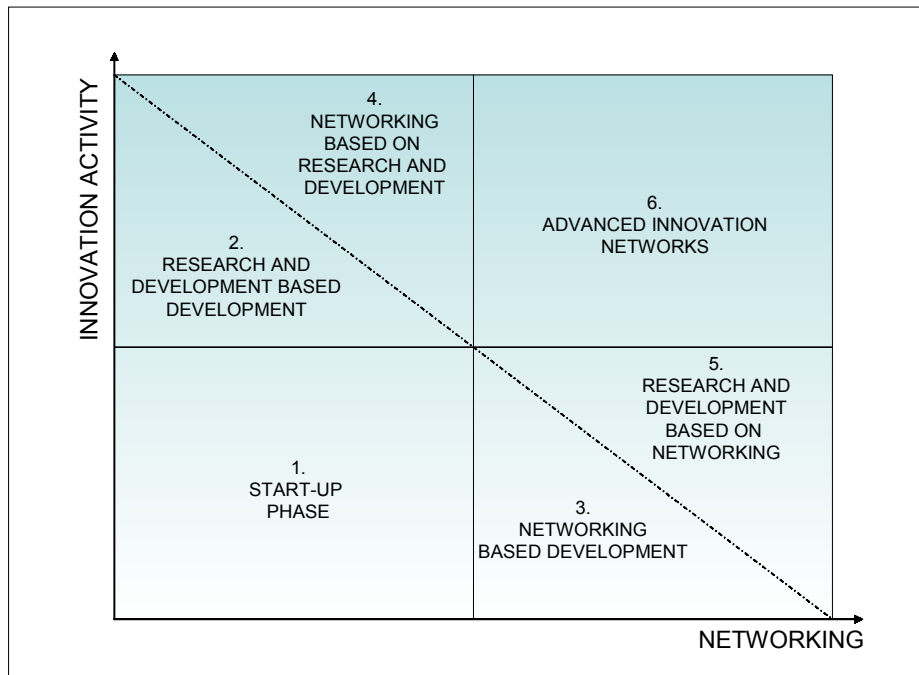
- 1) through the systematic development of the research and development activities and innovation infrastructure (innovation policy) or
- 2) through the development of networks between firms, research institutions, public agencies etc. (networking policy).

Figure 2. Development of operational environment with advanced innovation networks (cf. Camagni 1995)



The regions can be classified according to their stage of development (figure 3). Favourable situation is represented by the upper part of the diagonal where both the R&D activities and networking are well developed. The lower part of the diagonal refers to the undeveloped situation that can be divided into three sections: 1) start-up phase, 2) a main emphasis is on the R&D activities, and 3) the networking dominates and innovation activity is low. Respectively, the upper part of the diagonal is divided into following sections: 4) creation of networks is based on the needs which emerge during the innovation processes, 5) advances in R&D are based on the demand emerging in the operating networks, and finally 6) the well developed innovation networks form a favourable operational environment.

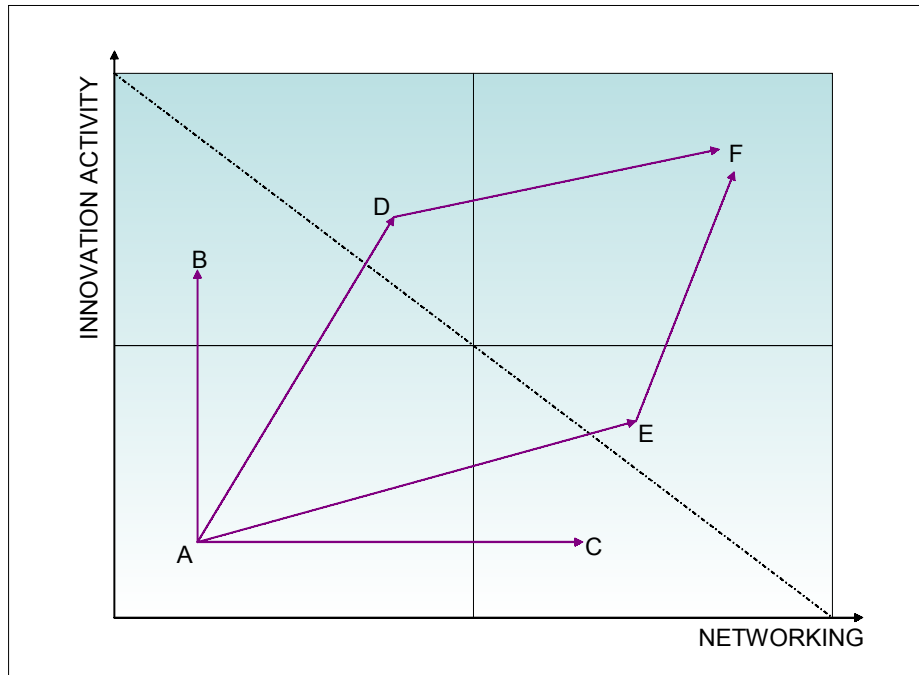
Figure 3. Different stages of regional development (cf. Camagni 1995)



The alternative development paths yield different outcomes (figure 4). The example paths in figure 4 can be interpreted as following:

- $A \rightarrow B$ and $A \rightarrow C$: The emphasis is put exclusively on the support of the innovation process, especially on the R&D, or on the creation of networks. These paths cannot be considered as optimal solutions.
- $A \rightarrow D$ and $A \rightarrow E$: The former case stresses the R&D activities and the development of networks is based on the needs of innovative firms, and in the latter case an emphasis on the networking contributes to the local innovation process. These could be optimal paths in the short term.
- $A \rightarrow D \rightarrow F$ and $A \rightarrow E \rightarrow F$: There is a close recursive relationship between the two elements. The development of innovation process contributes to the development of networks, whereas the emphasis on the networking supports the R&D and the innovation process as a whole. In the long term, these alternative paths could be applied to reach the target position or environment with advanced innovation networks.

Figure 4. Development paths directed to the environment with advanced innovation networks (cf. Camagni 1995)



In reality, the development path consists of small advances which alternate between R&D and the development of networks between firms and their interest groups. These figures presented above provide a base for this study.

3. Data and research area

Descriptive statistics and research questions

The data used in this study is based on personal interviews¹. The executives interviewed in autumn 2003 represented 30 high tech firms located in Jyväskylä Science Park (JSP) in Jyväskylä in Finland. More than half (17) of these firms are operating in the IT sector and the rest of firms represent the other high tech sectors. The number of employees varies from 1 to 70 and in 60 percent of the firms there are less than 6 employees. See table 1 for further information of the firms.

Table 1. Descriptive statistics of interviewed firms

	Starting year	Number of employees	Annual turnover, € (in 2002)
Mean	1992	11	1 102 000
Median	1995	5	250 000
Minimum	1970	1	35 000
Maximum	2003	70	5 517 000

The research questions of this study concentrate on the possibilities of regional policy makers to influence on the development of networks and regional innovation activity. The executives interviewed were asked to evaluate²:

How important is the role of external support in the following cases:

- a) when creating cooperation and*
- b) during the innovation process.*

Moreover, the executives were asked to determine more accurately (an open question):

What kind of support is needed from the external part?

Research area

The main idea of Jyväskylä Science Park is to develop and strengthen business which is based on new knowledge and technology, as well as building the favourable operational environment for high tech companies. The subsidiary of JSP, JSP Facilities Oy, is responsible for 15 percent of the total office space in Jyväskylä. In addition to rentable premises JSP Facilities provides both property and facility services as well as ICT connections. Hence, it has to be considered that the location of the firms in the science park environment may have an impact on the firms' views about the questions researched here. However, the major part of the firms thinks that their location decision is solely based on the appropriate premises available in the region, and not on the other functions of JSP-organization.

Jyväskylä is the biggest city in Central Finland (the Jyväskylä urban region has about 140 000 inhabitants) and one of the fast growing regions in Finland. Special expertise can be found in the fields of paper manufacturing and paper machinery as well as en-

ergy production, environmental, information and welfare technology. The multi-disciplinary University of Jyväskylä and the Jyväskylä Polytechnic are among Finland's leading research and educational institutions. Business activity in the region is underpinned by a few public or quasi public organisations such as Jyväskylä Regional Development Company Jykes Ltd, Jyväskylä Science Park Ltd and Central Finland Chamber of Commerce.

The fast economic growth of Jyväskylä is based, at least in large part, on the knowledge capacity and high tech sector. Purposeful contribution to the development of regional knowledge base and supportive environment for the entrepreneurship has been successful. The development of ICT-cluster has become one of the key factors of the local economy in the Jyväskylä urban region. A strong influence of the ICT-sector has also been perceptible in the other fields (e.g. in metal industry, paper manufacturing and paper machinery) which apply the IC -technology in their own activities. The fast growth of the ICT-sector in the region largely results from successful strategic choices and extensive co-operation between regional actors. Investment in the development of ICT-business has been accompanied by improved supply of services, entrepreneurial culture, quality of living, and particularly by increased educational possibilities. (Linnamaa 2001.)

4. Results

Location choice

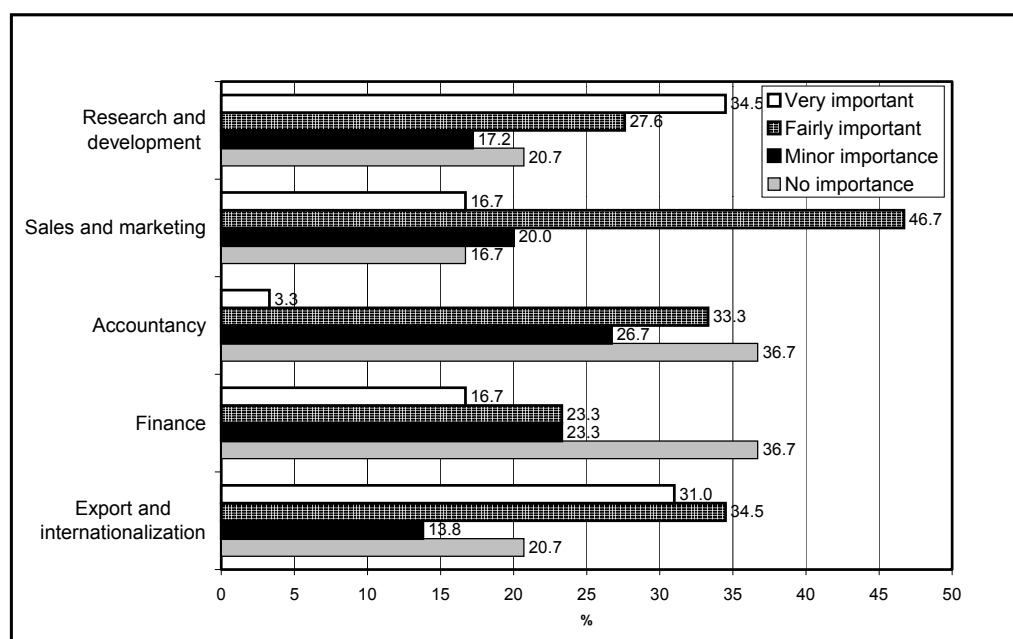
A certain ('critical') mass of firms and other economic actors can be considered as basic elements when creating an innovative local environment. Hence, before proceeding to the actual research questions, the factors affecting the location choice of firms are studied shortly. Most frequently Jyväskylä was chosen as a location for personal reasons (home town of the entrepreneur). University of Jyväskylä and central location of the city were also named among the most important influential factors but not to such a great extent than the personal reasons. Availability of the appropriate premises was the main reason for the location choice inside the city (in Jyväskylä Science Park).

Thus, to attract new business into the region it is important to create a positive entrepreneurial atmosphere and attitude towards new start-ups. A favourable social environment is a crucial thing for the attempts of regional policy makers at encouraging potential local entrepreneurs as well as people from the other regions to start-up their own businesses. Supporting the role of university as a generator of new ideas and business opportunities would be useful. Moreover, the existence of scientific environment could be strengthened by improving the educational and R&D resources of the university and other educational institutions. Finally, a well functioning physical infrastructure and especially, the development and supply of suitable premises should be assured by regional policy makers as well.

Creating cooperation

The cooperation was divided into five fields of business: research and development; sales and marketing; accountancy; finance; and export and internationalizing. External support was considered very important by about one third of the interviewed firms when creating relationships in the fields of research and development and export and internationalizing, and only one fifth of the respondents did not appreciate the external support at all in these fields (figure 5). Also, the cooperation in sales and marketing proved to be a necessary target for policy makers. However, the major part (two third) of the respondents taught that the cooperation relationships in accountancy and finance were mainly based on their own contacts and capabilities, and thus, there is no a significant need for the external support in these fields of business.

Figure 5. Importance of external support in the networking process of firms



To control the effects of some firm specific factors on the responses, the crosstables were formed and the significance of the results was tested by Pearson chi-square test. The responses were classified into two groups: ‘no importance’ and ‘minor importance’ formed one group and the other consisted of the responses ‘fairly important’ and ‘very important’. The firm specific variables – age of firm, number of employees and annual turnover – were grouped in the following way:

- Group 1: Firms established in 1998 or after that.
Group 2: Firms established before the year 1998.
- Group 1: Firms with five employees or less.
Group 2: Firms with more than five employees.
- Group 1: Firms with annual turnover 500 000€ or less in 2002.
Group 2: Firms whose annual turnover exceeded 500 000€ in 2002.

The results are reported in table 2. However, due to the small size of the sample the results should be interpreted cautiously.

Age of the firm seemed to have a statistically significant (at ten percent level) impact on opinion of firms, concerning particularly the cooperation in the fields of accountancy, finance, and export and internationalizing. The negative relationship between the age of the firm and the need for external assistance is easy to understand. Typically, the young

firms have less experience in business and their resources can be rather limited. Therefore, the importance of external support as a consultant and intermediary in their networking process may be highly emphasized. The number of employees turned out to be significant (at five percent level) when the cooperation in the fields of sales and marketing and finance were concerned. Also the annual turnover seemed to have an effect on the need for external support in the financial relationships. This means that the external support in these fields matters more to smaller than larger firms when the size of firm is measured by the number of employees or annual turnover.

Table 2. Effect of firm age and size on the evaluation of the need for external support in the networking

Age of firm vs.	χ^2 -test value	p-value	Contingency coefficient
- Research/development	2.426	0.119	0.282
- Sales and marketing	2.084	0.149	0.259
- Accountancy	3.157*	0.076	0.313
- Finance	5.154*	0.023	0.388
- Export/internationalizing	4.050*	0.044	0.350
Number of employees vs.			
- Research/development	0.121	0.728	0.065
- Sales and marketing	4.043*	0.044	0.345
- Accountancy	0.096	0.757	0.056
- Finance	4.537*	0.033	0.362
- Export/internationalizing	0.468	0.494	0.126
Annual turnover (in 2002) vs.			
- Research/development	0.054	0.816	0.045
- Sales and marketing	1.152	0.283	0.199
- Accountancy	0.738	0.390	0.160
- Finance	7.479*	0.006	0.459
- Export/internationalizing	0.444	0.505	0.125

Notes: * =Statistically significant at the 10 % level.

The results of the interviews show that the need for advisory support in the creation of cooperation and networks is a common feature in all of these fields of business (table 3). Some of the most important issues for policy makers are to advice firms about how to find and approach an external service provider or other potential partner, and how to act with them (modes of action). They should bring together entrepreneurs and experts from different fields. The results of these interviews confirm that the role of regional policy makers as an enabling organization, which makes sure that service is provided but the actual measures are carried out by private sector firms, such as accountants, financiers, marketing and patent agents, is a potential strategy. The use of these services

can lead to the greater internal efficiency, especially, of small firms. Diverse set of service providers forms a group of actors very essential to the innovative milieu.

In the first phases of exportation process and in R&D activities the financial support plays a prominent role. In general, there are a number of reasons why obtaining finance can be difficult, especially for new and small firms. First, it may be due to uncertainty resulting from the lack of historical information to base the investment decision on and the lack of the entrepreneur's ability of starting such a business. Second, the cost of finance for relatively small amounts can be extremely high (there are no economies of scale). Third, there is a higher real or perceived risk in investing particularly in small innovative firms who need funding to develop a prototype of a product to show that it is marketable. (Glancey & McQuaid 2002.) Thus, the policy makers should have a wide experience and knowledge about how to find the potential investors, and they should act as an intermediary in the funding process. Guidance about the different financial instruments should be provided as well.

Moreover, the respondents suggested some kind of collective meetings for the local firms of similar types of products and interests. This could enable firms to become familiar with one the other and create synergies by combining both their material and immaterial resources. First, the resulting ('direct') economies of scale could be profited, for example, through supporting the search of finance (the cost of finance for larger amounts are lower than for smaller amounts), providing larger product/service deliveries to the market or developing export business of firms by forming joint or co-operative export bodies. Second, the synergy economies could be strengthened by applying the same modes of action and problem solving for the firms with similar types of products. Hence, the firms belonging to the same product groups should be considered more and more as supportive and complementary modules to one another. Third, the networking allows firms to complete their own knowledge base by learning from one another that promotes further their innovative activity.

Table 3. Development of local synergy. What kind of external support is needed in the networking process?

Research and development	Sales and marketing	Accountancy	Finance	Export and internationalization
- create/support contacts with experts with specific knowledge	- create/support contacts with marketing firms and advise how to act with them - organize collective meetings for the firms with the same products/interest (e.g. cooperative marketing activities)	- create/support contacts with service providers (how to find them)	- provide advisory support: how to act with investors, familiarity with different financial instruments - act as an intermediary between firms and investors, especially in R&D and export activities	- advisory support: who/which organisations should be contacted - collective meetings for the firms (e.g. co-operative export bodies)

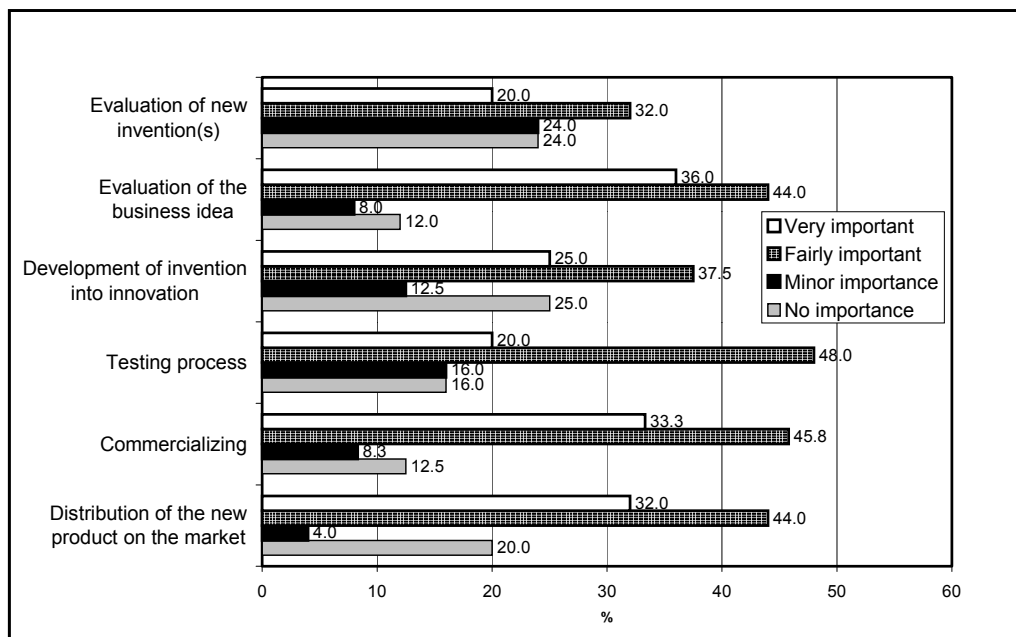
In general, the firms need an individual-level approach by policy makers. Only this allows them to recognize the latent needs which cannot be expressed or recognized by the firms themselves. Differences between expressed and latent needs/potential often stem from the difficulties that many small and medium sized firms have in diagnosing the external support requirements of their business (North & al. 2001). According to the interviewed firms, the customized support and services for different types of firms taking account of their life-cycle path, economic and personnel resources, capability of the owners and managers (concerning their knowledge in the fields of substance, business and entrepreneurship) are more and more important.

Innovation process

A need for policy interventions varies between different phases of the innovation process, including evaluation and screening of new invention(s); analysis of the business idea; development of the invention into the innovation; testing; commercializing and distribution of the new product on the market (figure 6). According to the interviews, the importance of external support proved to be smallest in the first phase of the process which consists of the evaluation and screening of new invention(s). It was considered very or fairly significant by one half of the firms. On the other hand, a policy intervention in the next stage, when analysing the business idea, turned out to be very valuable: 80 percent of the respondents evaluated it at least fairly important. The analysis of the

business idea is followed by the development of the invention into the innovation and a testing process in which the need for policies is a bit smaller. About two third of the firms considered it fairly or very important. The last two stages in the innovation process include commercializing and distribution of the new product on the market. In these stages, the external support provided by regional policy makers proved to be almost equally important than in the analysis of the business idea. Only a little minority of firms neglected the role of policy intervention.

Figure 6. Importance of external support in the innovation process of firms



The same analysis for the firm specific effects, which was done with networking, was carried out here as well. Like in the networking process, according to Pearson chi-square test the opinion of firms seemed to be dependent, at least partly, on the age of the firm (see the results in table 4). External support was considered important especially by younger firms in the following phases of the innovation process: evaluation of new invention(s), analysis of the business idea, testing and commercializing. Besides the age, the annual turnover proved to be significant (at ten percent level) in several phases including the screening of new inventions, analysis of the business idea, testing and distribution of the new product on the market. However, the number of employees was significant only when the need for external support in the analysis of the business idea was concerned. The turnover and number of employees refer to the size of the firm. Thus, it seems that the demand for external support is higher among the smaller firms

than larger ones. These results are rather logical because the innovation process involves a lot of uncertainty and the failure of the process can be destructive particularly for young and small firms. Thus, by turning to the assistance of external part the firms can try to decrease uncertainty and increase the possibilities of success.

Table 4. Effect of firm age and size on the evaluation of the need for external support in the innovation process

Age of firm vs.	χ^2 -test value	p-value	Contingency coefficient
- Screening	3.744*	0.053	0.361
- Analysis of business idea	3.516*	0.061	0.351
- Development	1.434	0.231	0.237
- Testing	2.820*	0.093	0.318
- Commercializing	3.158*	0.076	0.341
- Distribution	1.281	0.258	0.221
Number of employees vs.			
- Screening	0.962	0.327	0.192
- Analysis of business idea	4.167*	0.041	0.378
- Development	2.003	0.157	0.278
- Testing	2.482	0.115	0.301
- Commercializing	0.873	0.350	0.187
- Distribution	2.339	0.126	0.293
Annual turnover (in 2002) vs.			
- Screening	3.222*	0.073	0.338
- Analysis of business idea	6.771*	0.009	0.462
- Development	2.517	0.113	0.308
- Testing	3.436*	0.064	0.348
- Commercializing	2.274	0.132	0.294
- Distribution	3.949*	0.047	0.369

Notes: * =Statistically significant at the 10 % level.

Moreover, the firms were asked to mention what kind of support is particularly needed (table 5). Concerning the start-up phase of the innovation process, some of the firms taught that it is useful to have a realistic view of external part about the development possibilities of new invention(s). However, a majority of the respondents taught that this first phase of the innovation process is mainly internal to the firm.

The analysis of the business idea is extremely crucial stage in the innovation process. The ideas carried forward to the development stage should be limited to those most likely to succeed, because when the development process starts things become very costly. In this stage, an external part should have a wide experience in the development of new business. Firms need someone who can see their business idea in its entirety and

evaluate its capability to enter a market. New and complementary ideas are appreciated by firms as well.

In the development and testing process the advisory and financial support are especially needed. Very important thing concerning the testing process is to find the ways and channels for carry out the testing. Thus, the policy makers should be active and try to make the cooperation between firms easier by bringing different actors in the region together. This could contribute to the creation of cooperative relationships between potential pilot units/firms of testing and firms whose own testing possibilities are insufficient. This supports again the importance of cooperation and synergies in the local operational environment.

Successful marketing plays a crucial role in the final stages of the innovation process, including commercializing and distribution of the new product on the market. Thus, the policy makers should ensure that marketing services are available in the region. Market research and designing of marketing material, imago and brand are typically required from external service provider. Due to the limited resources of firms it is often beneficial to have an external part taking care of the selling, marketing and distribution plans. As a whole, it is important to support and facilitate the process of commercializing.

Table 5. External innovative intervention. What kind of support is needed during the innovation process?

Evaluation and screening of new invention(s)	Evaluation of the business idea	Development of invention into innovation	Testing	Commercializing and distribution of new product on the market
- realistic view about the development possibilities of new invention(s)	- to see the business idea in its entirety and evaluate its capability to enter a market - new and complementary ideas	- advisory support - financial support	- financial support - to find the ways and channels for testing, e.g. pilot firms (collective meetings for firms)	- marketing services: market research; designing of material, imago and brand - selling, marketing and distribution plans

In general, in the innovation process the contacts with experts from different fields are important. Moreover, the policy makers should operate in the firm-level to become familiar with the real needs of firms. The collective meetings of firms and synergies cre-

ated by these connections contribute to the innovation process as well. In the innovation process, a commercial view to the business idea and marketing assistance are especially important, and external support is considered valuable.

Creation of new and innovative firms is an essential part of the innovation milieu. Hence, one set of policies should encourage the commercializing and disseminating of research carried out in universities and other research institutes. Grants or other support could be available for promising business opportunities. This was emphasized by several respondents, and as a good example they mentioned the annual competition of the best business idea organized in Jyväskylä by regional actors.

5. Conclusions

These interviews prove that there is a demand for external support in the networking and innovation processes of firms. Two types of approaches, innovation and networking policies which were defined in chapter 2, are supported by the results. Both of them are needed in the development of advanced innovative networks, and their interactive character as supportive modules to one another is stressed. The development path is formed by small advances which alternate between the development of innovation process and networks among firms and their interest groups.

The policy makers should concentrate on the development of networks especially in the fields of research and development; export and internationalizing; and sales and marketing. In the innovation process, the main emphasis should be placed on supporting the business knowledge of firms including the analysis of the business idea, commercializing and distribution of the new product on the market. The role of external support was more emphasized by younger firms than older ones and also to some extent by smaller than larger firms.

The results revealed some important things associated with the policy interventions. An individual-level approach by policy makers is highly appreciated among firms. Only this allows them to recognize the real needs of firms. The customized support for different types of firms taking account of their life-cycle path, economic and personnel resources, capability of the owners and managers (concerning their knowledge in the

fields of substance, business and entrepreneurship) have become more and more important for firms. The individual-level approach is also a crucial precondition for the well developed regional service structure that should meet effectively the requirements of firms. Diverse set of service providers is important particularly for small firms whose own resources are limited.

The policy makers should not only bring together the firms and service providers but also the firms with similar type of products or interests. The collective meetings may encourage firms to form e.g. the joint or co-operative export bodies, which contributes to their possibilities to integrate into the international markets. As a whole, the results support strongly the importance of business orientation and commercial view in all activities of regional policy makers.

An individual-level approach seems to play a key role in the success of regional policy interventions. A right timing and ability to meet the critical needs of firms are important things for the effectiveness. Thus, the policy makers should try to improve their old modes of action or to create totally new ones to meet the demand of firms that may differ in their size, line of business, knowledge base, phase of the life cycle etc. Taking account of costs and personnel resources, this can be a challenging task for regional authorities.

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Notes

¹This data has been collected as a part of larger study that evaluated the effects of the interventions of Jyväskylä Science Park on their target groups.

²Four response categories: 1=no importance, 2=minor importance, 3=fairly important and 4=very important.

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