

EXPLORATION OF GEOGRAPHICAL SCOPE: THE CLUSTER OF GRENOBLE

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Abstract

The article studies the particular high tech cluster of Grenoble in the light of regional studies. We particularly explore the geographical scope from organization, knowledge and risk perspectives. This exploration uses a large quantitative data collection. We observe that the trial-driven synthetic knowledge dynamics are generally based on engineering sciences and developed at distance which comes as a challenge for well-established cluster. Our results emphasis a significant differences across organisations (firms, research centres, universities and pubic bodies) and sizes (small, medium and large). Large firms develop knowledge dynamics at a greater distance compare to others. Alike research centres and universities, medium-size firms perceive a greater knowledge anchoring than small firms and large firms. We found that theory-driven analytical and branding-driven symbolic knowledge types are more anchored than synthetic knowledge which is precisely the type of knowledge considered as the main resource in the Information and Communication Technologies (ICT). Finally, we argue that the increase of geographical distance between knowledge senders and receivers increase the perception of risks associated to unintended knowledge spillovers.

Key words: knowledge, proximity, distance, anchoring, cluster

JEL Code: R11, R58, Q55

Introduction

Geographical distance between knowledge senders and receivers do not present any technical barrier anymore. However, it questions organizations about their geographical scope and their ability to manage the increasing knowledge mobility. It also asks organizations if the particular type of knowledge they use and/ or create is more or less compatible with short or long geographical distances. Finally, those organizations can legitimately wonder if long distance knowledge dynamics carry more risks than the ones developed locally. All those questions come to both fuel and challenge existing researches on clusters grounded on agglomeration theories. Therefore, the article explores “What is the geographical scope of organizations, knowledge and unintended spillovers within the cluster of Grenoble?”

The article uses an exploratory quantitative approach in the cluster of Grenoble. Particularly focusing on geographical proximity/ distance, knowledge anchoring/ mobility, knowledge and risk of unintended spillovers, a questionnaire has been completed by 932 highly educated people. A variety of 111 firms, research centres, universities and public bodies from the cluster of Grenoble contributed to this survey. We use descriptive statistics to offer a first attempt of geographical scope exploration.

The theoretical framework will firstly highlight the need for further explorations in regional studies. Then, the methods will be presented, followed by the results and discussion. Finally, the conclusion will provide some elements of response and paths for further studies.

1 Theoretical framework

In the field of regional studies, an historical perspective emphasis a paradigm shift from the national innovation to the regional innovation mechanisms. Two decades ago, Porter, (1990a) argued that countries have an important leverage on the innovation capabilities of a nation. The National System of Innovation (NSI) was developed by Freeman (1987) and the National Innovation System (NIS) by Nelson (1993) and Lundvall (1992). The central mechanism of those theories was based on national institutions considered as a driving force (Nelson, 2000) and allowed “network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies” (Freeman, 1987).

More recently, innovation at the regional level took the path on the well-established national system. In both settings, a variety of organizations are involved: Firms, research centres, universities and public institutions. Those organisations are collaborating and sharing knowledge within and across regions which constitute a shift toward the Regional Innovation Systems (RIS) according to Cooke (2003) and Malmberg & Maskell (2002). This growing importance of regional economy encouraged researchers to develop several conceptual frameworks named “Territorial Innovation Models” (TIMs), trying to understand reasons of disparities between flourishing regions and regions loosing speed. TIMs gather models such as innovative milieu, industrial districts, localized production systems, new industrial spaces, innovation clusters, regional innovation systems and learning region (Moulaert and Sekia, 2003).

Such TIMs are determined by the geographical concentration and connection among companies, suppliers, service providers, firms and institutions (Porter, 1998). It refers to the agglomeration theory coined by Marshall in the 19th century. Marshall (1920) studied

economies of scale of firms established in an industrial district offering proximity networking with other firms, suppliers, clients to benefit from knowledge spillovers lowering costs. He took the example of the cutlery industry in Sheffield area where “the mysteries of the trade become no mysteries, but are as it were in the air”. Grounded in the division of labour theory, regions get specialized and act together with others regions. This means that collaborations are implemented to develop composite products based on regional specialization.

The agglomeration effect at the cluster level is based on the intensity of knowledge dynamics occurring within and outside the cluster. Unfortunately, the literature does not distinguish organizations in term of geographical scope. Since the scope of interaction is organization-specific, it presents a theoretical weakness where a typical firm has a different geographical scope than a typical research centre. Similarly, the existing TIMs do not explore the difference of geographical scope between large international firms and start-ups. Consequently, the article explores the geographical scope of the cluster of Grenoble and most of its members. At the cluster level, we expect that the geographical distance will generally be important because the competition is occurring globally in the ICT sector. However, we expect some differences between organizations where research centres, universities and public bodies would be more involved in local networks while firms would be more involved in global networks. We also expect to have a different knowledge anchoring and mobility according to the type and size of organizations.

Following this early exploration, the article will explore geographical scope according to the three categories of knowledge defined by Cooke (2005): analytical, synthetic and symbolic knowledge. Analytical knowledge is science based which mean theory-driven (Laestadius, 2000) requiring multi stakeholders’ involvements: industry and research. Such cooperation leads to a high level of proximity within science parks, technical universities, etc. (Asheim & Coenen, 2004). It seems that analytical knowledge is rather developed within communities of practices located within limited areas which apparently increase the feeling of trust among members. According to Cooke (2005), it leads to the development of centres of excellence based on leading universities and firms. Consequently, we expect to have a stronger mobilisation of analytical knowledge within knowledge dynamics occurring at geographical proximity. Different in its nature, synthetic knowledge is based on engineering within this industrial sector. According to Laestadius (2000), synthetic knowledge is trial-driven and rather codified to facilitate knowledge transfer at distance. Thus, we expect to have a stronger mobilisation of synthetic knowledge within knowledge dynamics occurring at a

greater distance. Last but not least, symbolic knowledge is characterised by a high degree of art, communication and branding (Cooke, 2005). Firms intend to develop such knowledge to improve their image and create a unique value to their customers. In practice, the regional aspect sticks to the product image. From a consumer perspective, there is an association of quality with the region of design and/ or manufacturing. For instance, there is the belief that good cars are made in Germany and good watches are made in Switzerland. In the article, we expect a stronger mobilisation of symbolic knowledge within knowledge dynamics occurring at geographical proximity.

The third exploration of this article is articulated around the link between the geographical scope of knowledge dynamics and the notion of risk of unintended knowledge spillovers. Based on the current expansion of long distance knowledge dynamics, some scholars and practitioners already pointed out the rise of risks identified under the name of unintended knowledge spillovers. Particularly focusing on the ICT sector, Brossard & Vicente (2007) argued that the risk is not related with geographic proximity and distance. Challenging the concept of geographical proximity, they rather based their analysis on the cognitive proximity which would be correlated with the notion of risks. Based on their arguments, long distance are not more risky than local ones. Consequently, we expect to have no correlation between the level of risk of unintended knowledge spillovers and the geographical distance between organizations.

2 Data and methods

Following the section devoted to the theoretical framework, we use a quantitative approach to explore the three axes suggested in previous paragraphs: The geographical scope of the cluster and its organizations, the geographical scope of knowledge types and the geographical scope of unintended knowledge spillovers. To initiate such exploration, the article focuses on the particular technology cluster of Grenoble.

Located in the French Alps at 550km from Paris and 100km from Lyon, Grenoble benefits from a particular atmosphere in the middle of mountains while being connected with the world. Considered as a high tech cluster, Grenoble is specialized in Information Technologies (IT), micro /nano technologies, renewable energy and biotechnology. Over the last 15 years, Grenoble has seen a great expansion of the IT sector thanks to cumulative knowledge on physics, chemistry, materials and turn now to renewable energy and biotechnology thanks to composite knowledge dynamics across fields. Grenoble is counting

435,400 inhabitants in one of the most dynamic and profitable region of Europe and a large proportion of highly educated people. Grenoble benefits from the concentration of complementary organizations and a good network thickness.

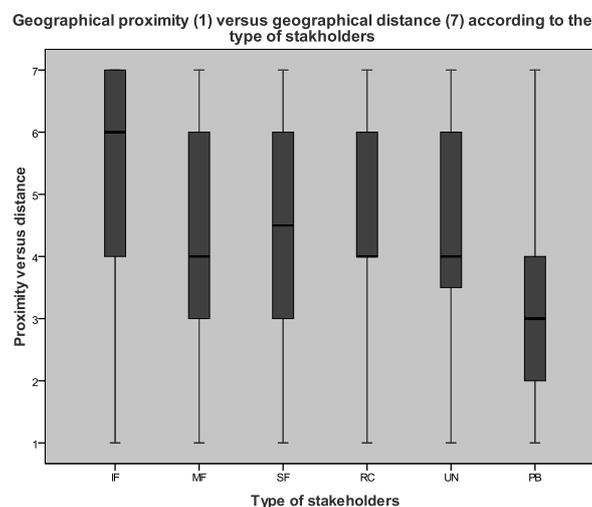
We elaborated and distributed an on-line survey to perform the exploration. Out of 5,000 people contacted, 932 responded (response rate of 18.64%). 77.2% of them have fully completed the survey. The quantitative empirical study allows us to conduct descriptive statistics. The design of the questionnaire is articulated around the existing literature review and two perceptions items: the perception of geographical proximity/ distance between knowledge senders and receivers and the perception of knowledge anchoring/ mobility.

At the cluster level, various organizations from the entire knowledge value chain were involved: Firms (51%), research centres (25%), universities (18%) and public bodies (6%). Within the firms' category, size of the organization matter and might influence geographical scope of knowledge dynamics. Therefore, we created three categories: Small size organizations (1-10 people), medium size organisations (10-500 people), and large size organisations (greater than 500 people). In total, 111 organizations contributed to the survey. At the individual level, the function occupied by respondents, the education level and the management power (number of subordinates) have been collected. The sample is not representative of the region because we only targeted knowledge-intensive people. Consequently, 836 people (91.5% of the sample) hold managerial and /or highly intellectual jobs. Intermediary jobs, employees and workers only represent 7.7%. Job profile is strongly correlated to the education level of the sample. Indeed, half of them hold a master degree and 37% a PhD degree. Only 13% hold an undergraduate degree. Just a simple computation gives the number of years of studies after high school of the entire sample. It reaches the impressive amount of 5,350 years of studies with an average of 5.85 years after high school. Such average is not representative of national statistics. It emphasis the gap between national figures and the ones from technology clusters such as Grenoble. Not related to the education level, the management power remains low. 32% of respondent do not have any people under their responsibility while 30% of them have manage between one and five people. It points that people working in research centres or universities are highly educated but do not necessarily have subordinates. Regarding the gender balance of the sample, 69.1% of respondent are male and 30.9% are female which meet the representatively in this sector.

3 Results and discussion

Based on the data collection, the article aims at understanding the geographical scope of knowledge dynamics of organizations. The aim is firstly to identify the general geographical scope (distance versus proximity knowledge dynamics) of the cluster and secondly to identify if there are differences across organizations (Figure 1). From a general perspective, knowledge dynamics are rather established at distance. Such distance can be explained by the nature of the ICT sector being highly competitive and globally established. When knowledge becomes a scarce resource, there is a clear search for rich and distant knowledge dynamics. Analysing differences across groups, International Firms (IFs) are significantly different from all stakeholders with a strong development knowledge dynamics established at distance to grasp particular knowledge bits located in different places. Medium size Firms (MFs), Small size Firms (SFs), Research Centres (RCs) and Universities (UNs) are not significantly different regarding the distance of knowledge dynamics. Finally, geographical distance / proximity is significantly different from Public Bodies (PBs) having local connections with the cluster of Grenoble. Such proximity knowledge dynamics reinforce the local anchoring by creating a unique environment enhancing innovation.

Fig. 1: Geographical proximity / distance



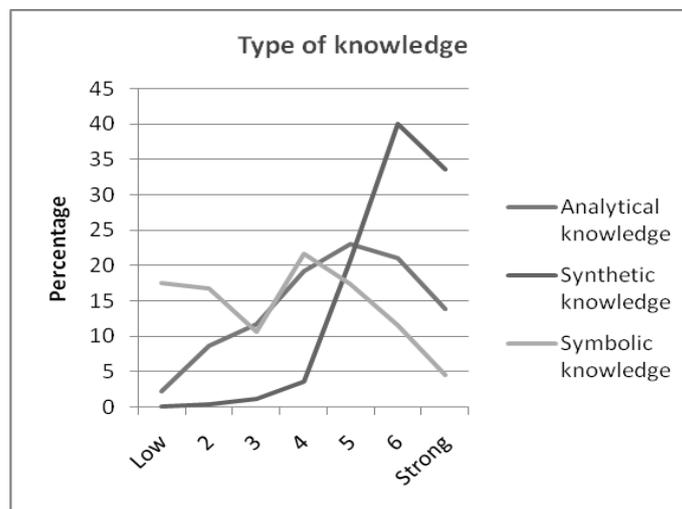
Source: Self-developed

Based on the geographical scope of knowledge exchange, the article tends to measure the perception of knowledge anchoring /mobility. From the empirical data, results offer a picture where knowledge is rather mobile than anchored. However, there are some significant differences across organizations. IFs and SFs share similar patterns, i.e. very mobile knowledge. From a statistical point of view, medium size companies are significantly

different from international and small firms. MFs perceived a stronger anchor within the local economy. Their technological development is often positioned within market niches which allow them to create differentiated products and services relatively protected from the global competition. Their specialization is based on core knowledge concentrated within the cluster of Grenoble. In the same vein, RCs are significantly different from IFs with a stronger anchoring of knowledge. Knowledge developed by UNs offer a dual perspective: half-anchored (in link with RCs), half-mobile (in link with the dissemination policy through publications and conferences). Finally, PBs develop anchored knowledge to meet local organizations' needs.

Based on the domination of long distance knowledge dynamics and knowledge mobility, the article will try to identify if the nature of knowledge (analytical, synthetic, and symbolic) can be linked to the geographical scope. In the cluster of Grenoble, synthetic knowledge is the most important. Analytical knowledge is rather strong while symbolic knowledge is underdeveloped because the ICT sector is rather based on technical performance than on an image value. (Figure 2)

Fig. 2: Type of knowledge



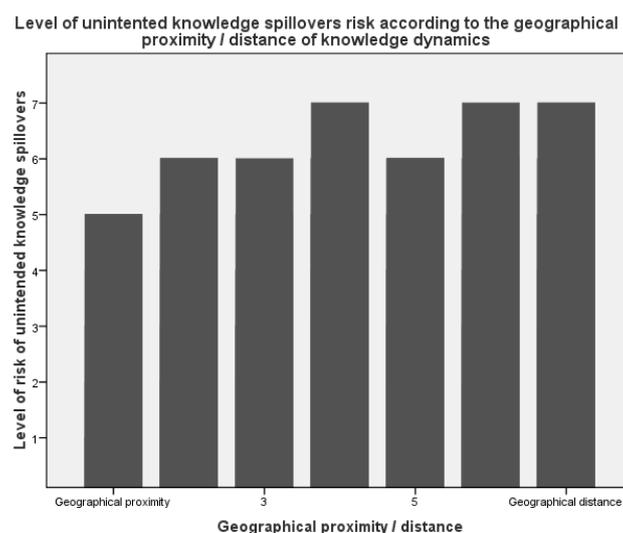
Source: Self-developed

Crossing the mobilisation of different types of knowledge with the geographical scope of knowledge dynamics, knowledge dynamics tend to be developed at distance for any types of knowledge. Contrary to expectations based on the literature review, from a statistical point of view, there is no significant difference between analytical, synthetic and symbolic knowledge. There is not a stronger geographical proximity for analytical knowledge and a stronger geographical distance for synthetic knowledge. However, the stronger the

mobilization of analytical knowledge, the stronger the anchoring is (although not exceeding 4 out of 7). Synthetic knowledge is slightly less anchored than analytical knowledge. Such mobility can be partially explained by the global scope of engineering knowledge exchange. As far as symbolic knowledge is concerned, the anchoring is stronger than other types of knowledge. It means that the construction of a brand image of the cluster would reinforce its anchoring and the economic robustness. This finding might encourage the cluster not to neglect such kind of knowledge.

With the increasing geographical distances and knowledge mobility, the article also wishes to point out limits of such trajectory. The risk of unintended knowledge spillovers is a major concern for organizations. The empirical study argues that the level of unintended knowledge spillovers is increasing with the increase of distance between knowledge senders and receivers from “high” to “very high” (Figure 3). Locally, it seems that the risk is slightly lower, arguably thanks to a higher feeling of trust, knowledge intensive interactions and the development of relational proximity through informal discussions within communities of practice. To moderate this statement, from this measure, it is possible to tell that the level of risk is generally high at any geographical distance. This perception of “high” or even “very high” risk does not discourage organizations to intensify knowledge dynamics globally to develop strategic alliances, to expand their activities in other industries and to compete globally.

Fig. 3: Unintended knowledge spillovers according to geographical proximity / distance



Source: Self-developed

Conclusion

In the literature on regional studies, we identified the need for exploration of geographical scope from three perspectives: Organisation, knowledge and risk. In the cluster of Grenoble specialised in high tech, synthetic-based knowledge dynamics are established a great geographical distance which challenge knowledge anchoring within cluster. This geographical distance has an impact on the perception of risks of unintended knowledge spillovers.

The large data collection offers the following findings. From an organizational perspective, the geographical scope of knowledge dynamics emphasise long distance between large firms and partners. Slightly less distant, small and medium size firms, research centres and universities are sharing the same perception of geographical scope whereas public bodies are more involved locally. The knowledge mobility is very strong in large and small companies. Medium-size companies consider knowledge less mobile like research centres and universities. From a knowledge perspective, synthetic knowledge is dominant in exchanges, followed by analytical and symbolic knowledge. Our results show that both analytical and symbolic knowledge carry a higher degree of anchoring as opposed to synthetic knowledge being more mobile. From a risk perspective, the greater the geographical distance, the greater the perception of risk related to unintended knowledge spillovers.

The present exploration presents some limits related to the use of perception measures instead of objective measures. We are also aware that the cluster of Grenoble is sector and geographically specific which is consequently not representative. To overcome the perception measures, we recommend to scholars to undertake studies using Social Network Analysis to offer a complementary analysis. In further studies, we also suggest to study the geographical scope of organizations linked to their size. In the high tech sector we conjecture an optimum of knowledge anchoring for medium size firms. In the same vein, it would be helpful to understand what other parameters (predictor and effect) the development of long versus short distance knowledge dynamics.

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