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Proximity, technology and mode of diffusion as determinants of knowledge flows

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Description :

diffusion des connaissances, utilisation des TIC, proximité géographique, changement technique.

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Dans cet article, nous étudions les relations de coopération entre les entreprises, comprises en tant que diffusion et partage de connaissances, proximité entre partenaires et mode de diffusion. Nous avons réalisés une étude empirique auprès de 348 entreprises. Les résultats sont en ligne avec ceux trouvés dans la littérature : la distance, les communications virtuelles et le savoir-quoi (know-what) augmente la connaissance codifiée échangée entre les entreprises, alors que les communications « physiques » ont l'effet inverse. De plus, plus les entreprises échangent de savoir-quoi, plus elles échangent aussi des types de connaissance complémentaires (savoir comment, savoir pourquoi) ; plus la collaboration est inter-régionale, et fondée sur des communications virtuelles, plus la connaissance échangée est codifiée.

Cet article fait suite à [une revue de la littérature sur les relations de coopérations entre les entreprises et le lien avec l'usage des TIC](#).

Mots clefs : diffusion des connaissances, utilisation des TIC, proximité géographique, changement technique.

ABSTRACT.

In this paper, we analyze the cooperative relations of firms, in term of knowledge diffused and shared, proximities between partners, and modes of diffusion. An empirical investigation is undertaken near 348 firms. The results are consistent with the literature : the distance, the virtual communication and the know-what increase the codified knowledge shared among firms, while the real communication have the opposite effect. However, the results do not suggest an opposition between virtual and real communication or between know-what and know-how, but rather a complementarity of these elements. Indeed, the more firms share know-what, the more they share complementary types of knowledge (know-how and know-why), and the more the collaboration is inter-regional and funded on virtual communication, and the more the shared knowledge is codified.

Keywords : knowledge diffusion, ICT use, geographical proximity, technological change

Introduction.

The tacit knowledge argument usually used to explain the geographical concentration is unsatisfactory and introduce a restrictive reading of the process : explicit / technology / dispersion versus tacit / face-to-face / concentration.

The French school of proximity dynamics shows that proximity covers a number of dimensions (Torre and Gilly, 2000). Following Boschma (2005), we distinguish the technological and organizational (at the level of firms), the cognitive and relational (at the level of individuals), the institutional and the geographical proximities. These proximities widely moderate the role of geographical proximity for the emergence and the development of knowledge externalities. For example, Breschi and Lissoni (2006) and Singh (2005) find that the relational proximity among inventors is the main channel for the diffusion of an explicit knowledge (patent), and this proximity makes it possible

to exceed the other borders.

Several connected questions remain. In a relation between two partners, what is the goal of the relation, what kinds of knowledge are diffused, what are the tools used to communicate ? In sum, if the initial and the final knowledge are explicit (in the case of patents), which is really the content of diffused knowledge through the relation among partners ?

The distinction introduced with Polanyi (1966) between implicit and explicit knowledge seems to be accepted by almost interested in the economics of knowledge. An ongoing discussion remains in connection with the dramatically development of ICT : how far knowledge can be codified ? However, if the issue opposes Cowan et al. (2000) and Johnson et al. (2002), they widely accept the following fact : at any moment of time, most economically useful knowledge is a mix of the both implicit and explicit knowledge.

If the distinction is theoretically interesting, it is practically more difficult. So, this assumption leads us to distinguish two characteristics from the process of knowledge diffusion. On the one hand, Lundwall and Johnson (1994) distinguish four kinds of knowledge : know-what, know-why, know-how and know-who. On the other hand, Jensen and al. (2004) distinguish two modes of diffusion according to the object of relation : codification or interaction.

Moreover, the diffusion channel (face-to-face, ICT or both) depends widely on these assumptions. Like proximity, ICT covers a number of platforms beyond Internet and email : collaborative, organizational, storage platforms, etc. These platforms have not the same usages, according to the kinds and objects of knowledge diffusion and the effective proximities.

The goal of this paper is to test the determinants of the knowledge diffusion between partners. We use the annual regional survey "Firms and ICT" addressed by Marsouin in 2006, to a representative sample of private Breton firms from 10 to 250 employees. In this survey, in which firms are questioned on their ICT uses, we added two new entries : proximity and knowledge management of firms partnerships. The added value of this survey is to combine the following three types of information, on firms partnerships : proximities, ICT uses and knowledge management.

The qualitative data collected by this survey enable us to test the validity of some hypotheses on the determinants of knowledge diffusion. More precisely, we first test the assumption that knowledge flow between two firms is a combination of codified and non codified knowledge, and a combination of different type of knowledge (know-what, know-how and know-why). A section of the survey allows us to test the impact of geographical, technological and organizational proximities between firms and their partners on the diffusion of knowledge. Finally, another category of questions let us test the link between the kinds of knowledge diffused and the channels of diffusion (ICT or face-to-face).

For this, we use discrete choice econometric models (multinomial logit). An empirical investigation is undertaken near 348 firms. The results are consistent with the literature : the distance, the virtual communication and the know-what increase the codified knowledge shared among firms, while the real communication have the opposite effect. However, the results do not suggest an opposition between virtual and real communication or between know-what and know-how, but rather a complementarity of these elements. Indeed, more the shared knowledge is know-what, more this knowledge is a complement of others types of knowledge (know-how and know-why), and more the collaboration is inter-regional and funded on virtual communication, and more the shared knowledge is codified.

This paper is organized as follow. Section 2 introduces the hypotheses we test in the paper. Section 3 describes the data on firms relationships we have collected and the methodology we use. Section 4 reports and explain the empirical findings. Section 5 discusses some open empirical issues and possible extensions and offers concluding

thoughts.