Journal of the Korean Geographical Society, Vol.36, No.5, 2001(539~560)

Geographies of Learning and Proximity Reconsidered: A Relational/Organizational Perspective

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학습과 근접성의 지리에 대한 재고찰: 관계적/조직적 관점

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Abstract : This paper aims to critically review the geographical literature on learning and proximity that stresses the role of the regions and geographical proximity in sustaining competitive advantage, and to conceptualize a relational/organizational perspective on the sources of knowledge and learning in the firm. In the first part of the paper, I argue that the geographical literature lacks the deliberate scrutiny of how learning occurs in the firm and where the sources of knowledge and learning come from. Secondly, I attempt to elaborate the concept of proximity through a relational/organizational perspective. Thirdly, I delve into how learning takes place and is realized in the firm through communities in the firm such as communities of practice, epistemic communities and task-force teams and how such communities in the firm generate knowledge and sustain learning by drawing on relational/organizational proximity. This paper concludes by claiming that the sources of learning exist in organizational spaces, with complex geographies mobilizing distributed knowledge and competences and combining varied forms of knowledge beyond the simple demarcation of tacit and codified knowledge.

Key Words : learning, proximity, knowledge, communities of practice, epistemic communities, task-force teams

요약 : 본 연구는 지역 발전과 기업의 성공에 있어 추동력으로써 주장되는 지식과 학습의 근원에 관한 문제에 대한 이론적 고찰이다. 최근 들어, 경제지리학과 인접 사회과학계를 중심으로 지식과 학습의 근원으로써 지역과 지리적 근접성의 역할을 강조하는 연구가 급격히 늘어나고 있다. 그러나, 이러한 연구들은 기업에 있어 학습이 어떻게 발생하고 그 과정이 조직되는지에 대해서, 그리고 그러한 지식과 학습의 근원이 어디에 있는지에 대한 엄밀한 고찰이 부족하다. 이러한 경향성은 기업 조직에서 발생하는 학습의 본질과 그 과정을 오도할 뿐만 아니라, 학습의 근원으로써 지역과 지리적 근접성의 역할을 과장할 수 있는 위험성을 내포한다. 본 논문의 목적은 학습의 지리에 대한 최근의 연구를 비판적으로 고찰하고, 근접성에 대한 개념적 확장 및 조직 학습 이론을 통해 학습의 근원에 대한 관계적/조직적 관점을 이론적으로 구축하는 것이다. 이러한 작업의 일환으로 '실행 커뮤니티(communities of practice)', '인식 커뮤니티(epistemic communities)' 그리고 '테스크포스팀(task-force teams)' 등과 같은 기업조직내 '커뮤니티'를 통해 학습이 어떻게 발현되고, 구축되는지에 대해 고찰한다. 본 논문에서는 이러한 조직형태들을 통해, 분산되어 있는 지식과 역량이 조직의 공간을 통해 결집되고 다양한 형태로 존재하는 지식들이 결합됨으로써 혁신이 달성될 수 있다고 주장한다.

주요어 : 학습, 근접성, 지식, 실행 커뮤니티, 인식 커뮤니티, 테스크포스팀

1. Introduction

Knowledge, learning and innovation become buzzwords in this era as capitalist firms are under pressure to cope with an increasing competition in technology and market. Many argue that the capability to learn competitive knowledge thus is critical for the continuous survival and evolution of the

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firm. A great deal of attention has been paid to explore the source and generation mechanism of learning and innovation. Out of various theoretical perspectives, a knowledge or competence-based approach has been welcomed as a useful framework for understanding the dynamics of learning (e.g. Foss, 1998; Hodgson, 1998). As this approach that conceives the firm as a processor of knowledge and a learning entity sees that knowledge residing in the firm is composed of organizational competences and that the majority of competitive knowledge tends to exist in a tacit form. Its central locus brings to the fore the problem of how knowledge composed of competences is generated, maintained, replicated, and modified. This has direct connection with an issue of learning and its nature.

Learning is associated with the creation and development of competitive knowledge in and outside the firm. However, such learning may not take place in a social vacuum. The process of learning involves not only a cognitive process, manifesting the process of acquiring, exchanging and transferring knowledge in an organizational context (Odgaard and Hudson, 1998), but also a non-cognitive process, which is characterized by unconscious learning (Amin and Cohendet, 1999b; Wenger, 1998). However, whatever its nature, learning should be achieved through social interactions between agents. This recognition implies that the process and outcome of learning are likely to be determined by the characteristics of relational/organizational proximity that binds agents involved in learning process together as well as that influences an ability to mobilize decentralized knowledge and resources.

In recent years, economic geographers have paid much attention to the region as a key source of learning for creating organizational knowledge and competences. The elaboration of their argument stems from the assumption that tacit knowledge is spatially sticky and geographical proximity is, accordingly, central to accessing and acquiring such tacit knowledge. It follows that the centrality of learning should lie in geographical proximity. However, it is problematic that the geographical literature on learning tends to unduly stress the advantage of localized learning in firm competitiveness and the power of geographical proximity in learning. In other words, it lacks the deliberate consideration of how learning takes place in the firm and where the sources of knowledge and learning come from. There is a danger that this tendency is likely to misconstrue the nature of learning which takes place in the firm and overstate the power of geographical proximity and the region as a source of learning.

This paper does not aim to conceptualize the theory of the firm itself, nor provide an overview of the literature on learning and innovation in economic geography. The purpose of the paper is to challenge the received wisdom in economic geography and propose a different point of view on the source of learning. This paper suggests that a relational/organizational perspective provides critical insights into exploring the sources of learning and how learning occurs and is realized in the firm. The first section critically reviews the geographical literature on learning and proximity. In the following sections, I attempt to conceptualize a relational/organizational perspective on the sources of knowledge and learning in the firm, by drawing on theories of the firm and organizational learning. To do this, the concept of proximity is elaborated in order to grasp the nature of learning and its process. In this section, the main point I wish to make is that geographical proximity alone is not sufficient for understanding the nature of learning and thereby the centrality of proximity and learning should be studied along relational/organizational dimensions that go beyond geographical proximity. This recognition leads us to take a closer look at the sources and processes of learning. In the last part of the paper, I attempt to rebuild the relationship between learning and proximity, by drawing on such concepts as *'ba'*, communities of practice, epistemic communities and task-

force teams. Jointly, I try to show how such communities in the firm sustain learning by creating relational/organizational proximity and taking advantage of geographical proximity.

2. A Critical Perspective on Geographies of Learning and Innovation

> *Regions are becoming focal points for knowledge creation and learning in the new global, knowledge-intensive, capitalism. In effect, they are becoming learning regions. These learning regions function as collectors and repositories of knowledge and ideas, and provide the underlying environment or infrastructure which facilitates the flow of knowledge, ideas and learning* (Florida, 1998: 19).

Inspired by the emergence of the learning or knowledge-based economy paradigm (Burton-Jones, 1999; Foray and Lundvall, 1996; Lundvall, 1996), the region has, in recent years, drawn a great deal of interest from economic geographers and regional economists (see, for example, Cooke and Morgan, 1998; Ettlinger, 2000; Maskell, 1999; Maskell and Malmberg, 1999a, 1999b; Storper, 1997). The burgeoning literature on learning in economic geography stresses that the region is a repository of knowledge assets, mostly tacit, which are critical to maintain firm's competitiveness. In other words, the key to corporate success lies in how to best access, disseminate and internalize such tacit knowledge within the organization. Since such tacit knowledge is spatially sticky, it logically follows that it can be best accessed, learned and finally mastered on the basis of face-to-face interactions at the local or regional scale. In the end, it sees that geographical proximity is a crucial dimension in effectively learning such tacit knowledge.

Geographers often take some remarkable examples of advanced industrial districts, such as Silicon Valley, Baden-Württemberg and the Italian industrial districts, in order to justify the role of geographical proximity in learning tacit knowledge. Hence, the competitiveness of such regions is driven by localized learning and innovative capabilities based on 'relational assets' and 'untraded interdependencies' (Amin and Thrift, 1997; Cooke and Morgan, 1998; Storper, 1997). This highlights that relational assets, which involve locally common cultural and behavioral norms incrementally created by trust and reciprocity between local institutional agents, play a fundamental role in governing social economies of the region.

Jointly, it is often argued that the source of competitiveness in such regions lies in the place-specific institutional mechanisms of learning, characterized by the ability to sustain flexible adaptation to environmental changes or even reflexive reorganization. These may be the characteristics of places showing 'best practices' in a global economy. They are often called 'learning regions' (Florida, 1995, 1998; Morgan, 1997), reflecting the distinction between such regions and Fordist mass production regions.[1] Firms in learning regions that are replete with the assets which support innovation and learning information, knowledge, technology, ideas, training, and skills gain dynamic efficiency through the access they enjoy through networks of interdependence with other firms, formal institutions of learning, and common conventions and understandings that surround firms (Amin and Cohendet, 1999a: 89).

In doing so, geographical proximity is regarded as critical for accessing localized relational assets as well as fostering untraded interdependencies. Harrington et al. (1999) argue that geographical proximity among firms, which are particularly engaged in industrial sectors relying on specialized information or skill or rapidly changing innovations, facilitates the frequent interaction, both formal and informal, that engenders the social virtues of trust, co-operation, and exchange of information (tacit and explicit) necessary for success. Of course, the possibility has been acknowledged that this logic can only apply when the region or locality

shares the strength of its 'untraded and traded interdependencies' between local economic institutions and has a richness of valuable (tacit) knowledge (Hudson, 1999; Malecki, 2000; Storper, 1997).

However, reasoning behind the logic underlying these arguments can be questioned. Contemporary firms operate under pressures with uncertainty created by rapidly changing environments and the complexity of reality. These competition environments require firms to better learn and adapt than competitors (Kanter, 1989; Thrift, 1996). They force them to use any kind of knowledge, to make any kind of alliances and to go to any region as far as they can. Nevertheless, the recent geographical literature on learning and innovation tends to overstate the power of geographical proximity and the region as a source of learning (see, for example, Asheim, 1999; Braczyk, Heidenreich and Cooke, 1998; Keeble and Wilkinson, 1999; Malmberg and Maskell, 1997; Maskell and Malmberg, 1999a; Simmie, 1997).[2] Moreover, it lacks hard empirical evidence as to how firms learn. As pointed out by Glasmeier and Fuellhart (1996):

> Research and writing on firm learning primarily emphasize either the internal or external environment of a firm. Far less attention is paid to the intersection between the two that is, the processes by which changes in the external environment are recognized, identified, and internalized by the firm in a way that maintains or even increases competitive position. Although geographers, planners, and regional economists have explored this intersection, there has been a tendency to reduce the problem to either (a) descriptions of archetypal situations in which it is presumed that firms learn through proximity, and therefore firms found in proximity to one another have a higher propensity to learn; or (b) a highly abstract theoretical discourse that renders conceptual operationalization impractical.

In the same context, Oinas (1999) also claims that the geographical literature on learning lacks research on actual learning processes to prove whether learning is localized or takes place in a corporate hierarchy or anywhere else. This illustrates that there is a need for more scrutiny on the perspective that stress the advantage of localized learning. Let me assume that it is the case that firms operating in a certain place are more competitive. If so, is this the result of learning local tacit knowledge? Is such local tacit knowledge composed of strategic assets that enable local firms to obtain competitive advantage? Can tacit knowledge secure firm's competitiveness in an era of technological complexity and environmental uncertainty?

However, there is a growing literature arguing that in this era, local tacit knowledge and incremental learning are no longer sufficient for securing firm's competitive survival. According to Amin and Cohendet (1999a), business networks largely dependent on local tacit knowledge and incremental learning may prove to be inadaptable in the face of radical shift in markets and technologies. They assert that especially for globalized large firms, the key problem is not so much how to acquire localized tacit knowledge or specialize in one form of knowledge, but rather how to mobilize and integrate distributed forms of knowledge whether it is tacit or codified. The question raised by Amin and Cohendet is convincingly supported by some case studies. Sternberg and Arndt (2000) investigated the influences of the region on the performance and capacity of firms' innovation. According to the study, large firms in industrial clusters have little to do with the region in the way of learning and innovation behavior, and even small firms in high-tech industrial clusters dominated by a handful of large firms are little influenced by regional factors.

Oinas (1999) also insists that firms tend to show the strong connection with knowledge sources outside the local in order to sustain learning and innovation. As firms tend to strategically make a huge effort to avoid leaking out critical knowledge and competences, localized sources of knowledge is likely to be non-strategic assets that could be partly helpful in incremental innovations. Similarly, Amin

(2001a) stresses that geographical proximity does not imply association and interaction, as access to the sources of knowledge depends on the capability of the firm to mobilize a variety of contact networks to establish economic links with firms, markets, and institutions located elsewhere nationally and internationally. Reliance on face-to-face contact and local knowledge for market opportunities may progressively decrease, once firms sustain the routinization of local proximity into relational and institutional proximity, through corporate and associational belonging and cultural enrolment, and through visibility, trust and emotional closeness enabled by virtual and transport connectivity.

A survey by Jones (2000) on the effect of local networking on the innovative performances of firms in London disproves the recent main stream research which argues the advantage and potential of localized interactive learning between local firms. The survey convincingly suggests that regions, in particular large cities, should be seen less as a networking mediator for the localized learning of tacit knowledge than nodes to access to business services such as administrative and legal services and financial institutions; formal institutions or facilities for industrial activities such as R&D centers and business training institutes; multiple-layered labor market pool from technicians to R&D engineers. Coincidently, Glasmeier and Fuellhart (1996) also argue that, while agglomeration economies certainly promote incremental or routine learning, their impact on strategic or non-routine learning is less clear, because it might be hypothesized that truly strategic learning results more from a hierarchical diffusion of knowledge that transcends the local. Cohendet et al. (1999) go so far as to suggest a convergence between localized and globalized networks of learning, by showing that in contrast to claims asserting the superiority of local tacit knowledge, large multi-locational firms are capable of perfectly combining codified and tacit knowledge by developing IT-based communication systems that enable to integrate localized competences into a frame of interactive learning.

These theoretical and empirical studies all dissent from the current trend in geographical literature by questioning the power of geographical proximity and the region as a source of learning. These are signals for notifying that it is time to reconsider the role of proximity and place in corporate learning to avoid a possible error through geographical hyperbolism which such logical reductionism may result in. However, this is not to say that learning has nothing to do with space and place. As proved in a variety of studies, certain places that are replete with the sources of knowledge provide clustered firms with heightened opportunities to learn. Geographical proximity can also be, to a greater or lesser extent, helpful in accessing to the regional sources of learning.

In a nutshell, the important point is that geographical proximity itself does not guarantee that learning processes are initiated and made. Learning is not given and does not lead to a uniform outcome. Rather, learning is initiated and realized through complex and multi-faceted organizational processes across space, beyond a restricted place. Corporate learning is a product of complex human relationships and social interactions surrounding firms. The effectiveness of learning is likely to depend on the quality of social interactions, the nature of learning itself and the nature of ties among agents, regardless of whether it is collective or individual. Therefore, it is right to see that geographical proximity is only one aspect of factors that influence wider socio-cultural and institutional processes, which surround organizational learning. Understanding the process and mechanism of learning needs to start from unravelling the corporate contexts in which learning takes place. The following section attempts to conceptualize the concept of proximity, with focusing on relational and organizational dimensions.

3. Learning and Proximity: A Relational/Organizational Perspective

1) Understanding the concept of proximity relationally

By definition, the term 'proximity' is referred to as the state of being close or near when describing a relation between agents. Nevertheless, it would be wrong to see this term as indicating simply the spatial. The concept of proximity encompasses multi-dimensional aspects that mediate and influence learning between agents. Agents and groups may be close not only territorially, but also relationally, organizationally, institutionally and so on. Proximity should thus signify much less the spatial interactions *per se* than the mix of situated culture and institutions that characterizes the context and facilities communication, cumulative informative exchange and learning (de la Mothe and Paquet, 1998). In this context, proximity is seen as defining the web of complex human relationships and social interactions. If we recognize that learning reflects the dynamic process of social interaction, the focus should lie on examining such processes. In other words, it should highlight the role of relational dimensions in learning.

As repeatedly mentioned above, corporate learning involves complex social interactions between individuals, and across functional boundaries or a firm boundary. Relational proximity refers to the nature of the relationship between individuals, members of a group, or groups. This can be sustained through common language and culture, mutual trust, mutually respected norms of behavior. Thus, the extent to which agents are proximate relationally seems to relate to the creation of social capital. The concept of relational proximity involves not only informal relationships between individuals, such as informal networks, but also formal relationships between agents who belong to a purposeful organization. Meanwhile, the concept of 'organizational proximity' is referred to as a coordination mechanism that binds individuals engaged in a purposive activity together (Blanc and Sierra, 1999). Thus, firms try to establish common codes of coordination and communication to facilitate social interactions, while avoiding the possibility of mismatch or conflicts in communications between members. Conventionally, organizational proximity applies to intra-firm relationships. But, organizational proximity is required to coordinate inter-firm relationships, such as user-producer relations (Blanc and Sierra, 1999). In what follows, I attempt to elaborate relational/organizational proximity through the concepts of cultural proximity and cognitive proximity.

2) Cultural and cognitive proximity

Organizational proximity can be facilitated when organizational members share common cultural attributes. Therefore, cultural proximity is regarded as crucial to sustaining organizational proximity. The term 'culture' refers to the conventional ways of doing things among people or within the organization, and is shaped by the way people share common norms, values, language and understandings over time. Culture is created at multiple levels, from small group to organization or society, and beyond, and levels usually overlap. Cultural proximity provides members of organization with a common perspective. Thus cultural proximity plays a role in increasing common understanding among members. This is not only important for facilitating collective learning with methods such as informal dialogue and interactive communication, but is also conducive to improving the capacity to solve certain problems faced by organizations.

Of course, the benefits of cultural proximity can be promoted by maintaining geographical proximity between agents. Meanwhile, long-term co-location between agents is likely to increase the potential for sharing cultural proximity between them. Thus both dimensions of proximity would be complementary. Let us suppose a case where two agents are geo-

graphically separated from one another, but share the same culture at the organizational or national level. Thanks to a sense of common understanding and inclusion between agents, they can continue to manage their relationship and sustain problem-solving, learning and adaptation more effectively, partly with the help of virtual proximity via cutting-edge telecommunication methods such as e-mail and teleconferencing.[3] However, this does not seem sufficient. The degree of interactions and common-understandings appear to be, to a greater or lesser extent, limited by geographical proximity. As recently argued by Asheim (2000), social capital that is incrementally produced from mutual trust and the sharedness of norm, common belief and culture and required to maintain long-term reciprocal and synergetic relationship may, to a large extent, be built through close relations based on direct interactions and communications. In this sense, cultural proximity seems likely to be heightened by geographical proximity through face-to-face contacts.

The cultural approach to proximity helps us to understand how organizations or communities within the firm gain relational/organizational proximity, while the cognitive approach to proximity also offers an insight into achieving a balance between sustaining organizational ties for a unity and maintaining novelty or radical innovation. The concept of cognitive proximity in the study learning and innovation is influenced by a Neo-Schumpeterian evolutionary perspective. This perspective stresses that variety (or diversity) can play a crucial role in creating learning and innovation needed for sustaining the dynamic evolution of the firm (Metcalfe, 1998; Saviotti, 1996). It emphasizes the role of cognitive and behavioral diversity in improving the learning capability. The term 'cognition' refers to the mental action or process of acquiring knowledge through thought, experience, and the senses (Hayes and Allison, 1998). Nooteboom (1999a, 1999b, 2000) introduces cognitive proximity as a means of explaining the dimension of learning and innovation in the relationships between inter-firm alliance partners.

The concept of cognitive proximity is the opposite to that of cognitive distance. This conception helps us to understand the ways in which the cognitive distinction between agents affects the performance of learning and innovation. It emphasizes that the more cognitive distance between agents, the more the possibility there is of creating novelty or creative destruction. That is because cognitive distance is more likely to provide the opportunity for agents to access fundamentally new ideas and insights from other sources. At the same time, the less cognitive distance there is, the more the possibility to generate new insights and knowledge is constrained.

There is a similar point of view on the benefit of cognitive distance which states that agents have distinct cognitive structures while sharing cultural proximity, the potential for organizations to improve learning and problem-solving capabilities by mobilizing cognitive diversity may be increased. If agents are culturally close to one another, there is the possibility that they will show a similar structure of cognition and perception. Cognition tends to be contingent upon interpretative contexts between people, but it may be more or less similar according to cultural proximity, which involves shared language, culture and experience (Nooteboom, 1999a). Conversely, cognitive proximity is not necessarily similar between people who share cultural proximity. Nevertheless, differences in the rationality of cognition and behavior among people or sub-groups can, to a degree, be coordinated and governed by cultural proximity.

In sum, cultural and cognitive proximity between members allows in-depth, two-way communication and encourages the exchange and sharing of information and knowledge by drawing on trust, common understanding and sense-making. Therefore, it facilitates continuous learning and incremental innovations within a given framework. Meanwhile, there is the danger that a cultural and cognitive identity

may prevent a firm or a group from adapting to radical changes in environment, by preventing it from taking up creative ideas and different points of view. In this context, the crucial point for continuous adaptation is a firm's capability to manage organizational proximity and mobilize cognitively distant agents in order to create novelty. In the following sections, I explore how learning and knowledge creation take place in the firm by analyzing proximities along a relational/organizational dimension.

3) '*Ba*' as relationally defined spaces of knowledge creation and learning

The previous discussion shows that different forms of proximity are, to a greater or lesser degree, interwoven in the framework of relational/organizational proximity. The combined recognition of cultural and cognitive proximity in learning enables us to recognize the importance of relational/organizational proximity, when conceiving learning as a social and interactive process. This dimension of proximity, seems to be promoted, or influenced, in part by the dimension of geographical proximity.

Nonaka and Takeuchi's (1995) model of knowledge conversion gives a fascinating illustration of how these forms of proximity are interwoven. Their model is concerned with theorizing intra-firm learning processes, centered on the process of knowledge creation. They see that tacit knowledge in and out of the firm can be a basic element in promoting corporate competence and competitiveness. The key point of the model is as to how such competitive knowledge is socialized (tacit to tacit), externalized (tacit to codified), combined (codified to codified) and internalized (codified to tacit) within an organizational boundary, and how this cycle of knowledge conversion process is repeated through a feedback process. It is argued that tacit knowledge can only be acquired through interactions between individuals. Thus the process of learning consists of a series of learning processes through direct observation, imitation, practice and hands-on correction on the basis of face-to-face contact. This process highly relies on how people or organizations form relational ties and maintain reciprocal relationships. Therefore, building a milieu of trust and mutual engagement among agents is a precondition. In this context, geographical proximity is viewed as a partial support for reproducing and reinforcing such milieu.

Going one step further, Nonaka and his Japanese colleagues have attempted to elaborate on the learning process of organizational knowledge, drawing upon the concept of *'ba'* (Nonaka and Konno, 1998; Nonaka and Toyama and Konno, 2001). I suggest that this concept is highly helpful in defining the relationship between proximity and learning. The Japanese word *'ba*(場)' roughly means 'place' in English, but necessarily goes beyond what place implies. The concept of *'ba'* is defined as a *shared space* where learning takes place. It can be a physical space (e.g. office and dispersed business space), a virtual space (e.g. e-mail and teleconference), a mental space (e.g. shared experiences and ideas), or any combination of them. This definition of *'ba'* shows that a key to forming *'ba'* is 'interaction', which is considered to be influential in the process and outcome of learning. Nonaka, Toyama and Konno (2001) put it:

> *Ba* is the context shared by those who interact with each other and, via such interactions, those who participate in ba and the context itself evolve through self-transcendence to create knowledge (p.22).

They subsequently try to explain the processes of knowledge creation and learning, drawing on four types of knowledge spaces, *ba* (*ibid.*: 24-26). First, 'originating *ba*' is the place where individuals share feelings, emotions, experiences, and mental models, and is a knowledge space where 'socialization process (tacit to tacit knowledge)' takes place. Thus, the key to knowledge creation is physical, face-to-face interaction. Second, 'dialogue *ba*' is the place where individuals' mental models and skills are converted into common terms and concepts. 'Dialogue

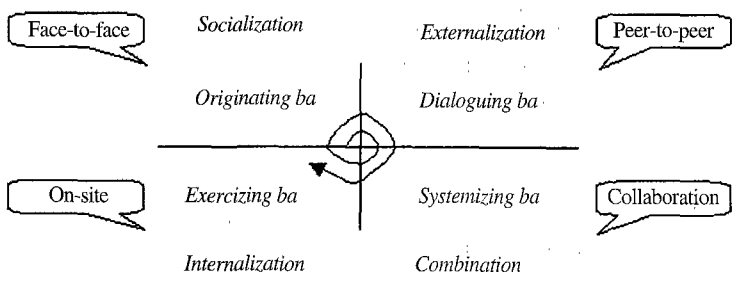

Figure 1. Four kinds of knowledge spaces and knowledge creating process

Source: adapted from Nonaka, Toyama and Konno (2001).

ba' corresponds to the 'externalization process', which occurs in the codification of knowledge. Therefore, the sharing and articulation of knowledge through dialogue between participants, and the further articulation through reflection are critical. This implies that 'dialogue *ba*' seems likely to be effectively sustained when the organization deliberately creates 'knowledge communities', such as project teams, strategic communities, or cross-functional teams. Third, 'systemizing *ba*' is a virtual place rather than real time and space. It offers a context for the 'combination process' by which new systemic, explicit knowledge is created through the combination of various elements of explicit knowledge. This type of *ba* is largely supported by the utilization of ICTs (Information & Communication Technologies), such as on-line networks, databanks, documentation and groupware. Finally, 'exercising *ba*' is a place where 'internalization' takes place. Continuous learning and self-refinement through on-the-job training or peripheral and active participation facilitate the conversion of codified knowledge into tacit knowledge.

The concept of *ba* signifies that spaces of learning exist in any form of place where social interactions for learning take place. It goes beyond a physical space. It directly connotes the power of relational/organizational proximity. To a degree, relational/organizational proximity can be sustained at a distance with the help of ICTs methods such as e-mail, telephone and teleconferencing. However, it is not to say that geographical proximity is not important in learning. Rather, I would stress that geographical proximity can be a useful means of gaining rich relational/organizational proximity. The effective combination of different forms of proximity may enable the people involved to better understand, make sense of and learn from one another in mutual and recursive ways. Nevertheless, it should be noted that geographical proximity without relational/organizational proximity is like an empty bowl. The interpretation of the relationship between proximity and learning, discussed throughout this section, emphasizes the social and interactive nature of learning, which takes place in the firm.

4. Learning and Communities in the Firm

Following the conceptualization of the relationship between proximity and learning, this section places its focus on 'organizational forms' or 'knowledge communities' that occur learning and knowledge creation in the firm. Although there are various kinds of communities in the firm, this section deals with informal forms of organization, including communities of practice, epistemic communities and task-force teams. Although each of them is distinctive in terms of its origin and purpose, I suggest that these communities can be vital sources of learning.

Taken together, this section tackles a matter of proximity in learning through communities in the firm. Particular emphasis is given to how communities in the firm create and develop relational/organizational proximity through space and place in organizing their own activities.

1) Learning through communities of practice

In recent years, some learning theorists have convincingly begun to argue that organizational learning does not necessarily take place by conscious design or formally recognizable cognitive frames (Amin and Cohendet, 1999b; Brown and Duguid, 1991; Fox, 2000; Lave and Wenger, 1990; Wenger, 1998). This assumption can be found in the literature that deals with particularly on the success of Japanese firms (see, for example, Aoki and Dore, 1994; Kenney and Florida, 1993). It is argued that competitive Japanese firms have tended to improve knowledge and skills (*Kaizen*) and even sustain technological and organizational innovations, through daily common interactions, communications and informal meetings between peers in workplace. In a similar context, Amin and Palan (2000) argue that in addition to formal source of learning such as R&D, daily practice among individuals and groups within firms can also be the vital source of learning, through forms of knowledge -mostly tacit knowledge -generated in practice, social interaction and action, via communities of practice within firms.

In fact, every organization is made up of many communities of practice in which learning is a matter of new meaning and emergent structures arising from common enterprise, experience and sociability -learning in doing (Wenger, 1998; Amin and Cohendet, 1999b). For Wenger and Snyder (2000), communities of practice are defined as groups of people informally bound together by shared expertise and passion for a joint enterprise -for example, engineers engaged in deep-water drilling consultants who specialize in strategic marketing, or frontline managers in charge of check processing at a large commercial bank. Thus, communities of community are homogeneous groups that are composed of people engaged in the same practice in regular communication with others. They describe the common features of communities of practice.

> Some communities of practice meet regularly - for lunch on Thursdays, say. Others are connected primarily by e-mail networks. A community of practice may or may not have an explicit agenda on a given week, and even if it does, it may not follow the agenda closely. Inevitably, however, people in communities of practice share their experiences and knowledge in free-flowing, creative ways that foster new approaches to problems (pp. 139-140).

It implies that the source of learning in communities of practice comes from experience, interaction, and shared meaning between members of the community. This view on communities of practice allows us to understand the nature of learning as a multiple, ongoing, distributed process (Amin and Cohendet, 1999b) as well as a socially constructed process (Brown and Duguid, 1991; Wenger, 1998). In detail, the nature of learning requires participation in the doing, the sharing of perspectives about the doing itself, and the mutual development of both the individual and the collective's capabilities in the process (Lave and Wenger, 1990). Within communities of practice, people share tacit knowledge through dialogue and exchange ideas about work practice and experiment with new methods and ideas (Hendry, 1996). Informed dialogue among members is central to the on-going co-evolution of meaning and capabilities, because the work itself is central to a community of practice, and because meaning, purpose, and learning are tied to the doing (Liedtka, 1999:7).

Communities of practice differ from classical communities, implying formal forms of organization, such as functional groups (see Table 1). Functional groups refer to organizational units with specialized domain of work that are compartmentalized by the nature of labor (for example, manufacturing, mar-

keting, R&D and so on). Members of a functional group are composed of homogeneous agents sharing a disciplinary specialization. By contrast, communities of practice are informal. They are not created, but evolve through self-organizing process based on mutually committed interactions. Once again, Wenger and Snyder (2000) explain:

> Membership in a community of practice is self-selected. In other words, people in such communities tend to know when and if they should join. They know if they have something to give and whether they are likely to take something away. And members of an existing community, when they invite someone to join, also operate on a gut sense of the prospective member's appropriateness for the group (pp. 141-142).

Communities of practice exist in the minds of their members in the connection that they have with each other and with the larger institution in which they reside (Brown and Duguid, 1991). Thus the creation of community resides in a set of shared meanings that are intimately bound up with the practice of the work itself, the purpose that such work serves and for whom, and the on-going development of its individual members. Within the firm, communities of practice thus represent in hybrid groups of overlapping and interdependent communities (Brown and Duguid, 1998). Knowledge, rules for action and culture can be spread at the level of wide-organization, through vigorous links and communications between communities of practice.

Basically, communities of practice are created and managed as a means to enhance individual competences of the community members (Cohendet, Creplet and Dupouet, 2000). However, communities of practice can also make a contribution to shaping new problem-solving routines in the face of the context of radical learning. This implies that communities of practice can be the sources of radical innovation in response to dramatic events as well as incremental learning. Hutchins (1996) gives an example of adaptation to radical situation, by showing how a navigation team, facing a critical moment in the middle of being on a cruise, arrives at a new stable procedure. The story is summarized as follows:

> Following a chaotic and unsuccessful search for a solution through experiments and computational and textual alternatives, the team developed an answer through doing. As local tasks were found for individuals distributed across the ship, the ensuing sequence of actions and conversations, drawing on experience and experimentation, led to the construction of a solution based on trial and testing. On this occasion, a solution was found on time (Amin and Cohendet, 1999b: 18).

Here, the navigation team looks like a community of practice and successful adaptation is driven by learning in doing, recursive communications and trial and testing between team members. Hutchins' study suggests that radical innovations can be attained through not just learning by design, but also learning in doing. Let me describe in more detail the process of building communities of practice and the learning process, through three infrastructures of learning.

When trying to establish new codified knowledge in the form of new technology or machine, some of people related to this work may feel a need for voluntarily creating a discussion group or a study group. Perhaps, most of the people who intend to participate the community emerge from common work practice and are interested in sharing and learning useful knowledge. In managing the community, participants may know tacitly rules and norms that are required to shaping mutual engagement among them. 'Mutual engagement' is a prior condition that allows the community to accept a variety of cognition and interest; to do things they seek to do together; to have mutual value, trust, reciprocity and sharedness; and to manage their community. From this, the community members may come to recognize the basic of what should do or not, why to do.

The second stage is 'joint enterprise' which implies to be begun with practices in the community in reality. Doing together need to reflect multiple

voices among members in a reflexive or recursive way and to negotiate those. Things agreed might be continued through experimental and reflexive processes bringing together the ways such as trial and error, continual sense making, understanding and reconciliation. For the time, some may secede from the community and simultaneously new members may come. In doing so, the community may have opportunities to renovate, as they may bring new experience and knowledge into the community. They can be 'knowledge brokers' between different communities. This is the reason why boundary blurring is important for learning and innovation. In doing so, mutual accountability will be created and local code of practice will be made.

In the next stage, both visible and invisible performances that are experienced and shaped through the process of materialization may need to be shared as well as codified among members. In this sense, the third stage, what might be called 'shared repertoire', is crucial in continuing a learning community and leading to innovation. To share performances and outcomes they might draw upon stories, artifacts, discourses, concepts, historical events, and discourses. These can be shared or publicized via cutting edge ICTs, such as databank and the Internet. But, it needs more. In limited parts, some of their performances and outcomes are necessary for publicizing for people beyond the boundary, like other communities of practice or the rest of the workers of the firm. They may talk about what is wrong or good in doing something. By that stage, the capability of the organization to solve problems will be increasingly promoted. That stage will also help diffuse knowledge within the firm. Ultimately, new routine is successfully embedded in the organization. Although this process described above is assumed and interpreted in a quite simplified manner, it helps us to understand the role of communities of practice in learning.

The recursive processes of learning in communities of practice can be enriched by the concept of proximity. Communities of practice appear to be a homogeneous group that is composed of people who share common practices with similar cultural and cognitive proximities. Etienne Wenger (1998) refers to the role of geographical proximity on learning in doing:

> People who have related backgrounds are capable of creating a community of practice with less mutual engagement. If they are geographically proximate to one another, potential of learning may be further increased (p. 130).

There is no doubt that geographical proximity is, to some extent, conducive to the creation of mutual engagement between members of the community, especially at the early stage of its formation. However, it needs to avoid seeing geographical proximity as either a sufficient condition or a requisite for steering communities of practice. The process of building soft infrastructures in communities of practice, indicating mutual engagement, joint enterprise and shared repertoire shows well as to how communities of practice obtain organizational proximity. The increase of mutual engagement through doing things together and mutual relationships may further lead participants to promote relational/organizational proximity. The process of learning that occurs through ongoing practice and draws on social energy and power generated through interaction in joint enterprises between participants leads to the formation of a local code of practice and a regime of mutual accountability. Once relational/organizational proximity is sustained and a shared repertoire is created, knowledge sharing and learning between members of the community can be increasingly facilitated through either face-to-face contacts or distant contacts via virtual proximity, drawing on communication technologies such as teleconferencing and email.

However, it should be noted that communities of practice do not always play a role as a key agent that induces radical innovations nor can be created, or work well, in all firms. Basically, a community of practice is a kind of knowledge community where

members learn knowledge embedded in the community. Thus, communities of practice are more likely to contribute to improving existing routines through incremental learning and an exploitation of best practice rather than exploring new routines or radical innovations (Cohendet and Llerena, 2001). Jointly, communities of practice may work well in firms that are characterized by corporate cultures, emphasizing diversity, autonomy, and individual empowerment. Communities of practice would not fit with some cultures and would not be a good means of dealing with more urgent, difficult matters of business change (Davenport, 2000: 9). To deal with more uncertain or complex issues, alternative communities are often organized in the firm. In what follows, I suggest two kinds of communities; epistemic communities and project (or task-force) teams.

2) Learning through epistemic communities

The original concept of 'epistemic communities' has been developed in international relations, dealing with the decision-making process of international environmental issues. In this realm, the concept is defined as 'a network of professionals with recognized expertise and competence in a particular domain and an authoritative claim to policy-relevant knowledge within that domain or issue-area' (Haas, 1992: 3). Epistemic communities are similar to communities of practice, for example in terms of the process of interaction between members and the attitudes and behaviors of members. However, epistemic communities differ from communities of practice in many ways. Epistemic communities are intentional and strategic, because they are organized to collectively solve a certain problem or sustain knowledge creation in a specific area. In this sense, Storck and Hill (2000) call these communities 'strategic communities' to emphasize the strategic nature of this type of knowledge community.

Another important dimension to distinguish it from communities of practice is that epistemic communities have a commonly understood procedural authority, which is needed for effectively achieving the objective. Epistemic communities can be established when members of a community have procedural authority which every member understand commonly and accept (Cowan, David and Foray, 1999). The procedural authority conveys the idea of a progress towards a cognitive goal set by the community, becomes a guideline to manage a community, and thereby plays a key role in holding the community members together (Cohendet, Creplet and Dupouet, 2000). The existence of procedural authority and the strategic nature of the organization imply that in epistemic communities, autonomy and identity tend to be weaker than in communities of practice.

The goal of epistemic communities does not lie in the achievement of individual interests or the improvement of individual competence. Rather, epistemic communities are centered on the achievement of a strategic goal and the codification of knowledge they intend to create. Members of an epistemic community are bound together by their commitment to enhance a particular set of knowledge (Cohendet, Creplet and Dupouet, 2000). The community members are composed of professionals with recognized expertise and competence who are fit for a strategic goal, beyond geographical and functional boundaries. In this sense, this type of learning community provides the potential for not only making great use of dispersed human resources and knowledge within the organization but also utilizing the benefits of communities of practice in terms of learning and knowledge creation. Epistemic communities enable firms to deal with continuous changes in business environment. More crucial is that epistemic communities seem to be better to handle unstructured problems than communities of practice.

As communities of practice are homogeneous groups that are composed of people engaged in the same practice in regular communication with others,

it could be argued that this kind of knowledge community draws on the advantage of cultural and cognitive proximity. Meanwhile, epistemic communities are heterogeneous groups that are composed of individuals who are characterized by distinctive cognitions and cultural backgrounds. Thus, it is crucial to bring together the benefits of cognitive distance (diversity) and cultural proximity (identity). To do this, epistemic communities are required to establish a procedural authority, which is regarded as a coordination mechanism that reconciles cognitive diversity and cultural identity. This is a prerequisite for organizational proximity. The cognitive-cultural distinctions make it more difficult for members of an epistemic community to sustain organizational proximity than for members of a community of practice. This means that epistemic communities might require face-to-face interactions on a regular basis in order to reconcile cognitive differences and thereby connect new insights to radical innovations. Based on an example of Xerox, which established a strategic community -called the Xerox Transition Alliance- organized for the corporate-wide improvement of IT infrastructure, Storck and Hill (2000) argue:

> Alliance members believed that almost two-thirds of the group's value was derived from face-to-face networking at the regular meetings. One Alliance member who had an especially expensive and arduous journey attended every other meeting and participated by audioconference when he could not attend in person. The importance of maintaining personal relationships in this way also distinguishes the Alliance from other high-performing teams, for which research indicates that physical proximity is not critical. Although face-to-face meetings are not prerequisite means of interaction for a community of practice, most communities do work this way (p. 68).

We need to read their statement carefully, because it is dangerous to view it as advocating the advantage of geographical proximity without considering relational/organizational proximity. The statement illustrates the process of creating relational/organizational proximity through the mobilization of distant actors who are interested in a particular problem-solving beyond delimited places and boundaries. As stated by Amin (2001b), this stresses the centrality of another geography, one that replaces predefined places and boundaries with a geography of sites, containments and contours that unfolds through purposeful acts. In other words, it emphasizes the role of geographies of circulation and mobility-including, for example, conferences and meetings through both a short and long haul journeys- in learning through knowledge communities. In short, it could be argued that reciprocal and interactive learning and radical innovations in epistemic communities can be achieved by effectively combining these kinds of multiple proximities centered on the relations of actors.

3) Learning through task-force (or project) teams

A task-force (or project) team is one of the communities in the firm, which is committed to the strategic production of knowledge and the way of solving a specific problem in a given point in time. This community is an ad hoc temporary organization that is designed to accomplish a specified task. As task-force teams are goal-oriented in nature, they are managed under clear-cut time limitation. Task-force teams are heterogeneous groups of employees with professional knowledge in a given task selected from different teams or departments. Members of the task-force team attempt to mobilize individual knowledge and competences in order to achieve the goal of a given task within a certain time frame.

The formation of the task-force team is likely to induce in a strategic way the benefits of diversity in evolutionary terms. An evolutionary perspective sees that the assets of organizational competence and the learning capability tend to result from cognitive diversity among organizational members (Cohendet and Llerena, 1997; Metcalfe, 1998a; Saviotti, 1996). This implies that task-force teams are

a kind of organizational tools that try to create hybrids of the different communities (Cohendet and Llerena, 2001). It seems that members of the task force team who come from different units of organization are characterized by having distinctive cognitive frames, as they are specialized in distinctive fields of work with different interests. Sometimes, this cognitive distance is likely to bring about difficulties deriving consensus and identity between members of the team. Nevertheless, once they build mutual trust and establish common identity and consensus, the task-force team can be a driving force of innovation. This nature of social relationships between team members reflects the characteristics of communities of practice and, as a result, involves the collateral effect of the creation of knowledge by creating quasi-communities of practice.

However, there are fundamental differences between task-force teams and communities of practice. As communities of practice do not have a strategic objective and obligation, their capabilities to mobilize resources most appropriate for seeking radical learning may be restrictive. Meanwhile, the task-force team binds members of the team together through a given goal and accountability. In addition, its members are a group of people who have the best knowledge in relation to the project. Thus, this form of organization is relevant to make good use of individual knowledge and competences decentralized across organizational boundaries.

In many ways, the nature of project or task transcends boundaries of demarcated formal work groups. In this case, traditional work groups seem to be irrelevant for mobilizing knowledge and competences decentralized across overall boundaries of formal organizational units. It has been argued that the bureaucratic nature of modern large business organizations is likely to be inflexible and inadaptable in an age of rapidly changing market and technology (Nonaka and Takeuchi, 1995). In this context, organizing task-force teams are seen to be effective means to sustain strategic learning, which is in need of mobilizing efficiently decentralized competences and sustaining quickly a strategic goal.

As with the other communities descrubed above, the activities of task-force (or project) teams can also be promoted by drawing on a property of proximity. I argue that the task force teams seek to draw more on geographical proximity to promote organizational proximity than any other communities in the firm. Large multidivisional firms attempt to make use of the advantage of proximity to organize and operate task force teams, which require boundary-spanning co-working activities. Such a strategy often takes the shape of establishing an exclusive site designed for only *ad hoc* task force activities. Its aim is to not only promote the efficiency of a task force activity, but also to avoid the possibility of formal work organizations intervening in this activity. The task-force team is usually allowed freedom and autonomy in its activity.

A task-force team is composed of members who have different expertise and belong to different teams. While such a nature of teamwork may offer a chance to utilize the advantage of cognitive distance or variety, its relational/organizational proximity is questionable. To overcome this problem and steer task-force activities, some firms create a purpose-specific physical space. This is what is known as the co-location strategy. This kind of strategy tends to be frequently sought in order to effectively undertake projects or tasks, which require to mobilize a variety of expertise and knowledge. A new product development project is the best example to show the accomplishment of a task through co-location. The co-location strategy is deliberately seeks to reduce the period of the development cycle of a product through techniques of simultaneous engineering. But it also allows to decrease conflicts and mismatch, and to mobilize distributed or separated competences of tacit knowledge in a coherent way. DiBella, Nevis and Gould (1996) illustrate a co-location strategy by FIAT, an Italian car manufacturer in the process of developing new product:

Table 1. A typology of communities within the firm

	Functional groups	*Project teams*	*Epistemic communities*	*Communities of practice*	*Informal networks*
Goal	To deliver a product or service	To accomplish a specified task	To deal with unstructured problem or produce knowledge	To develop members' capabilities; To build and exchange knowledge	To collect and pass on business information
Membership	Everyone who reports to the group's manager	Assigned by senior management	Defined by organizational function, but chosen by individuals whether to be active or not	Members who select themselves	Friends and business acquaintances
Agents	Homogeneous	Heterogeneous	Heterogeneous	Homogeneous	Heterogeneous
Rules	Manifest formal rules	Manifest regulation and obligation for action	No regulation, no obligation, but manifest procedural authority	No regulation, no obligation	No regulation, no obligation
Driving force that holds it together?	Job requirements and common goals	The project's milestones and goals	Procedural authority or its own governance processes	Passion, commitment, and identification with the groups expertise	Mutual needs
Duration	Until the next reorganization	Until the project has been completed	Normally until the common goal has been finished but as long as the community want to continue their activities	As long as there is interest in maintaining the group	As long as people have a reason to connect
Knowledge production and the mode of learning	Unintended Learning by doing	Unintended Learning by interacting between members	Intended Learning by searching, Learning by interacting	Unintended Learning in doing/working	Intended or unintended Dependence on social ties and intention to learn and share knowledge

Sources: based on Wenger and Snyder (2000); Cohendet, Creplet and Dupouet (2000); Storck and Hill (2000)

New product development teams work together in 'co-location' in common, open work areas to facilitate communication and co-ordination. Staff from other FIAT Auto divisions, such as design, manufacturing and marketing, who are also assigned to the piattaformas staff groups responsible for the new models of a certain size or cost work in co-location. Where engineers and other functional staff once worked sequentially on related tasks, now they work concurrently in parallel rather than in series. In this form of simultaneous engineering, new models are completed without the time delay that occurred when components were designed sequentially or when newly designed components had to pass from function to function (p. 365).

The FIAT case shows a co-location model where the project team members work together in part of existing work areas, while BMW, a German car maker, illustrates a more radical co-location strategy which establishes a new R&D center that brings together decentralized R&D laboratories in a certain space.

> BMW has embarked upon a radical experiment in which some 6,000 engineers and support staff are co-located at its Research and Engineering Centre to the north of Munich The Centre is much

> more than a conventional R&D facility, because it represents an unprecedented co-mingling of skills, including research, design, development, manufacturing, personnel, procurement, and patents. Such extreme co-location is designed to achieve one fundamental goal, namely to reduce the development cycle of new models by up to two years through the use of advanced simultaneous engineering techniques, in which manufacturing methods are developed in parallel with prototypes (Cooke and Morgan, 1998: 45-46).

On this site, members of a task force team may carry out all the tasks associated with the project. Until finalizing the project, members of the team may always attend the laboratory prepared for the project. Members of the team usually work together at the same place. Relational/organizational proximity may be facilitated through intensive processes of joint practices, open ways of communication and mutual efforts to understand each other. These are the processes of developing common language, mutual understanding and sense-making, and thereby can be a base that enables members to exchange and share their tacit knowledge in a more effective way. Effectiveness in communication is a property of relational/organizational proximity.

This is not the end of the aspects of learning by interaction and communication within the team. On this site being established exclusively for supporting a variety of task force activities, there are many chances to share common interests and knowledge between members of various task force teams. Members of a task force team often invites outsiders who have expertise and skills in a certain area of work and share, if necessary, and discuss the problems that they face. These may play a part in instilling new ideas, insights and knowledge in a cognitive frame of a certain task force team. Novelty or radical innovation can be derived from bringing together multiple set of knowledge in and outside of the team boundary.

The nature of relationships between members being generally dependent upon mutual commitment and trust would be actually crucial to making such hands-on interaction and communication effective. The role of communication and interaction lies in disseminating and sharing knowledge, largely tacit, through combining different forms of knowledge and thereby resolving potential mismatch and conflict. Hands-on communication and interaction may thus become effective only in case that people related become willing to collaborate, interact, and engage with one another (Barker and Camarta, 1998). These may rely on the extent to which agents are proximate organizationally.

5. Conclusions

In this paper, I have reviewed the recent geographical literature on learning and suggested a relational/organizational perspective on learning and proximity by introducing the insights offered by 'knowledge or learning communities' within the firm. I have argued that the current fashion stressing the power of the regions and geographical proximity as the sources of learning has been silent on how learning takes place and is organized in the firm and where the sources of learning come from. Learning reflects complex social relations in and outside of the firm. This is, namely, to represent that the process and outcome of learning are defined by a property of relational/organizational proximity. Nevertheless, these are often left in a black box in the geographical literature. It is claimed that it is time for us to delve into these questions and attempt to unpack the black box.

As a means of doing this, I have proposed that an understanding of the sources of learning and its process needs to be begun by scrutinizing corporate contexts. Firms attempt to find sources of knowledge and learn them by mobilizing and blending knowledge and competences distributed in and outside the boundary of the firm. This point represents that the sources of learning exist in organizational

spaces. To exemplify this, I have tackled the relationships between learning and proximity, drawing on the concept of 'ba' defined as a shared space, communities of practice, epistemic communities and task-force teams. I have claimed that knowledge or learning communities within the firm can be vital sources of learning and make a contribution to sustaining innovations, by mobilizing distributed knowledge and competences and blending varied forms of knowledge. It has been shown that their organizing processes are deeply associated with the building process of relational/organizational proximity. Of course, this process could be more effective when they have spatial nearness, especially at the early stage of its formation. However, their performance and outcome are ultimately likely to depend on the purpose of organizing specific communities and the density and strength of relational/organizational proximity developed through practices of a certain community.

Finally, it is important to note that communities in the firm can play a critical role in sustaining both incremental and radical learning in the process of their own problem-solving activities. Problem-solving activities involve either incremental learning or routine-breaking learning. Thus, problem-solving activities may neither be simple responses, nor passive activities. The practice and process of solving problems in a specific organization represent the characteristics of social relations and the ways of collective interaction which are embedded in the organization. Social capital is created by shared experience and common understanding and mutual trust between members and thereby leads to organizational proximity. This process of building organizational proximity contributes to mobilizing cognitive diversity that allows to bring together new insights and ideas as well as develope in a coherent way common cognitive ground and consensus. In the long-term perspective, it thus seems to help to keep balance between incremental and radical learning. Although three kinds of communities in the firm are all said to be conducive to both incremental and routine-breaking learning, each has the different potential for learning. Communities of practice seem to contribute to intensifying incremental learning, while epistemic communities seem to play an important role in achieving strategic learning in a longer-term basis. Meanwhile, task-force teams can be a critical player in the strategic production of knowledge and problem-solving in a shorter-term basis. In sum, the key point is that incremental and radical learning by firms can be sustained through organizing various forms of learning communities and these processes of learning are occurred and realized through the operations of the networks of relations across organizational spaces. This means that in response to radical environmental change, firms attempt to sustain routine-breaking learning by taking advantage of learning communities. These may no longer be the assets of localized learning, because such learning is only possible by drawing on decentralized knowledge residing in corporate hierarchy and organizational spaces.

Acknowledgement

Some of the ideas developed in this paper were presented at the Korean Regional Geographers Association Summer Conference, held at Pusan National University, July 1999. I wish to acknowledge my intellectual debts to Ash Amin, Ray Hudson and Chul Woo Lee for their stimulating comments on earlier drafts. I am also grateful to two anonymous referees for their helpful comments. Nevertheless, the usual disclamers apply.

Notes

1) According to Florida(1998), while Fordist mass production regions represent those based on comparative advantage that is generated by factors such as natural resources and cheap labour cost, 'learning

region' is possible in case that a region's competitive advantage is driven by knowledge creation and continous improvement.

2) However, most studies of 'learnign organisations' and 'organisational learning' also have the same problem as the literature on regional learning, by primarily focusing on the organisational context of learning, with little attention to the societal and spatial context.

3) Virtual proximity refers to situations which employ technology to either simulate or approximate geographical and cultural proximity.

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(Received October 8, 2001)