Journal of the Economic Geographical Society of Korea
Vol. 6, No. 1, 2003(61-77)

Enhancing Regional Innovation System Potential: The Dimension of Firm Practices

Jong-Ho Lee*

Abstract : Firms are central economic agents that play an important role in systems of innovation as they take responsibility for generating and diffusing knowledge in both organizational and societal context. They must be considered as learning organizations which interact with other firms and institutions that share their environment. The systems of innovation literature accentuates institutional conditions that influence innovation in sectoral, regional or national levels. Meanwhile, it tends to ignore the complex dimensions of firm practices in relation to learning and innovation activities. In this context, this paper attempts to examine what firms do for sustaining innovation and how they learn to innovate. This is not just critical to know individual firms innovativeness which depends on interactions with environments within and outside the organizational boundary but also to evaluate the regional innovation system potential. In short, it is important to see that firms would attempt to take advantage of distributed knowledge within and across the boundaries of the firm without sticking to particular regional innovation systems. I argue that the more firms of a cluster attempt not only to combine localized sources of knowledge and external sources of knowledge but also to become a learning organization, the more increased regional innovation system potentials can be.

Key Words : Knowledge, Firm practices, Learning, Learning organization, National/ regional innovation systems

1. Intorduction

As Foray and Lundvall (1996) argue, we are now in a 'new era' of economic activity dominated by the emergence of a knowledge-based economy which is more strongly and more directly rooted in the production, distribution and use of knowledge than ever

* Research Fellow, Center for Regional Innovation Systems Research, Taegu Institute of Social Studies

before. This means that innovation is increasingly recognized as the key to sustaining strong competition in the accelerating pace of change. The capacity to learn and adapt to rapidly changing conditions determines the innovative performance of firms, regions and nations. So, the capacity to sustain innovation largely depends upon a complex set of relationships between internal firm dynamics and the broader setting within they operate.

The innovation systems approach suggests that innovation should not be viewed as a linear process generated by isolated R&D activities. Instead, innovation is non-linear, iterative, and interactive in its nature. This sees innovation as a social process entailing the multi-lateral relationships between individuals both within and beyond the firm level. This approach can be defined as encompassing all the important factors that influence the development, diffusion, and use of innovations as well as the relations between these factors. These factors can be studied in a national, regional, or sectoral context (Edquist, 1997).

Most innovations occur in firms. Thus firms are central economic agents that play an important role in systems of innovation as they take responsibility for generating and diffusing knowledge. They must be considered as learning organizations which interact with other firms and institutions that share their environment. However, it is problematic that the literature on systems of innovation stresses institutional conditions that influence innovation in sectoral, regional or national levels, while downplaying the diversity and difference of firm performance and behavior. Although firms are considered to be the key agents in systems of innovation, the innovation systems literature ignores the complex dimensions of firm practices in relation to learning and innovation activities.

In this context, the main purpose of this paper is to elaborate what firms do for sustaining innovation and how they learn to innovate. This is not just critical to know individual firms innovativeness but also to evaluate the regional innovation system potential. In this paper I propose some of critical dimensions that are significantly associated with firm learning and innovation activities which would influence the potential for regional innovation system in both direct and indirect ways. First of all, I discuss the preconditions which firms can be a learning organization in terms of organizational form. In next section it deals with how firms attempt to facilitate knowledge creation and sustain radical innovation through temporary organizations. In the last two sections I examine the way in which firms would attempt to search and learn knowledge on a global basis beyond given regional innovation system they operate.

2. Towards Innovation-oriented Organizational Form and Routines

Following the increasing importance of knowledge and learning in the present era of the learning-based economy, an organizational model has been shifting from a traditional Fordist organizational model to an innovation-mediated one.1) An alternative organizational model by Kenney and Florida is also, as with other writers stressing new competitive organizational forms, inspired by the characteristics of organizational forms and behaviors which highly innovative Japanese manufacturing firms have adopted.) Organizational form is considered to be critical for influencing the capability of the firm to mobilize decentralized resources and competences both internally and extra-locally (Amin and Cohendet, 1999). The emerging new forms of organization, labeled as an innovation-mediated organizational form, are designed to encourage organizational innovation and learning. For Kenney and Florida (1993: 14), there are five basic dimensions that distinguish the innovation-mediated model from the traditional model: a transition from physical skill and manual labour to intellectual capabilities or mental labour; the increasing importance of social or collective intelligence as opposed to individual knowledge and skill; an acceleration of the pace of technological innovation; the increasing importance of continuous process improvement on the factory floor and constant revolutions in production; the blurring of the lines between the R&D laboratory and the factory. For this model, workers should not be viewed as simply a given factor in production. Rather, they are considered to be an integral part of the learning economy, which focuses upon functional flexibility rather than numerical flexibility (Ettlinger, 2000).

Thus, innovation-mediated production integrates the knowledge and intelligence of all workers, from R&D scientists and engineers, who create new technologies and product ideas, to shop-floor workers, who turn those innovations into marketable products (Kenney and Florida, 1993: 15). Therefore, the conceptual starting point of innovation-mediated production comes down to the question of how firms sustain learning and adaptation by harnessing and organising the intelligence, skill and knowledge of organisational members. Such capabilities to learn and adapt can be realised by esta- blishing an organisational form which is pro-active, flexible and open-minded.

It has been argued that traditional forms of organization have become obsolescent, as they have revealed their limitation in coping with a rapidly changing environment. Firms have thus faced the challenge to move towards more decentralized and networked organizational forms away from hierarchical and concentrated ones (Cooke and Morgan, 1998; Hedlund, 1994; Levinthal, 1996). Evolutionary

and competence-based theories of the firm are helpful in explaining the changing features of organizational forms that contemporary large firms face. A theoretical framework of these views emphasises the capabilities of firms to mobilize the knowledge distributed inside and outside the firm, as well as to sustain collective learning as the most crucial strategic asset. In view of this, it is critical to reset the boundaries of the demarcated divisions of labor between organizational units, in order to foster interactive learning between distributed units or subgroups. To do this, Cooke and Morgan (1998) stress the need to consider the role of peripheral organizations such as branches and subsidiaries, the responsibility of work teams, local autonomy, the link between R&D and production, and the importance of suppliers.

Under the Fordist mass production regime, typical organization forms consist of highly segmented divisions of labor, characterized by task specialization, functional fragmentation, and hierarchical management control. The realization of mass production based on the maximization of cost effectiveness is the basic concern. This means that the underlying principle lies in maximizing the efficiency of formalised routines. Vertical control based on hierarchy is a principled way of managing the organization. Therefore, non-managerial units such as R&D and production have little authority to make a decision. The model also emphasizes the vertical flow of information that is well reflected in the linear process of innovation. Thus it has no space for accepting cognitive diversity and multiple voices. Daily work practices are carried out on the basis of officially defined relationships. All of those aspects result in the limitation to the possibilities for members of the firm to interact and communicate. In addition, this model is based on simple adaptive responses to environmental change. As a result, firms have great difficulties in sustaining adaptation and learning in the context of a rapidly changing environment and market competition.

In contrast, an innovation-mediated organizational model is designed to increase the degree of innovation and collective learning to sustain and secure high quality and productivity. This model differs significantly from the Fordist model of organisation in the organizing and managing of the divisions of labour among teams, departments, functions or individual workers. It stresses that learning and knowledge creation are the responsibility of everyone in the organization, not just a selected few such as R&D engineers and managerial groups (Nonaka and Takeuchi, 1995). The shared divisions of labor are characterized by functional fluidity and boundary blurring, with the intention to increase the capabilities to solve problems, learn, innovate and adapt. This overlap and the crossing of functional boundaries foster collective learning based on learning-by-interacting (Morgan, 1996). Work practices

are designed to encourage workers to learn and innovate through learning-by-interacting, learning-by-doing and learning-in-doing, drawing upon interactive participation and communication (Lee, 2001; Wenger, 1998).

In addition, this model emphasizes boundary blurring between conception and execution. This is inspired by the recognition that organisational forms designed to adapt to hyper-competitive environments must be capable of integrating the knowledge and intelligence of all workers. Excessive functional specialization leads to a separation between technical and organizational knowledge and thus brings about a variety of problems in the coordination between functions and in knowledge management.

It is argued, therefore, that the functional link between R&D and downstream functions is important to effectively combine the abstract scientific and technical knowledge of R&D workers, which is embodied in innovations and saleable commodities, and the knowledge of shop-floor workers, which provides a crucial source of product and process improvements (Kenney and Florida, 1993). This argument is clearly reflected in Lam (1996), who studied Japanese firms:

> Engineers involved in the project are expected to interact on a continuous basis, share information and responsibility. The overlapping approach makes a narrow division of labour ineffective. The fluidity and ambiguity of job boundaries mean that R & D engineers are sometimes expected to play a technical support role in production or to be a market researcher if necessary. Project members are expected to reach out across boundaries, to engage in intensive information transfer and to acquire a breadth of knowledge and skills. This is especially evident when engineers are engaged in new product development (p.192).

As a means to realize such functional integration, geographers like Cooke and others (see Cooke and Morgan, 1998, Morgan, 2001, Hayter, 1996) emphasize the need for co-location between R&D and manufacturing. They believe that the geographical clustering of R&D and manufacturing can contribute to improving the potential for learning and innovation because it allows employees across different job boundaries to interact on a face-to-face basis.

Training methods, such as job rotation and the exchange of workers between functional divisions, are also critical dimensions in sustaining organizational innovation. By taking part in these, it is believed that workers can gain contextual skills and knowledge about organizational routines and management processes. Contextual skills and knowledge are referred to as general capacities for coordination and information processing (Lam, 1996), and these enable engineers to cope with emergent tasks and unusual problems (Campbell and Warner, 1992). Such skills and knowledge are considered to be composed of competence bases that are critical for adapting to rapidly changing technological and product market

environments.

In addition, job rotation and the career cycle of R&D engineers can be a helpful means of incorporating formal and tacit knowledge. It is widely accepted that job rotation plays a role in broadening the skills and knowledge base of engineers as well as facilitating information and knowledge flow across different functions. In part, this practice between different teams, subgroups or departments is likely to improve relational/organizational proximity between heterogeneous groups within the firm, as there is the possibility that it creates personal networks which will in turn facilitate learning.

3. Facilitating Knowledge Creation through Temporary Organizations

Firms can be seen as constellations of diverse communities of learning, which means to recognize firms as sites where knowledge are formed, practiced, and altered. These communities might be found in traditional work divisions and departments. But they also cut across functional divisions, spill over into after-work or project-based teams, and straddle networks of cross-corporate and professional ties (Lee, 2001).

A project team is a kind of knowledge community which is committed to the strategic production of knowledge and the way of solving a specific problem in a given point in time. This is an ad hoc temporary organization designed to accomplish a specified task and is thus managed under clear-cut time limitation. Project teams are heterogeneous groups of employees with professional knowledge in a given task selected from different teams or departments. Members of the 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 a project 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 project 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 a project 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, a

project 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 a kind of community of practice.

However, there are fundamental differences between project 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, a project team binds its members together through a given goal and accountability. In addition, its members are a group of people who are considered to 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 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 project 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.

The activities of a project team can also be promoted by drawing on a property of proximity. It is claimed that a project team tends to seek to draw on spatial proximity to promote organizational proximity. Large multidivisional firms attempt to make use of an advantage of proximity for facilitating boundary-spanning co-working activities. Such a strategy often takes shape by establishing an exclusive site designed for only ad hoc project activities. It is intended not only to promote the efficiency of a project team activity, but also avoid a possibility that formal work organizations intervene in their activity. The team may usually be allowed to have freedom and autonomy in their activity.

The project teamwork, composed of members who have different expertise and belong to different departments, may offer a chance to utilize an advantage of cognitive distance or variety, while its relational/organizational proximity may be questionable. To overcome this problem and steer project activities, some firms create a purpose-specific physical space. A new product development project is the best example of showing the accomplishment of the project through co-location. The co-location strategy is deliberated to not only reduce the period of the product development cycle through the techniques of simultaneous

engineering, but also to decrease conflicts and mismatch, while 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 new product development:

> 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).

In a certain site prepared for the project, members of a project team may carry out all the tasks associated with the project. Social capital between team members 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.

In fact, the nature of relationships between members depends by and large on the level of social capital accumulated as the result of mutual commitment and trust and it would be actually crucial to making such hands-on interaction and communication effective (Lesser, 2000; Nahapiet and Ghosal, 2000). The role of communication and interaction lies in disseminating and sharing knowledge, largely tacit, through the combination of 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 engaging with one another (Barker and Camarta, 1998). These may be possible when people closely interact on the basis of face-to-face in initial stage and thereby establish relational proximity and social capital.

4. In Search of Globally Distributed Sources of Knowledge

In todays turbulent competitive environment, the dilemma facing firms is that, to succeed on a global scale, they must possess capabilities to be globally efficient, to be multinationally flexible, and to capture the benefits of worldwide learning all at the same time (Dicken et al., 1994: 30). This means that corporate learning takes place inside the firm through the network of intra-firm

relationships as well as outside the firm through the complex network of inter-firm relationships. In other words, firms need to learn within and across the boundaries of the firm. Perhaps, the globalization of R&D activities and strategic alliances are most significant dimensions of learning pursued within and across the boundaries of the firm. These learning methods have become increasingly critical to access external sources of knowledge. The rapid increase in the globalization of economic activities and in global competition in markets and technology has forced firms to strengthen these strategies.

Following the globalization of product markets, financial transactions and direct investment, R&D activities of large firms should be globalized, not only in their traditional role of supporting local production, but also in order to create interfaces with specialized skills and innovative opportunities at a world level (Tidd et al., 1997: 138). The rationale for this is that multinationls expand the geographical scope of R&D activities beyond their home countries. From the market perspective, foreign corporate R&D activities are pursued to adapt products and processes to local markets where adaptations to local tastes and traditions are important. Normally, market-specific R&D activities can be active in multinational firms in industries, like electrical appliances and automobiles.

However, the driving force of foreign R&D activities should be found in a broader way. The increasing tendency of foreign R&D activities is associated with the efforts of firms to access and learn host countries or regions specific knowledge. Empirical studies prove this that, for multinationals, the locations of foreign R&D have tended to be concentrated in certain countries where the sources of knowledge critical to promoting firms technological capabilities are replete (Kumar, 2001; Pavitt and Patel, 1999). For Zanfei (2000), the local embeddedness of R&D activities is critical to enhancing the capability to learn local-specific knowledge and can be strengthened by recruiting local personnel and building cooperative networks with local institutions such as firms and research institutes.

While the globalisation of R&D represents learning practices based on intra-firm networks of relationships, inter-firm alliances are seen as the critical sources of learning between firms. As mentioned earlier, alliance firms share information, such as market intelligence, and both tacit and explicit knowledge in the form of skills, know-how and technologies, in a complementary way. Inter-firm learning processes involve a combination of tacit knowledge and codified knowledge as well as a combination of local knowledge and distanciated knowledge. For example, technology sharing involves sharing of codified knowledge between firms, including patents, product technology and process technology (Inkpen, 1996). However, it needs more. To share technology requires interactive learning pro-

cesses between firms through personnel exchange, face-to-face and telemediated meetings between alliance firms.

In addition, joint product development projects are also characterized by interactive learning processes. In doing this, alliance firms create joint project teams. In a certain circumstance, alliance firms operate project teams on the basis of co-location. In general, members of the team, however, interact on a global basis. They communicate through telemediated contact methods such as emails, fax and teleconferencing. However, in some circumstances, physical interactions such as face-to-face meetings and conferences between distanciated project team members could also play an important role in creating and maintaining relational proximity. These cases imply that learning does not necessarily need geographical proximity and need not necessarily be dependent upon localized learning (Lee, 2001). The increasing tendency for the globalization of R&D and strategic alliances illustrates that firm learning takes place through networks of relationships across organisational spaces on a global basis.

5. Building Global Networks

Increasing international competition makes it difficult for individual firms to survive by themselves. This is, in part, because market and technology have become more complex and dynamic, and cannot be covered adequately with the internal capabilities of an individual firm. It would find it difficult for firms to possess all the resources and knowledge which are required to compete in a given market. Because of this, inter-firm alliances have been increasingly advocated as a way to sustain an individual firms continuous survival and growth.

The nature of inter-firm alliances is becoming increasingly complex and multifaceted. The reasons for this include difference in the motives and expectations of alliances between firms which intend to forge alliances, and the variety of areas and forms of alliances. As shown in Table 1, strategic alliances are forged for a variety of purposes as well as in various areas, ranging from R&D to production and marketing. First, with reference to marketing, the purpose of alliance between multinationals is usually to either penetrate local markets or to intensify their market positioning. Some alliances in marketing are associated with national or supranational regulatory policies. The tendency for large firms to steer their business portfolio towards core competences leads to the increase in long-term contracts between market leaders in the form of mutual OEM in consumer goods. The corollary of this is that allied firms are not only able to maintain, or even expand, their market share, but also avoid the problems of overcapacity caused by market saturation or excessive facility investments.

Table 1. Purposes of inter-firm alliances by large firms

Classification	Purposes
Marketing	· Penetrating market and intensifying market positioning · Overcoming trade barrier · Expanding market share via diversifying product portfolio via mutual OEM
Production	· Realizing economies of scale and scope · Coping with overcapacity caused by market saturation or excessive facility investments → Monopolising global market by global market leaders · Utilizing comparative advantage between market leader and technology leader · Reciprocal mutual sourcing on a stable basis (product vs. product; product vs. parts; parts vs. parts)
Technology (R&D)	· Learning and gaining complementary technological competences from counterpart · Monopolizing an emerging market via technological advancement · Sharing costs, uncertainties, risks of R&D · Leading global competition for preoccupying industry standards (e.g. digital television, home network) · Saving costs via cross licensing · Utilizing complementary assets between manufacturer and techno-based firms · Coping with a rapidly increasing technological convergence via sharing complementary technological competences between allied firms

Sources: based on Dicken, 1998; Gnyawali, 1999; Hudson, 2001; Powell, 1998; Tidd et al., 1997

Second, inter-firm alliances are largely forged for joint production. The aim of this is either to realise economies of scale and scope or to overcome the problems of overcapacity. In seeking cooperative relationships in production, joint ventures are a conventional form of alliance. On the other hand, firms tend to establish long-term supply relationships on a stable basis. In this process, interactive learning appears to take place between customer firms and suppliers (Lundvall, 1988). In addition to alliances between manufacturers, there is a growing tendency for R&D-intensive firms to make connection with manufacturers. The aim is to utilize the complementarity of core competences between firms specialized in different areas.

Third, technological collaborations are the most common in inter-firm alliances, particularly between technologically intensive firms (Hudson, 2001). Most of these technological collaborations tend to take place in the area of product development. Although there are a number of reasons for these

Table 2. Conditions for higher and lower regional innovation systems potential: the dimension of the firm

Higher	Lower
Management Focus	
Learning and coordination	Control and efficiency
Collective learning for high quality and productivity	Efficiency of mass production with low cost
Structure of decision-making	
Convergence and co-ordination of local voices	Vertical and hierarchical control
Local autonomy and responsibility	Non-managerial groups having little authority to make a decision
Division of labour and work form	
Shared division of labour	Highly specialised division of labour
Functional fluidity and boundary blurring	Specialised functional boundaries
Integration of conception and execution	Separation of conception and execution
Work practices based on both formally and informally constructed relationships	Work practices based on officially defined relationships
Collective task through team work promoting job rotation and the career cycle of workers	
Link between R&D and production	
Organic link between R&D and production	Functional separation of R&D and production
Based on the interactive innovation model	Based on the linear innovation model
Highlighting spatial and organisational proximities	Proximities not considered
Job rotation and the exchange of workers	Fixing independent routines between divisions
Implications for innovation	
High adaptability in the face of hyper-competition	Low adaptability in the face of hyper-competition
Stressing contextualised skill and knowledge, collective learning and multi-lateral knowledge transfer and diffusion	Stressing vertical flow of information Leading adaptive response and substantive rationality Low capability to solve problems
Leading innovative behaviour and procedural and recursive rationality	Low possibility of interaction and communication Low degree of organisational proximity
Fostering chances to interact and communicate between workers across functions in both formal and informal ways, based on organisational proximity	Ignorance of cognitive diversity
Activating communities of practice	
Acknowledgement of cognitive diversity	

collaborations, the common intentions of the firms include the sharing of costs and risks, the reduction of the time and uncertainties in the development of new product, technological learning and the monopolization of markets. In this respect, learning is not the only reason for technological collaborations. However, strategic alliances can offer great opportunities to learn new skills and knowledge (Inkpen, 1996). The potential for learning and the success of technological collaborations are likely to rely, to a greater or lesser extent, on the complementarity and balance of technological competences between alliance partners, the degree of relational proximity between alliance firms and a firms absorptive capacity based on a prior knowledge base (Child, 2001; Kraatz, 1998; Nooteboom, 2000; Tidd et al., 1997).

Such strategic inter-firm networks tend to be made beyond a certain boundary of a cluster. However, it does not mean that it causes to erode the benefits of cluster. Instead, the pursuit of global networks through strategic alliances as part of co-petition strategies can give firms of a cluster more opportunities to access new knowledge and information. Firms would attempt to create strategic alliances in order to learn knowledge and competences that they do not possess, from their alliance partners. It implies that the nature of knowledge flows generated between them is likely to be decisive, radical rather than routine, incremental. Once such new sorts of knowledge are mastered and absorbed in a recipient firm, they would become local knowledge on which local firms have chances to capitalise.

In this context, the more firms of a cluster engage in the built-up of trans-local learning networks the more information and knowledge about markets and technologies are plumped into internal networks from which local actors benefit (Bathelt, Malmberg and Maskell, 2002). Eventually, it can be argued that the extra-local knowledge flows can facilitate local interactions and support a clusters cohesion.

6. Conclusion

In this paper I have shown that the emerging knowledge-based economy requires firms to be more innovative than others. The systems of innovation approach emphasizes that innovation is a social process. It therefore implies that high regional innovation system potential can only be sustained through socially interactive learning processes between individuals, between firms, or between firms and supporting organizations. The objectives of firms are not simply confined to harnessing internal resources and localised knowledge. Instead, they attempt to take advantage of distributed knowledge within and across the boundaries of the firm. This directly means that firms would not stick to particular regional innovation systems. They do not try to isolate themselves. Rather, they try to make

best use of benefits from regional innovation systems by setting up multiple organizational spaces on a global basis and mobilizing distributed organizational competences. As systems of innovation approach stresses, these firms represent interactive, iterative and cooperative nature in learning processes.

However, it is hard to see such place-less innovation activities as a factor of deteriorating the potential of a particular regional innovation system. The more firms of a cluster attempt to combine localized sources of knowledge and external sources of knowledge and the more firms of a cluster become a learning organization, the more increased regional innovation system potentials are. Such a state of regional innovation system can be called the learning region.

Note

1) An alternative organizational model by Kenney and Florida is also, as with other writers stressing new competitive organizational forms, inspired by the characteristics of organizational forms and behaviors which highly innovative Japanese manufacturing firms have adopted.

References

Amin, A. and Cohendet, P., 1999, "Learning and adaptation in decentralised business networks," *Environment and Planning D: Society and Space* 17, pp.87-104.

Barker, R. and Camarta, M. R., 1996, *Creating a learning organization through communications: preconditions, indicators, and applications, Proceedings of the Association for Business Communication,* Chicago, Illinois, November.

Bathelt, H., Malmberg, A. and Maskell, P., 2002, "Clusters and knowledge: local buzz, global pipelines and the process of knowledge creation," *Paper presented at the Second International Symposium on Knowledge and Space*, Heidelberg.

Campbell, A. and Warner, M., 1992, *New technology, skills and management: Human Resources in the Market Economy,* London, Routledge.

Child, J., 2001, "Learning through strategic alliances," in Dierkes, M. et al.(eds.), *Handbook of Organizational Learning and Knowledge,* Oxford, Oxford University Press, pp.657-680.

Cohendet, P. and Llerena, P., 1997, "Learning, technological change, and public policy: how to create and exploit diversity," in Edquist, C.(ed.), *Systems of Innovation: technologies, institutions and organizations,* London, Pinter, pp.223-241.

Cohendet, P. and Llerena, P., 2001, "Routines and the theory of the firm: the role of communities," *Paper presented at the Nelson and Winter Conference,* Aalborg University, pp. 12-15.

Cooke, P. and Morgan, K., 1998, *The Associational Economy: Firms, Regions, and Innovation*, New York, Oxford University Press.

DiBella, A., Nevis, E. and Gould, J., 1996, "Understanding organizational learning capability," *Journal of Management Studies* 33(3),

pp.361-379.

Dicken, P., 1998, *Global Shift (3rd edition)*, London, Paul Chapman.

Dicken, P., Forsgren, M. and Malmberg, A., 1994, "The local embeddedness of transnational corporations," in Amin, A. and Thrift, N. (eds.), *Globalization, Institutions, and Regional Development in Europe*, Oxford, Oxford University Press, pp.23-45.

Edquist, C., 1997, "Systems of innovation approaches their emergence and characteristics," in Edquist, C.(ed.), *Systems of Innovation: Technologies, Institutions and Organizations*, London, Pinter, pp.1-35.

Ettlinger, N., 2000, "Frontiers of flexibility and the importance of place and space," *Paper presented at the Workshop on the Firm in Economic Geography*, University of Portsmouth, UK, 9-11.

Foray, D. and Lundvall, B-A., 1996, "The knowledge-based economy: from economics of knowledge to the learning economy," *Employment and Growth in the Knowledge-based Economy*, Paris, OECD, pp.11-32.

Gnyawali, D. R., 1999, Inter-organizational learning dynamics: roles of networks on knowledge creation, mimeo, Department of Management, Virginia Politechnic Institute and State University.

Hayter, R., 1996, "Research and development," in Daniels, P. and Lever, W.(eds.), *The Global Economy in Transitions*, London, Longman, pp.164-190.

Hedlund, G., 1994, "A model of knowledge management and the N-form corporation," *Strategic Management Journal* 15, pp.73-90.

Hudson, R., 2001, *Producing Places*, New York, Guilford Press.

Inkpen, A., 1996, "Creating knowledge through collaboration," *California Management Review* 39(1), pp.123-140.

Kenney, M. and Florida, R., 1993, *Beyond Mass Production: the Japanese System and Its Transfer to the U.S.*, Oxford, Oxford University Press.

Kraatz, M. S., 1998, "Learning by association?: interorganizational networks and adaptation to environmental change," *Academy of Management Journal* 41(6), pp.621-643.

Kumar, N., 2001, "Determinants of location of overseas R&D activity of multinational exterprises: the case of US and Japanese corporations," *Research Policy* 30, pp.159-174.

Lam, A., 1996, "Engineers, management and work organization: a comparative analysis of engineers work roles in British and Japanese electronics firms," *Journal of Management Studies* 33(2), pp.183-212.

Lee, Jong-Ho, 2001, "Geographies of learning and proximity: a relational/organizational perspective," *Journal of the Korean Geographical Society* 36(5), pp.539-560.

Lesser, E., 2000, "Leveraging social capital in organizations," in Lesser, E.(ed.), *Knowledge and Social Capital: Foundations and Applications*, Oxford, Butterworth-Heinemann.

Levinthal, D., 1996, "Learning and Schumpeterian dynamics," in Dosi, G. and Malerba, F.(eds.), *Organisation and Strategy in the Evolution of the Enterprise*, London, Macmillan, pp.27-41.

Lundvall, B., 1988, "Innovation as an interactive process: from user-producer interaction to the national system of innovation," in Dosi, G. et al.(eds.), *Technical Change and Economic Theory*, London, Frances Pinter, pp.349-369.

Metcalfe, J. S., 1998, *Evolutionary Economics and*

Creative Destruction, London, Routledge.

Morgan, K., 1996, "Learning-by-interacting: inter-firm networks and enterprise support," in OECD, *Networks of Enterprises and Local Development: Competing and Co-operating in Local Productive Systems,* Paris, pp.53-66.

Morgan, K., 2001, The exaggerated death of geography: localised learning, innovation and uneven development, mimeo, Department of City and Regional Planning, Cardiff University.

Nahapiet, J. and Ghosal, S., 1998, "Social Capital, intellectual capital and the organizational advantage," *Academy of Management Review* 23(2), pp.242-266.

Nonaka, I. and Takeuchi, H., 1995, *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*, New York, Oxford University Press.

Nooteboom, B., 2000, Learning by interaction: absorptive capacity, cognitive distance and governance, mimeo, Rotterdam School of Management, Erasmus University Rotterdam.

Pavitt, K. and Patel, P., 1999, "Global corporations and national systems of innovation: who dominates whom?" in Archibugi, D., Hoewlls, J. and Michie, J.(eds.), *Innovation Policy in a Global Economy*, Cambridge, Cambridge University Press, pp.94-119.

Powell, W., 1998, "Learning from collaboration: knowledge and networks in the biotechnology and phamaceutical industries," *California Management Review* 40(3), pp.228-239.

Saviotti, P. P., 1996, *Technological Evolution, Variety and the Economy*, Cheltenham, Edward Elgar.

Tidd, J., Bessant, J. and Pavitt, K., 1997, *Managing Innovation: Integrating Technological, Market and Organizational Change*, Chichester, John Wiley & Sons.

Wenger, E., 1998, *Communities of Practice: Learning, Meaning, and Identity*, Cambridge, Cambridge University Press.

Zanfei, A., 2000, "Transnational firms and the changing organisation of innovative activities," *Cambridge Journal of Economics* 24, pp. 515-542.

한국경제지리학회지 제6권 제1호 2003(61-77)

지역혁신체제 잠재성 향상의 조건: 기업의 혁신활동을 중심으로

이 종 호*

*대구사회연구소 지역혁신시스템연구센터 연구위원
(bluekite@hanmail.net)

요약 : 국가 및 지역혁신체제에서 기업은 지식의 창출과 확산을 위한 중심적 행위자 역할을 담당한다. 따라서 혁신시스템이 효과적으로 기능하기 위해서는 시스템내의 기업들이 기업내의 조직학습과 더불어 타기업 및 관련기관과의 상호작용을 통해 혁신을 창출하는 학습조직이 되어야만 한다. 지금까지 혁신체제론의 연구들은 산업부문별, 지역별 및 국가별 수준에서 혁신 성과에 영향을 미치는 제도적 조건을 규명하는데 초점을 두어 왔다. 그러나 이러한 연구들은 혁신체제의 중심 주체가 되는 기업조직의 학습 관행 및 조직 루틴이 지역혁신체제의 성과에 미치는 영향을 대해서는 상대적으로 소홀히 취급하고 있다. 본 연구는 이러한 문제점을 보완하기 위한 시도의 일환으로써 기업이 혁신을 달성하기 위해서 조직적 역량을 어떻게 구축하고 학습하는지에 대해 고찰하는 것을 목적으로 한다. 이것은 개별 기업의 혁신성과 경쟁력을 파악하는데 있어서 뿐만 아니라 국가 및 지역 혁신체제의 잠재성을 평가하는데 있어서도 매우 중요하다고 할 수 있다. 결론적으로, 기업들은 특정 지역혁신체제에 구속되기 보다는 기업의 경계 안팎에 존재하는 다양한 혁신의 원천을 탐색하고 조직적으로 체화시키기 위한 노력들을 추구한다. 그러나 이러한 기업조직의 활동 관행이 지역혁신체제의 잠재성을 저하시키는 요인이라고 보기는 어렵다. 오히려 특정 지역혁신체제 내 기업들이 외부의 지식에 접근하고 그것을 조직적으로 체화하는 사회적 학습과정을 통해서 지역혁신시스템은 제도적 고착 효과를 탈피할 수 있고 혁신체제 전반의 혁신 잠재성을 향상시킬 수 있다.

주요어 : 지식, 기업 관행, 학습, 학습 조직, 국가/지역혁신체제