Researching on the Situational Factors Influencing Knowledge Transfer among Enterprises in Clusters

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Abstract: Viewing industrial clusters as a situational factor influencing knowledge transfer among enterprises inside of industrial clusters, the author analyzes the asymmetric advantages of knowledge transfer provided by an industrial cluster—a peculiar kind of industrial organization—to enterprises inside of it compared with those outside of it. Geographical and social proximity accelerates the transfer of knowledge, reduces the time and cost of knowledge search and overcomes the transferring barriers stemmed from the viscosity of knowledge. Network relationship among cluster enterprises provides a special channel for knowledge flow, which is favourable for the diffusion and transfer of tacit knowledge. The strength or weakness of network relationship existing among enterprises in clusters has a profound effect on the sustainability, cost and quality of knowledge transfer. The base of knowledge as well as the gap and differences of knowledge structure exerts an inverted U-shaped impact on knowledge transfer. This research has a certain guiding significance on cluster policy-making and knowledge sharing among cluster enterprises.

Key words: Knowledge, knowledge transfer, cluster enterprises

INTRODUCTION

Knowledge transfer is a complicated systematic engineering, although individuals or enterprises are aware of the comprehensive benefits brought by knowledge transfer, successful knowledge transfer is still difficult to achieve. Many related research in the field of knowledge management have confirmed the important role that situation plays in the process of knowledge transfer. Given this, a lot empirical researches on knowledge transfer demonstrated the related situational factors and their functions (Han, 2011). Domestic and foreign scholars studied the issue of knowledge transfer in different situations, the existing literature are mostly focused on multinationals, enterprise alliances, project teams etc., the characteristics and influencing factors in diverse situations are different.

As a form of economic organization more stable than market and more flexible than bureaucracy, an industrial cluster provides its internal enterprises with special knowledge systems and transferring context, which extensively and multi-levely influences knowledge transfer among cluster enterprises. Using the typical organization characteristics as an entry point, the author represents cluster contexts from the common dimensions such as proximity, cluster network relationships and cluster knowledge distribution. Various functions of these factors in the process of knowledge transfer among cluster enterprises are also analysed.

THE INFLUENCES OF PROXIMITY ON KNOWLEDGE TRANSFER

The influences of geographical proximity on knowledge transfer among cluster enterprises: Among the multidimensional proximities of clusters, geographical proximity plays a fundamental role and is the most clearly defined and the least controversial one (Rao and Li, 2006). The influences of geographical proximity on knowledge-related activities such as regional knowledge spillovers and the diffusion of tacit knowledge have been confirmed by most scholars’ researches. As early as 1890, Marshall has stressed that the benefits brought by proximity of enterprises lies in shared labor market and intermediate inputs, as well as the local spillover effects stemming from “the secrets of industry being in the air” (Wang and Li, 2007). This geographical and spatial proximity of cluster enterprises endows themselves with asymmetric positive externality of knowledge relative to non-clustered enterprises. Geographical proximity is favorable for the collective learning and knowledge sharing of enterprises. When diverse kinds of economic or social associations
occur among each other, it’s easier to enhance trust and facilitate the spillover of knowledge and skills (O’Hagan, 2002).

Geographical proximity increases the opportunities of interaction among local enterprises, individuals and other behavioral subjects and reduces various tangible transaction costs. With relatively large externality of physical space, each firm in a cluster could obtain the benefits of knowledge spillover. Coase proposed that geographical proximity is beneficial to increase the symmetry of information, overcome the speculative action and decrease the time and cost involved in information seeking of enterprises (Rao and Li, 2006). Geographical proximity makes the diffusion of explicit knowledge among cluster enterprises more convenient and the acquisition of this type of knowledge by cluster enterprises easier, owing to the low-cost, rapid spread and transmission of codifiable information including technical documents and product specifications. The face-to-face interaction mechanism among behavioral subjects can not only facilitate the spread, diffusion and transfer of tacit knowledge effectively, but ensure the timeliness and accuracy of the corresponding activities. Consequently, geographical proximity increases the availability and usability of diverse knowledge through knowledge transfer. Another important role played by geographical proximity is bringing for cluster enterprises the same social identity, which leads to social proximity—the second situational factor influencing knowledge transfer of cluster enterprises.

The influences of social proximity on knowledge transfer among cluster enterprises: The term of social proximity is related to another term-social embeddedness. Granovetter argued that behavior and system are closely linked. As with social behavior, economic behavior is embedded deeply in the common cultural and institutional environment of society, with a certain kind of local embeddedness. The economic behaviors and consequences originated from social embeddedness are affected by subjects' interrelationships and the structure of the whole network. And social proximity can be subdivided into the form of organizational, cultural and institutional proximity (Wang and Li, 2007).

Enterprises of a cluster located in the same region, especially of the endogenous local industrial cluster, usually have a very similar culture. The cultural differences and similarities existing between senders and receivers have a great impact on the effects of knowledge transfer for both sides. Culture influences the behavioral norms, values and other important aspects of employees in both enterprises. The differences will directly cause the communication difficulties emerging in the process of knowledge transfer, even the information filtering effect. In extreme cases, knowledge conflict would come into being. Too large cultural distance would result in mutual distrust, knowledge revealing paradox and the phenomenon of knowledge hiding for both parties. Under these circumstances, knowledge transfer would not succeed. On the contrary, identical or similar organizational culture reduces the communication barriers between both sides.

Social proximity also creates trust and reciprocity preference between knowledge transfer subjects. Davenport and Prusak (1998) argued that during the operating process of knowledge market, "trust" is most important. A prerequisite for knowledge exchange or sharing among individuals in organizations is the reliability of knowledge buyers. Furthermore, trust can effectively decrease supervisory cost and facilitate knowledge sharing among enterprises. Therefore, the atmosphere of trust will make knowledge owners exchange knowledge freely. As a result of the existence of trust, the opportunities of knowledge transfer among behavioral subjects continue to increase with the passage of time. At the same time, with the increase of knowledge interacting and transferring behaviors, knowledge protecting behaviors would be minimized and sending willingness would be strengthened. What matters is that the quality of transferred knowledge can be guaranteed (Jian et al., 2010). There are strong endogenous adjacent factors including geographical, blood and cultural relationship in many regional clusters in China. Those factors play a large role in the process of knowledge transfer by overcoming the "non-local invention syndrome" in clusters, as well as enhancing mutual trust and willingness to send knowledge.

Being subject to the special context of proximity, turnover of employees in a cluster is relatively high and knowledge flow-embedded in regional labor network is quite frequent. And the employee turnover among cluster enterprises impacts on the knowledge spillover and diffusion in local area. Tang (2009)'s study shows that the viscosity of the technical knowledge is weakened and eliminated while the technical knowledge is transferred through employee turnover, which implies that employee turnover can "dilute" the viscosity of technical knowledge. This is also another special form of knowledge transfer, which is in perfect coincidence with most of cluster situations in China. A representative example is "digging the corner" among enterprises in a cluster, which can realize the sufficient transfer of personal empirical tacit knowledge and achieve the maximum performance.
THE IMPACT OF CLUSTER NETWORK RELATIONSHIPS ON KNOWLEDGE TRANSFER

Network relationships provides channels for knowledge transfer: A cluster turns into a "technological-economic-social" synthesis owing to the reduced transaction cost originated from geographical proximity, the existing labor network, the economic relationships strengthened by social relationships and trust, the interdependent network of production and technological cooperation stemmed from the division and cooperation of labor. Network is the aggregation of diverse relationships occurred during the process of exchanging and delivering resources among enterprises in a cluster. One of the most noteworthy network is social network. Scholars believe that all economic behaviors are embedded in social relationships, accordingly, the behaviors of knowledge transfer among cluster enterprises are also embedded in various network relationships of a cluster. As the network paradigm has a very strong explanation function, the idea that enterprises can grow and develop through external network relationships is agreed upon by many scholars. Relationship network can provide enterprises with good channels for the acquisition of accurate information by enterprises, what's more, it can also supply ample knowledge, information and complementary resources (Dou and Wang, 2012). Szulanski (1996) argued that successful knowledge transfer must rely on the relationship between knowledge senders and receivers.

From the point of view of the characteristics of knowledge flow inside a cluster, formal relationship network contributes to the flow of explicit knowledge, which can be codified and stored in the cluster's overall "knowledge base" and can be diffused rapidly in the cluster network. Whereas the informal network relations are relatively free and loose and are capable of creating an ideal environment for the transfer of tacit knowledge. Wang (2010) summarized the transferring and sharing process of tacit knowledge by way of informal networks among cluster enterprises. The process is as follows: Individuals finish the accumulation of knowledge by means of the internalization of corporate knowledge; Knowledge transfer and sharing among individuals are accomplished via informal communication forms, such as employee turnover (for instance, job-hopping), invisible college (which refers to informal academic exchange) and friends gathering; The transformation of personal knowledge into corporate knowledge are accomplished via the codification of knowledge, those transformed knowledge are then stored in an organization's knowledge base, in order that the transfer of tacit knowledge among organizations could be completed. To sum up, the speed of knowledge transferring and sharing in social relationship networks of industrial clusters is accelerated obviously, with higher degree of sharing and lower learning costs. Both parties' intention of knowledge sharing can be facilitated via various moderating effects of social network whatever the relationship, which can be formal (i.e., economic and contractual) or informal (i.e., non-trade).

As mentioned above, the relational network of cluster enterprises provides the channel and platform of knowledge diffusion and transfer among enterprises. It is a hard-to-copy intangible asset of cluster enterprises that differentiates themselves from other organizations. In the meantime, it is also an important endogenous factor that can promote the diffusion and transfer of internal knowledge of a cluster, not to mention its positive function in breaking through the "locking" and driving the growth of a cluster (Liu and Cheng, 2011). The growth of enterprises, the cultivation of competitive advantages and the improvement of innovation ability all call for the integration of relevant knowledge. However, each member of a cluster merely grasps some fragment of knowledge owing to knowledge division. Each related enterprise should fuse knowledge through various relationships in order to overcome knowledge separation and construct knowledge community by way of knowledge chains and networks which are good for innovation. Therefore, the more the self-centered direct network relationships, the more likely an enterprise acquires the needed knowledge and the lower the knowledge searching costs. The innovation and knowledge acquisition ability of an enterprise depend to a large extent on the quantity and quality of its network relationships. In an open network, the larger the number of cluster network connection, the greater the potential energy of corporate relationships and the more likely it is to obtain the flowing knowledge. The quantity of subjects directly associated with an enterprise in all its cluster network relationships represents the amlessness of corporate relational assets, affects the connectivity and cohesion of corporate self-centered individual network.

The Impact of the power of network relationship on knowledge transfer among cluster enterprises: The power of network relationship (relational distance) is one of the important attributes influencing the performance of knowledge transfer among cluster enterprises. There are three types of relationships among cluster enterprises: strong ties, weak ties and free exchange. The roles that they play in knowledge diffusion are entirely different (Wang, 2007). The relationships have different intensities and exhibit different characteristics in terms of the deliver
of knowledge and information. The strength of the relationships impacts the efficacy of the diffusion and transfer of explicit and tacit knowledge, as well as the depth and breadth of the transferred knowledge. As an individual enterprise in a cluster, its possessed and controlled power of network relationships influences its ability of knowledge searching, acquisition and innovation, as well as the types of organizational learning and patterns of innovation (Pan and Zheng, 2011).

Strong ties play an unique role on information transmission, knowledge diffusion and innovation efficiency within a cluster. Relatively strong network relationships accumulated over a long period of time can promote frequent interaction and knowledge exchange among cluster enterprises and individuals, reduce the uncertainty involved in knowledge diffusion and interaction and ensure the efficient and rapid spread of information and knowledge. Timely and effective knowledge supply can generate size effect of knowledge application and innovation, accelerate the socialization process of cluster knowledge and facilitate the spiraling of knowledge innovation. The most prominent function of strong ties is providing enterprises with much complex, tacit knowledge through interpersonal interactions, as this type of knowledge can only be effectively acquired through face-to-face interpersonal interaction. The spatial and social proximity make each enterprise geographically close to the relevant knowledge sources. The stronger the relationship, the more the opportunity of interaction, the faster the speed of knowledge diffusion and transfer and the larger the benefits gained from knowledge innovation (Ye, 2007). Besides, strong ties can maintain the continuity of knowledge diffusion and transfer happening inside the cluster network, ensure the high-level interaction among enterprises and individuals and guarantee the persistence and stability of knowledge supply (i.e., knowledge acquisition during knowledge transfer).

Compared with strong ties, weak ties are deemed as having better information/knowledge diffusion effect and being more conducive to promoting knowledge innovation performance. Although the knowledge diffused through strong ties are relatively ample, with the passage of time, the overlapping knowledge would increase and the redundant relations would emerge. As a result of the development of cluster network, the overall knowledge locking would arise. Eventually, an organization would reject and be immune to new external knowledge, which can be termed as the “non-local invention syndrome”. It hinders the acquisition of heterogeneous information and knowledge and affects corporate knowledge innovation. On the contrary, weak ties are widely distributed and of diverse kinds, without confined by fixed roles (Xie et al., 2012). Weak ties are more valuable for innovation activities as there are less knowledge overlapping among members and more heterogeneous, non-repetitive information and knowledge. The multi-subject nature of weak ties ensures the possibility of finding out different sources of knowledge and receiving more overflowed and transferred knowledge. However, in terms of the timeliness of diffusion and the persistence of relationships, weak ties are inferior to strong ties. Due to its high cost of knowledge searching and acquisition, weak ties’ efficiency of knowledge acquisition are affected to some extent.

According to the intrinsic association between the relational power and the knowledge diffusion and transfer, cluster enterprises should transform weak ties into strong ties, facilitate the effective diffusion of high-profits knowledge. With the decreasing of the benefits gained from weak ties, cluster enterprises should continuously search for other heterogeneous sources of knowledge, namely, develop more weak ties, so that they can constantly absorb and integrate knowledge to accomplish innovation. This is where the advantages of clustering innovation lay in.

The Impact of the network relationships on corporate intention of knowledge transfer: The network relationships of cluster enterprises also affect the sender’s intention of knowledge transfer. Reagans and McEvily (2003) cited the "reputation model" and "rule of cooperation model" proposed in the studies of Granovetter and Coleman to explain the connection between network relationship and intention of knowledge transfer as follows: In a highly dense network, if a knowledge source adopts uncooperative behaviors, this information would then spread quickly in the network, leading to the loss of opportunities to cooperate with other network members in the future. Considering the protection of its own reputation, the sender’s willingness of sending knowledge is generally strong in a highly dense network. The rule of cooperation model means that the existence of a strong tie with a third party would make it easier for the behaviors of network individuals be constrained by the rule of cooperation. In a highly dense network, if one party adopts uncooperative behaviors, not only can the opposite side enforce penalties, but other members can also adopt corresponding measures, with the result that the rule of cooperation being more binding. Using transferring willingness of both parties as a mediating factor, Zhu et al. (2011) verified in an empirical study that the density of network relationships can
enhance the sending willingness of enterprises and impact positively on the effect of inter-firm knowledge transfer.

THE IMPACT OF KNOWLEDGE DISTRIBUTION ON KNOWLEDGE TRANSFER AMONG CLUSTER ENTERPRISES

The knowledge distribution and potential difference among cluster enterprise. Generally, the sources of knowledge critical to corporate knowledge accumulation are relatively scattered in space, enterprises often expose themselves to regional or even international network of knowledge sharing. As to enterprises located in an industrial cluster, the relevant knowledge are highly concentrated geographically and a relatively intensive knowledge field is formed surrounding enterprises (Ye, 2007). The spatial aggregation of knowledge provides the possibility of knowledge diffusion, transfer and innovation. An industrial cluster is a knowledge-intensive organization proprietary to a particular industry. Becattini (1978) regards an industrial cluster as an ideal location of knowledge diffusion and innovation. The high concentration of professional local workforce, combined with geographical and relational proximity among enterprises, make it convenient for the new thoughts, information and knowledge be diffused rapidly. Cumulative and collective innovation are thus be promoted in the relevant regions. Therefore, an industrial cluster is viewed as a dynamic knowledge community or a knowledge diffusion network (also referred to as knowledge network by some scholars) composed of a large number of local enterprises. Various types of knowledge are distributed in different enterprises due to the need of industrial division. For the same kind of knowledge, there are differences in terms of the depth and breadth of knowledge mastered by each enterprise. Hence, knowledge inside a cluster are located in each enterprise with different form.

The need of industrial division leads to the high differentiation and dispersion of knowledge inside an industrial cluster. But the knowledge resources are not uniformly distributed and randomly mobilized in fixed geographical locations. The knowledge flow and diffusion in a cluster occur inside an epistemic community characterized by common knowledge structure. The knowledge of a cluster are also collected in these epistemic communities, the concentrated area and production space of a certain kind of knowledge are thus formed (Zhang and Xu, 2006). In this particular area and space, there exists a relatively large disparity among each enterprise, in terms of the knowledge basis, knowledge stock and personnel quality. The potential difference of "knowledge capability" does exist, it makes the distribution of corporate knowledge capability non-balanced. At the same time, it also become the source of power in terms of knowledge transfer among cluster enterprises. The potential difference of "knowledge capability" is also referred to as "knowledge distance" or "potential difference of knowledge", the existence of knowledge potential energy among subjects that causes the flow of knowledge. Enterprises in a cluster can thus be categorized as those having high knowledge potential energy and those having low knowledge potential energy. Wang (2010) classified the potential of cluster enterprises from the horizontal and vertical dimensions. The potential of enterprises assessed from different dimensions are not the same. Generally, knowledge spillover and transfer inside a cluster are from high-potential enterprise to low-potential enterprise. Thus it can be seen that division results in the disparity of corporate knowledge potential. The same enterprise inside a knowledge network can be either the receiver or the sender, this implies that there is no enterprise which has absolute advantage of knowledge, the potential energy is relative.

The impact of knowledge distribution on knowledge transfer. Hamel (1991)’s study shows that during the process of knowledge transfer, when the knowledge gap between each side is appropriate (so that the receiver can understand the knowledge that would be transferred afterwards) the learning of receivers can be promoted, the efficiency and effectiveness of knowledge transfer can also be enhanced. When the knowledge distance between each side is too large, the receiver’s willingness would be affected, as the transferred knowledge are beyond its processing capacity. This will lead to communication difficulties between both parties, the increase of transferring costs, the influence of confidence and patience of both parties, the damage to the transferring process and performance, as well as the possibility of the following transfer of knowledge. However, receivers usually don’t stop learning knowledge, on the contrary, when perceiving a big knowledge gap, these receivers would have a stronger willingness and motivation to receive and learn knowledge and proactively expand the boundary of knowledge searching, in order that they can find a larger number of appropriate opportunities to transfer knowledge (Lane and Lubatkin, 1998). Similarly, the corresponding knowledge gap can’t be too small. Too small a gap leads to the homogeneity of knowledge between enterprises. This will also affect the receiver’s willingness and motivation of learning. With a small knowledge potential difference, receivers would think that there is little new knowledge and the quality of transferred
knowledge cannot be guaranteed. The input involved in both parties' knowledge transfer would possibly lead to diseconomy. The contradiction of knowledge transfer mentioned above is the “inverted” U phenomenon termed by scholars in the field of knowledge management. There are high overlap among small and medium-sized enterprises in terms of knowledge and skills and certain kind of knowledge redundancy would be generated through the process of knowledge interaction. Therefore, big enterprises with the same knowledge structure (they are usually characterized with high knowledge potential) tend to be their main object of learning. These high-potential-energy enterprises in a cluster transfer knowledge to low-potential-energy ones in the same cluster through different ways and actively expand their organizational boundaries of knowledge searching, so that they can find out knowledge sources with higher potential energy outside the cluster.

In addition to the above mentioned knowledge gap between both sides of knowledge transfer, scholars at home and abroad also analyzed how knowledge distribution features affect knowledge transfer from other angles. Some researchers analyzed the impact of knowledge distance on knowledge transfer from the angle of structural complementarity and basic similarity of knowledge of both parties, he also proposed the issue of gap matching between two sides. Using cognitive theory and schematic concept, Zhang and Xu (2006) studied the regional knowledge community, especially the impact of knowledge distribution (knowledge level, knowledge heterogeneity) of cluster enterprises on their knowledge acquisition, knowledge learning and competitive advantage. When using Zhejiang Datang Cluster as the subject of case studies, based on technical and market dimensions, Xu (2009) verified that the distribution of technical knowledge is characterized by high homogeneity. Hence, for an enterprise inside a cluster, the acquisition of technical knowledge comes mainly from within that cluster. While the distribution of market knowledge is heterogeneous and the acquisition of market knowledge comes mainly from accumulation by itself or receiving knowledge transferred from outside the cluster.

CONCLUSION

The proximity of cluster enterprises brings themselves asymmetric, positive externality of knowledge compared with non-clustered enterprises. Proximity is good for the enhancement of trust among enterprises, the decrease of diverse tangible transaction costs and the improvement of collective learning and knowledge transfer. Spatial proximity help construct various economic and non-economic networks for cluster enterprises. These networks provide platforms and sources for each enterprise so that they can exchange and deliver resources. These networks are also hard-to-copy intangible assets and can be viewed as an unique context, which differentiates cluster enterprises from other organizations in terms of knowledge transfer. Formal relational networks are good for the flow of explicit knowledge, relatively free and flexible informal relational networks can foster a good transferring environment for tacit knowledge. Strong ties can provide enterprises with a lot complicated, tacit knowledge through frequent interpersonal interaction. Weak ties can minimize knowledge overlap and redundancy, not to mention the provision of heterogeneous sources of knowledge. A prerequisite for knowledge transfer is knowledge potential difference. Generally, knowledge flows from high-potential-energy enterprise to low-potential-energy one. Appropriate potential difference is good for knowledge transfer and it can strengthen the corporate willingness of receiving and learning knowledge. However, if the knowledge gap is too large, the effect of knowledge transfer would be spoiled, even that of sending and receiving willingness. Therefore, during the process of knowledge transfer among cluster enterprises, the matching of knowledge levels of both sides should be given serious attention.

REFERENCES


