THE STUDY ON INFLUENCING FACTORS OF KNOWLEDGE TRANSFER AMONG CLUSTER ENTERPRISES: BASED ON THE PERSPECTIVE OF DISTANCE CONTEXTS

Han Minghua
Faculty of Business, Ningbo University
Ningbo 315211, China
Email: hanminghua@nbu.edu.cn

ABSTRACT
This paper divides the distance context factors which affect knowledge transfer performance among cluster enterprises into three aspects, there are relationship distance, organization distance and knowledge distance. Then it discusses the effects on knowledge transfer in industrial cluster enterprises by each distance contexts. And then through the questionnaire survey and sample data statistics analysis, the paper makes an empirical verification. The result shows that the relationship and organization distance have significant and positive effect on knowledge transfer in cluster enterprises, while the knowledge distance not only has significant and positive effect, but also negative effect, but not significant. Finally, the paper puts forwards some related suggestions to improve the performance of knowledge transfer in industrial cluster enterprises under the distance context.

KEYWORDS
Industrial cluster enterprises; knowledge transfer; distance context; empirical analysis.

1. INTRODUCTION
Influenced by theories of knowledge management and enterprises’ core competition capability, more and more attention has been paid on both activities of cluster knowledge and knowledge management ever since 1990, and knowledge transfer among cluster is one of the most important issues followed by the researchers both at home and abroad. A lot of scholars such as Krugman, Baptista R. & Swann P. and Martin Bell & Michael believe that cluster environment is more suitable for the development and utilization for knowledge resource (Krugman, 1991; Baptista R. & Swann P., 1998; Martin Bell & Michael, 1999), thus promoting cluster enterprises to maintain the sustainable advantage [1, 2]. A special kind of information and its exchange formed in the same area and some industry benefits the transfer of new technology and new knowledge (Owen-Smith & Powell, 2002; Grabher, 2002; Storper & Venables, 2004). The cluster enterprises can promote innovation and technology. However, though cluster environment is beneficial to the knowledge transfer, knowledge has the character of context dependence [3-7] (Badaracco, 1991; Inkpen, 1998; Di Qiang & Zhang Chao, 2005; Yu Guangsheng & Liu...
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Wei, 2006; Zheng Chuan Jun & Xing Dingyin, 2007). The scope of the enterprise knowledge transfer is harassed by its contexts (Xu Jinfu, Xu Qiang & Gu Jinlei, 2003).

Due to the importance of context influences towards knowledge transfer, many scholars pay a lot attention on the research and study on knowledge transfer contexts, which mainly focus on the relationships between knowledge transfer and contexts[8-13] (Lei, Slocum & Pitts, 1997; Nonaka et al., 1998; Nonaka et al., 2000; Xu Jinfu & Xu Qiang, 2003; Ma Jun, Zhong Wei Zhou & Chen Yan, 2007; Fu Taohong & Du Rong, 2010), knowledge transfer contexts[14-22] (Albino et al., 1998; Xu Qiang & Liu Yi, 2006; Yakhlef, 2007; Khamseh & Jolly, 2008; Qi Hongmei & Huang Ruizhu, 2008; Zhang Rui & Yu Bo, 2009; Su Hui, 2009; Guan Tao, 2010; Luo Yanling & Ma Feicheng, 2011) and construction of model of knowledge transfer contexts[11, 23-25] (Szulanski, 2000; Jeffrey & Bing-Sheng Teng, 2003; Xu Jinfu & Xu Qiang, 2003; Wang Qingxiao & Yang Zhong, 2006). Among in, the distance context between subjects of knowledge transfer is viewed as an important contextual factor influencing enterprises’ knowledge transfer[13, 22, 26-27] (Xu Zhanchen & He Mingsheng, 2005; Fu Taohong & Du Rong, 2010; Luo Yanling & Ma Feicheng, 2011; Yu Haiyun, 2012). According to the present research, most knowledge transfer is studied inside an internal enterprise including multinationals, affiliate enterprise or alliance.

Therefore, this paper discusses distance contexts influencing knowledge transfer among cluster enterprises and its relationship with knowledge transfer based on previous research, and it further analyzes the effects that the distance contexts hold against knowledge transfer among cluster enterprises through empirical study.

2. MECHANISM ANALYSIS OF HOW DISTANCE CONTEXTS AFFECT KNOWLEDGE TRANSFER AMONG CLUSTER ENTERPRISES

According to situated cognition theory, understanding and application of knowledge is closely related with context. The knowledge context participants need to select the appropriate knowledge application scenarios, so the knowledge transferred from the enterprises contains historical and contextual information from the knowledge source enterprise, therefore, the transferred knowledge should match new contexts and historical ones while knowledge receiver enterprises try to understand and apply this knowledge. In general, the smaller the difference between them, the smaller "distance" between the present context that the knowledge being applied by the recipients and historical one that the knowledge being applied by the knowledge source enterprises, and more successfully knowledge transfers. Therefore, knowledge transferring activities between cluster enterprises in the same industry are certain to be restricted by the distance contexts between knowledge transferring enterprises. Guan Tao et al. (Guan Tao, 2005; Zhu XiuMei, 2009) make a study how geographical distance influences knowledge transfer and come to the following conclusion: smaller geographical distance benefits the knowledge transfer between enterprises, which is consistent with the theory that geographical proximity among industrial clusters will facilitate the transfer and sharing of knowledge between enterprises among cluster.

In view of the geographical proximity among industrial cluster enterprises, geographic distance factor is excluded from this paper. We focus on how different
relationship, organization and level of knowledge between knowledge transfer enterprises works on the knowledge transfer and we call these influencing factors as relationship distance, organization distance and knowledge distance.

2.1 Mechanism Analysis of How Relationship Distance Affects Knowledge Transfer among Cluster Enterprises

Marshall (1920) suggests cluster knowledge as “industry atmosphere” and it has certain public goods characteristics which make it possible to be shared by all enterprise members within a cluster as open resource. However, it is specific to individual enterprises and therefore the degree of openness of its knowledge resources will be under certain restrictions. The degree of openness is determined by the importance of the knowledge and the closeness of the two enterprises. From the perspective of the enterprise transferring knowledge, the knowledge is affected by the type of enterprise itself, which refers to general knowledge, basic knowledge, or core knowledge. Core knowledge which can provide a competitive advantage for enterprises is strictly protected. And it is influenced by the closeness of the relationship between knowledge transfer enterprises.

Cluster enterprises cooperate and compete with each other. If cluster enterprises compete more than cooperate (non-cooperative competition), or the cooperation is short-term or temporary, knowledge exchanges between cluster enterprises will be relatively less, which means the farther relationship distance is, less knowledge transfer would be likely to occur. On the contrary, if cluster enterprises have a long-term and stable cooperative relationship based on trust (as with upstream suppliers, downstream customers and enterprises in the same or other lines), it will help them to shorten relationship distance between the enterprises. Shorter relationship distance will be helpful to the exchange of knowledge and interaction between enterprises of both sides, which lead to more direct and frequent transfer of knowledge. The above shows that in the process of knowledge transfer between enterprises within the same industrial clusters, relationship distance which reflects the closeness between the knowledge source enterprise and its recipient one is very important for the performance of knowledge transfer.

Based on the above analysis, the paper proposes the following hypotheses.

H1: the relationship distance between cluster enterprises significantly affect knowledge transfer performance. The closer the relationship distance, the better knowledge transfer, and vice versa.

2.2 Mechanism Analysis of How Organization Distance Affects Knowledge Transfer among Cluster Enterprises

General speaking, the knowledge context can be divided into the internal context and external one. The former focuses on external ecological environment where enterprises rely on survival and development and the latter focuses on the enterprise's own internal state. Wang QingXiao and Yang Zhong (2006) believe that organization distance examines the organization differences in the structures, processes, values and so on [25], mainly in enterprises’ internal contexts. Based on the above, organization distance between cluster enterprises that transfer knowledge is viewed as differences in internal
contexts such as corporate culture, organizational structure and enterprise system between knowledge source enterprises and knowledge recipients. This paper pays great attention to the difference of both corporate culture differences and organizational structure ones.

2.2.1 Corporate Cultural Differences

Corporate culture is an important part of its strategic competition advantages and core competency. The corporate culture is known as the knowledge of action jointly owned by corporate members and stipulated according to the mutually agreed norms. It has the nature of knowledge, which also reflects correct understanding of the business context. So, there is no identical corporate culture including values, beliefs, and social norms and so on. No knowledge can be excluded from certain historical stage and the specific cultural environment in the process of discovery, creation and application of knowledge. As a matter of fact, knowledge is appropriately integrated into the cultural basis reflecting the significance of enterprise scenarios. Therefore, not only the content of the knowledge but also its unique corporate culture are transferred between cluster enterprises. If knowledge transferring enterprises are culturally similar, the cost of communication and coordination can be effectively reduced in the process of knowledge transfer. For example, if enterprises with source knowledge and knowledge recipients in the same cluster have same organizational culture as encouraging innovation, knowledge transfer and sharing between them are more likely to occur.

The foresaid shows that the culture difference between the source knowledge enterprises and knowledge recipients exert great influence on the performance of knowledge transfer in the process of knowledge transfer among cluster enterprises.

Based on the above analysis, the paper proposes the following hypotheses.

H2: the organization distance between cluster enterprises significantly affect knowledge transfer performance. The closer the organization distance, the better knowledge transfer, and vice versa.

2.2.2 Corporate Organization Structure Differences

Knowledge can be transferred two-way from both knowledge source enterprises and knowledge recipients among cluster enterprises. Once knowledge is transferred to recipients, whether it can be quickly absorbed and made effective use of depends on the fact whether it can be smoothly exchanged and transmitted within cluster, which is closely related with organization structure basis. Firstly, the organization structure to some extent determines the channels of exchange and transmission of knowledge in the enterprise; secondly, different organizational structures in enterprises exert different influence on effective creation and utilization; thirdly, different organizational structure will lead to different knowledge transfer speed. So, organizational structure will be viewed as a context that is established to affect their internal knowledge exchange and dissemination in this paper.

In general, the traditional organizational structure of enterprises such as linear, functional and so on has a stricter classification; information is transferred and communicated in accordance with certain rules such as command and instructions
between superior and subordinate and debriefing between peers. Thus, accepting externally transferred knowledge depends largely on channels of internal knowledge diffusion. As the responses of centralized hierarchy organizations are relatively slower toward environmental change, it will have a negative impact on absorption and utilization of knowledge. This flexible organizational structure is more convenient for the enterprises to exchange and communicate with external environment which in this paper refers to other enterprises among cluster, and therefore is more likely to rapidly spread and disseminate corporate learning and new knowledge in the enterprise. The above shows that different organization structures play great role in terms of internal exchange, perception and communication. So, organization distance is very important for the performance of knowledge transfer.

Based on the above analysis, the paper proposes the following hypotheses.

H3: the organization distance between cluster enterprises significantly affect knowledge transfer performance. The closer the organization distance, the better knowledge transfer and vice versa.

2.3 Mechanism Analysis of How Knowledge Distance Affects Knowledge Transfer among Cluster Enterprises

Mass production and specialization lead to knowledge "gap" - "knowledge distance" among cluster enterprises. Some cluster enterprises have accumulated a lot of knowledge application experience and innovation capability which exceed other ones in the cluster. This kind of knowledge gap make it possible for the knowledge flowing from “higher” enterprise which has relatively higher knowledge level and capacity to “lower” enterprise which has relatively lower knowledge level and capacity.

However, knowledge transferred from “higher” enterprise to “lower” one has a close relationship with "knowledge distance", and it will not only affects the speed of knowledge transfer and its cost, but also influences the results of absorption, utilization and even innovation of the transferred knowledge. Because knowledge distance reflects knowledge heterogeneity, knowledge can be smoothly transferred on the premise that both enterprises should have similar or overlapping knowledge (Hu Hanhui, 2006).

Knowledge heterogeneity reflects the gap of knowledge level between the enterprises transferring knowledge among cluster. If knowledge gap between knowledge source enterprises and knowledge recipients is big, it is more difficult for knowledge recipients to obtain the understanding of the transferred knowledge based on his own knowledge capacity, and it will be more difficult to achieve effective absorption and utilization of knowledge. Conversely, if too much emphasis is put on the overlap of the knowledge, that means knowledge might be too similar and it will be worthless to transfer the knowledge due to little knowledge distance.

The above analysis shows that the knowledge gap is necessary between the enterprises transferring knowledge among cluster. However, this distance should not be too big or too small. Inappropriate knowledge distance will have negative impact on the effectiveness of the knowledge transfer.
Based on the above analysis, the paper proposes the following hypotheses.

H4: the knowledge distance between cluster enterprises have significant impact on knowledge transfer performance. The more appropriate the knowledge distance, the better knowledge transfer, and vice versa.

3. EMPIRICAL ANALYSIS

3.1 Scale design and data collection

This paper studies how distance contexts affect knowledge transfer performance among cluster enterprises. So, enterprises in the industrial cluster environment are the object of the study and data is collected by questionnaire. A dependent variable is knowledge transfer performance among cluster enterprises. Independent variables are relationship distance, organization distance as well as knowledge distance. As the above mentioned variables are difficult to quantify data, while designing variables indicators of research questionnaire, we design a total of 15 quantitative indicators for distance contexts. There are six measurement items relationship distance (GXJL1~GXJL6), organization distance (ZZJL1~ZZJL4), knowledge distance (ZSJL1~ZSJL5), and knowledge transfer performance among cluster enterprises (ZYXG1~ZYXG7). The scale design is scored by five points.

The research is made in enterprises in line of garment and mold cluster representing local mainstream economy in Zhejiang province in China. E-questionnaires are e-mailed and paper questionnaire survey is made. The respondents are professional technicians and senior managers of these enterprises. 271 copies of the survey questionnaires are distributed and 208 copies are collected and the response rate reaches 76.6%. Among them, 172 copies are valid accounting for 82.7% of the questionnaires.

3.2 Descriptive Statistical Analysis of the Sample Data

After inputting valid questionnaire data, we use SPSS 17.0 for sample data processing. Based on descriptive statistical analysis results of the sample data that describe in 3 independable variables by 15 measurement items as well as dependable variable of 7 measurement items, their minimum maximum, the mean and standard deviation, the mean level of the relationship distance of knowledge transferring enterprises in the cluster is generally higher, indicating a more intimate relationship between the knowledge transfer cluster enterprises, which partly verify hypothesis that relationship distance has significant impact on performance of the knowledge transfer; The organization distance value is in upper level, which shows that the corporate culture or organizational structure of knowledge transferring firms in cluster has a certain similarity; Most value of knowledge distance are less than mean (3 points ) showing that there is a certain "knowledge distance” between the knowledge transfer cluster enterprises.

3.3 Analysis of Reliability and Validity

In order to further improve the quality of sample data, this paper makes an analysis of reliability and validity for those valid questionnaires. In this paper, validity analysis makes use of exploratory factor analysis, and 0.7 is viewed as the critical value for KMO factor analysis. The principal component analysis method is used to make factor analysis
for the scale tables, and characteristic value of factor is assumed greater than 1 as extraction standard together with maximum variance method to investigate and loading coefficients. Reliability analysis is tested by investigation of Cronbach’s Alpha coefficient (this study believes that the variables measured in the Cranach’s alpha coefficient should be greater than 0.7).

Test results show that KMO coefficient is greater than 0.7 passing the Bartlett’s spherical test. In the factor analysis of 15 measurement indexes for distance contexts of knowledge transferring enterprises within cluster, because the common index of the first index of the relationship distance and fifth index of knowledge distance is less than 0.6, these 2 indicators is deleted. The above factor analysis shows that common index of the first measurement item of organization distance is less than 0.6; therefore, this index is also deleted. Three new factors come out of the factor analysis of distance contexts of knowledge transferring enterprises within cluster; they are named as follows based on the implication of their indexes: X1, relationship distance factor; X2, organization distance factor; X3, knowledge distance factor. One new factor comes out of the factor analysis of performance of knowledge transfer; it is named as Y1, knowledge transfer performance factor based on its implication.

Based on the factor analysis and rejecting unqualified measuring indicators thereafter, reliability analysis results show variable Cronbach's Alpha are greater than 0.7 standard, achieving reliability requirements.

3.4 Regression Analysis

In order to further analyze how distance contexts work on knowledge transferring enterprises within cluster, this paper makes a regression analysis for the factor analysis results. Before the regression analysis, Pearson correlation test is made for those factor variables and results are as the following table 1.

<table>
<thead>
<tr>
<th>If Variable is</th>
<th>Then Correlation coefficients of X1 is</th>
<th>Then Correlation coefficients of X2 is</th>
<th>Then Correlation coefficients of X3 is</th>
<th>Then Correlation coefficients of Y1 is</th>
</tr>
</thead>
<tbody>
<tr>
<td>relationship distance factor (X1)</td>
<td>1.000</td>
<td>.000</td>
<td>.000</td>
<td>.322**</td>
</tr>
<tr>
<td>organization distance factor (X2)</td>
<td>.000</td>
<td>1.000</td>
<td>.000</td>
<td>.137</td>
</tr>
<tr>
<td>knowledge distance factor (X3)</td>
<td>.000</td>
<td>.000</td>
<td>1.000</td>
<td>.196**</td>
</tr>
<tr>
<td>knowledge transfer performance factor (Y1)</td>
<td>.322**</td>
<td>.137</td>
<td>.196**</td>
<td>1.000</td>
</tr>
</tbody>
</table>

** At the .01 level significantly correlated (bilateral)
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Table 1 shows there’s no correlativity between dependable variables, so it is impossible to make larger deviation in the regression analysis due to explanation of higher correlativity between dependable variables. Linear process of SPSS 17.0 is used to study whether there are any influence and its significant one of dependable variables (X1-X3) towards independent one (Y1) in this paper. Among them, in order to verify knowledge distance affecting knowledge transfer of enterprise cluster, a new variable X4 is introduced in the regression analysis. X4 means squared value of X3 ($X4 = X3^2$). The results of regression analysis are as table 2.

Table 2: The results of regression analysis of distance contexts of knowledge transferring among cluster enterprises and its knowledge transfer performance

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Then Regression coefficient</th>
<th>Then Standard Regression coefficient</th>
<th>Then T value</th>
<th>Then T value significant</th>
<th>Then $R^2$</th>
<th>Then adjusted $R^2$</th>
<th>Then F value</th>
<th>Then F value significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>X1</td>
<td>.321</td>
<td>.321</td>
<td>4.513</td>
<td>.000</td>
<td>0.161</td>
<td>0.140</td>
<td>8.020</td>
<td>.000</td>
</tr>
<tr>
<td>X2</td>
<td>.138</td>
<td>.138</td>
<td>1.944</td>
<td>.054</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X3</td>
<td>.200</td>
<td>.200</td>
<td>2.743</td>
<td>.007</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X4</td>
<td>-.018</td>
<td>-.017</td>
<td>-.237</td>
<td>.813</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The regression analysis in table 2 shows F test value is 8.020, the significant level of is 0.000 (less than 0.01), reaching very significant level.

According the results of data analysis in table 2, we can know,

1) The relationship distance (X1) and knowledge transfer performance (Y1) shows significant positive correlation in level p=0.000 (less than 0.01 ), and its standard regression coefficient is 0.321, which shows the closer the relationship between knowledge transferring cluster enterprises, the better knowledge transfer performance. Hypothesis H1 is supported.

2) The organization distance (X2) and knowledge transfer performance (Y1) shows relative positive correlation in level p=0.054 (less than 0.1), and its standard regression coefficient is 0.138, which shows more similar the organization structure, enterprise culture and other internal contexts between knowledge transferring cluster enterprises, the better knowledge transfer performance. Hypothesis H2 and H3 are supported.

3) The knowledge distance (X3) and knowledge transfer performance (Y1) shows significant positive correlation in level p=0.007 ( less than 0.01), and its standard regression coefficient is 0.200; Meanwhile, standard regression coefficient of knowledge distance square value (X4) is -0.017 showing that knowledge transfer has a negative correlation, but it is not significant ( p=0.813), which suggests that if cluster enterprises keep moderate knowledge distance, knowledge transfer can perform well and thus hypothesis H4 is somewhat supported.
4. CONCLUSION AND PROSPECT

Based on the references of knowledge contexts, cluster knowledge transfer and so on, this paper analyzes distance contexts influencing knowledge transfer performance of cluster enterprises and suggests dividing distance contexts into three aspects as relationship distance, organization distance and knowledge distance. Furthermore, an empirical analysis is made to verify the influences of the above distance contexts toward knowledge transfer of cluster enterprises.

The research shows that distance contexts have significant effects on knowledge transfer performance of cluster enterprises. Relationship distance has significant positive influence towards knowledge transfer performance of cluster enterprises; Organization distance such as enterprises’ culture difference and organization structure ones and so on has significant positive influence towards knowledge transfer performance of cluster enterprises; knowledge distance has significant positive influence towards knowledge transfer performance of cluster enterprises as well as certain negative but not significant influences. The analysis of this research reveals that according to the sample data, means of 5 measurement items (ZSJL1~ZSJL5) concerning knowledge distance are mostly less than 3 points (between 2.593-3.047), leading to the conclusion that “knowledge gap” between sample enterprises is similar and there is certain negative but not significant impact on transfer performance.

Based on the above analysis, enterprises may take the following measures to transfer knowledge internally in order to improve performance of knowledge transfer in cluster enterprises.

1) To establish a long-term mechanism of trust to shorten relationship distance between knowledge transfer cluster enterprises. In order to reduce the searching cost and negotiation costs [28], knowledge transfer cluster enterprises may set up "knowledge based” trust through long-term understanding and cooperation. Meanwhile, common code of conduct should be drafted between knowledge transfer cluster enterprises to prevent members to cheat each other. The self-restraint fulfillment system will reduce the risk in the process of knowledge transfer.

2) To construct an organization structure model promoting knowledge learning and communication and creating learning enterprise culture. The empirical results show that similarity of corporate culture and organization structure is conducive to the promotion of cluster enterprise knowledge transfer, but this paper believes that if the enterprise organization structure is rigid and lack of good learning atmosphere and culture, it will also have an adverse effect on the communication and application of knowledge, which influences the effect of knowledge transfer. Therefore, knowledge transfer cluster enterprise should try to set up an organization structure mode conducive to knowledge exchange and dissemination and try to promote the knowledge sharing and the value of enterprise culture.

3) To keep appropriate knowledge distance between knowledge transfer cluster enterprises. Meanwhile, cluster enterprises should facilitate pulling effect from higher knowledge enterprises to lower ones as well as a pushing effect from lower knowledge enterprises to higher ones to promote a dynamic flow of knowledge transfer and thereby achieve spiral growth of knowledge of cluster enterprises.
This paper studies distance contexts such as the relationship distance, organization distance and knowledge distance as well as its relationship with knowledge transfer performance in cluster enterprises and has obtained some valuable conclusion, however, there is some limitation. Firstly, the analysis of organization distance includes similarities of enterprise organization structure and culture, but only one factor comes out from factor analysis of organization distance data between knowledge transfer cluster enterprises in the empirical analysis, thus the difference of organization structure and culture cannot be distinguished; Secondly, the empirical analysis of knowledge distance shows that hypothesis is only somewhat tested. Therefore, future research should be aimed at the limitation of the above two aspects: one is to further modify questionnaire, especially design and improvement of measurement items of organization distance context; the other is to broaden the scope and area of investigation, meanwhile, knowledge distance between cluster enterprises should be taken into consideration in selecting samplings. Take key enterprises for example to obtain more accurate results.

In addition, there are other contextual factors influencing knowledge transfer among cluster enterprises. As this paper focuses on discussing and analyzing how distance contexts affecting knowledge transfer among industrial cluster enterprises, it makes little mention of other contextual factors. Therefore in the future we should pay more attention to the study of joint effects that distance contexts and other relevant contextual factors work on knowledge transfer among cluster enterprises.

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