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Factors Affecting Knowledge Transfer Success in Business Transforming Enterprise

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Abstract: The purpose of this study is to provide the systematic analysis of an intra-generational KT (knowledge transfer) influence factor evaluation model in business transforming enterprises. The study examined factors such as knowledge context, relation context, transferor context, recipient context and enterprises transforming context, in which process semi-structured interviews and Delphi methods were employed in respect of the data collection and Interpretative Structural Modeling and Analytic Network Process were used to establish the model. The case study shows that the recipient's desire to learning new knowledge plays significant role in putting forward to undertake transfer activities.

Key words: Business transformation, knowledge transfer, analytic network process

INTRODUCTION

Because of the fundamental and accelerated changes characterized by the globalization of markets, ubiquitous presence of information technology, the creation of new organizational forms and networks, enterprises are forced to business transform (Volberda *et al*., 2001). Especially in china which uses to be a big manufacturing country, the government makes a determination and grand goat which is actively carrying. On Industry upgrading and carrying on the change from manufacturing country to creative power. Growing around the business transform process is a new information age economy whose fundamental sources of wealth are knowledge and communication rather than natural resources and physical labor (Conway, 1999; Wetlaufer, 2001). In order to catch up the advanced groups, enterprises must obtain technology knowledge mainly from the advanced enterprises and promote the new knowledge internalization (Kanter and Corn, 1994). The weak knowledge enterprises can benefit from the technical cooperation and purchased equipment, then establish knowledge base, improve productive technology and management and so on. Transfer Knowledge plays the radical role in the transform process of weak knowledge enterprises (Gallagher *et al*., 1999). So if we realize that at present the successful KT is not completely recognized as a means of gaining significant competitive advantage, it makes senses that we investigate the links between knowledge transferring and the business transforming performance. For this reason, this study will examine the influence factors of KT in business transformation enterprises, collect data to establish the priority of factors and apply in one case study.

LITERATURE REVIEW

The KT process is possible to be identify four components of a framework which, describing and influencing the knowledge interaction between the transfer and the recipient: The actors involved in the KT process, the context where the interaction takes place, the content transferred between actors and the media by which the transfer is carried out (Albino and Garavelli, 1999). Thus, the evolution in successful KT process depends on not only the capable and willing of the transferors to transfer knowledge but also the capable and willing of the recipients to re-create the knowledge (Gupta and Govindarajan, 2000). Thus, the study categorizes the factors of transfer knowledge into four groups.

Context of transferred knowledge: From the views of Polanyi (1962), the knowledge can be ranged from explicit to tacit. Nonaka (1994) found that tacit knowledge is knowledge that cannot be codified which is embedded in individuals. Explicit knowledge is the kind knowledge that can be codified in the form of data, manuals, universal principles, technical specifications, engineering drawing and such like. Tacit knowledge is non-codify, deeply embedded in individuals, such as actions, routines, ideals, values and emotions. Explicit knowledge is formal (rules, procedures, etc.) and easy to transfer in codified and formalized form without a loss of integrity which always not the "core capability". Since it is seen as an asset, tacit knowledge is hard to communicate from one actor to another which is often defined "a continuous activity of knowing" (Brown and Duguid 2001; Empson, 2001; Nonaka, 1994). Poirier researches have paid more attention

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to the links between the characteristics of knowledge and KT preferment and pointed out that knowledge embeddedness, articulability and systematicness affect transfer efficiency (Inkpen and Dinur, 1998; Teece, 2000; Zander and Kogut, 1995).

Context of the bilateral actors: The breadth of the different knowledge owned and its connections affect the effectiveness with which new information can be acquired, used and transferred. Then, it seems possible to claim that the higher the degree of actors' prior experience, the greater the effectiveness of KT (Wathne *et al*., 1996). In literatures, factors affecting the success of KT by the transferors may be categorized into two domains: The transferors' capacity to transfer and willingness to transfer which is determined by the content of transferred knowledge and the relationship between interactive actors. Furthermore, the ability of the transferors to impart the knowledge in a specific format that the receive actors can assimilate is involved, especially the tacit knowledge. The ability to transfer is often shaped by a firm's internal capabilities, such as internal R and D, prior collaborative experiences and technical training. Cohen and Levinthal (2000) pointed that enterprise with a higher level of internal R and D capabilities would have higher absorptive capacity and hence higher transfer capacity. Prior experiences enhance the transferors transfer skill in areas where they have had success (Zahra and George, 2002). Through their prior collaborative experiences, the transferors institutionalize transferring mechanisms, establish the legitimate process and improve the organizational routines which will enhance the future transferring process (Zollo and Winter, 2002). The transfer is the interactive process between the transferor and the recipient. Therefore, the recipient's capacity and intent to learn which was identified by other researchers as the similar concepts of learning intent (Baughn *et al*., 1997; Hamel and Pralahad, 1994) and motivation (Szulanski, 1996) will also greatly influent the result of KT (Cohen and Levinthal, 2000).

Context of the support environment: There are significant barriers that come from functional interactive, geographical and organizational levels will affect KT (Dougherty and Hardy, 1996). These factors are organizational distance, physical distance, knowledge distance and culture distance. Each has been shown to be important to affect KT outcomes. For example, though a company may have the capacity to undertake the appropriate managerial activities to overcome any gap between the organizations, a lack of an evaluation of the knowledge distance still may lead to an unsatisfactory outcome (Davenport and Prusak, 1998).

Context of enterprises transforming: New markets and businesses and new approaches to creating and sustaining competitive advantage inevitably demand changes in the skill sets at all levels. Transformation must be cemented with new business processes, new management processes as well as new innovation processes (Prahalad and Oosterveld, 1999). Morton (1995) also suggests that it is the dynamic interplay among these forces that determines the ability of organizations to transform their performance (1) Organizational development (competencies, culture, organizational structure and learning), (2) Process improvement and re-engineering and (3) Information technology which can be redefined as organizational transformation, product transformation and technology transformation.

This study began with a brief overview of KT research from the organization transformation and intra-organizational KT fields. Based on the research streams, the study analyzed the discourse on variables affecting KT and selected thirteen factors across four contextual domains, including knowledge context, subject context, transformation context and supporting environment context. Following a delineation of the model, ISM and ANP was used to construct the model and analyze the data from experts' survey questionnaire. The finding indicated the priority of the key factors can affect KT success in the transformation enterprises.

METHODOLOGY

Process of model establishment: Data were collected by sending out three different experts' questionnaires. The first expert questionnaire was applied to determine the evaluation criterions and indicators in this evaluation model. The second expert questionnaire was adopted to establish correlation matrix between criterions with criterions, criterions with indicators as well as indicators with indicators. The third expert questionnaire obtained the importance weight by pair wise comparisons. The process of establishing the model was shown in Fig. 1.

Evaluation indicators: Through literature review, this research listed a number of influential factors mentioned in different documents as alternative options. Meanwhile, 22 experts of knowledge management were invited to make supplements and determination to expert questionnaires which includes 6 college professors in knowledge management research field, 8 doctoral students engage in knowledge management and 8 senior managers from the product development department of several enterprises. The assessment indicators of factors influencing KT in the transformation enterprise were presented in Fig. 2.

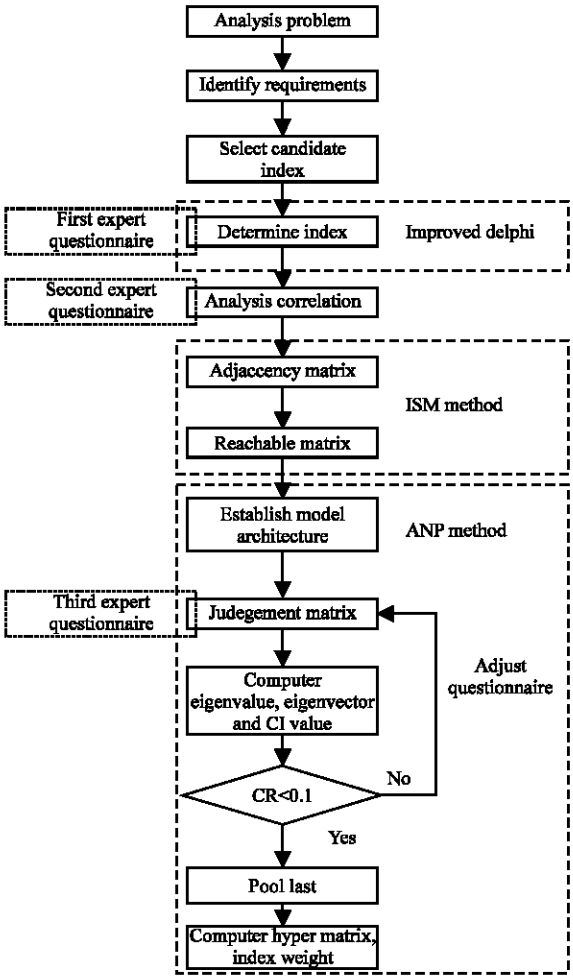

Fig. 1: Process of establishing the model

Correlation analysis

Correlativity: This study, by sending out second set of expert questionnaire, collected the direct correlativity between indexes in the model. On this basis, the adjacency matrix was deduced as indicated in Table 1. In adjacency matrix, in case that S_{ij} as 1, there was direct interdependent relationship between row index $_{Si}$ and column index S_j while 0 stood for no direct interdependent relationship.

Reachable matrix: Reachable matrix can be deduced by adjacency matrix, according the process, the indirect correlativity can be obtained through direct correlativity. This study, by adopting MATLAB software, got reachable Matrix E as shown in Table 1 and the indirect correlativity was marked with *.

Model

Model architecture: On the basis of analysis above, the study used ANP method to establish evaluation model of KT as Fig. 3. The model was split into three layers: the first was goal layer; the second was cluster layer including knowledge context, bilateral members context, transformation span context and support environment context; and the third was indicators layer.

Judgment matrix and consistency: Saaty (1990, 2004) defined that index CR measuring and judging whether the consistency of the matrix could be accepted. When CR<0.100, matrix has satisfying consistency. For example, Table 2 used S2 (knowledge embeddedness) as evaluation rule by expert E_i, in which compares the importance of S4

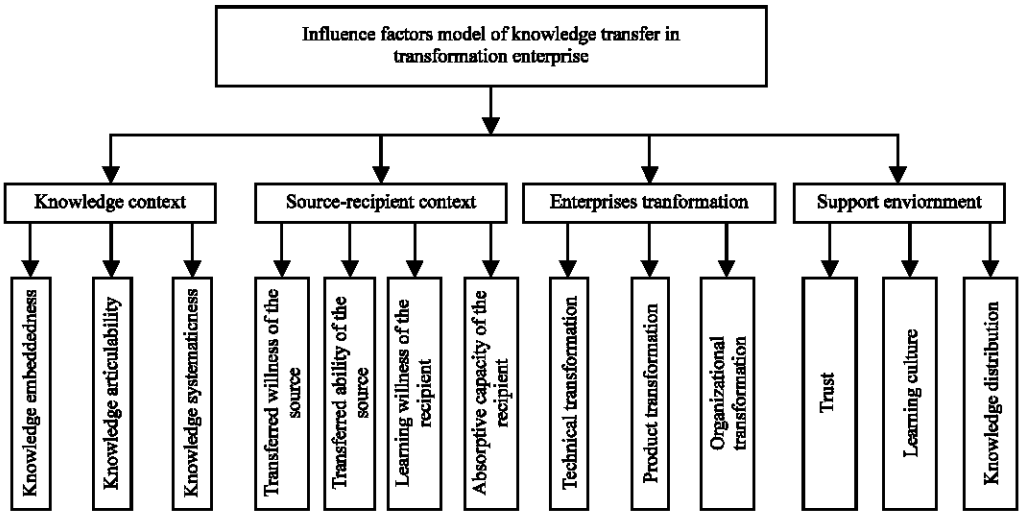

Fig. 2: Influence factors model of KT in transformation enterprise

Table 1: Index reachable matrix

Variable	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13
s1	1	1	1	1	1	1*	1	1*	1*	1*	1*	1	1*
s2	1	1	1	1	1	1*	1	1*	1*	1*	1*	1*	1*
s3	1	1*	1	1	1	1*	1	1*	1*	1	1*	1	1*
s4	0	0	0	1	1	1*	0	0	0	0	0	0	0
s5	0	0	0	1	1	1	0	0	0	0	0	0	0
s6	0	0	0	1*	1*	1	0	0	0	0	0	0	0
s7	0	0	0	0	0	0	1	1	1*	0	0	0	0
s8	0	0	0	0	0	0	1	1	1	0	0	0	0
s9	0	0	0	0	0	0	1	1	1	0	0	0	0
s10	1*	1*	1*	1	1*	1*	1*	1	1*	1	1	1*	1*
s11	1*	1*	1*	1*	1*	1	1*	1*	1*	1	1	1	1
s12	1	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1	1*
s13	1	1*	1*	1*	1*	1*	1*	1*	1*	1*	1	1*	1

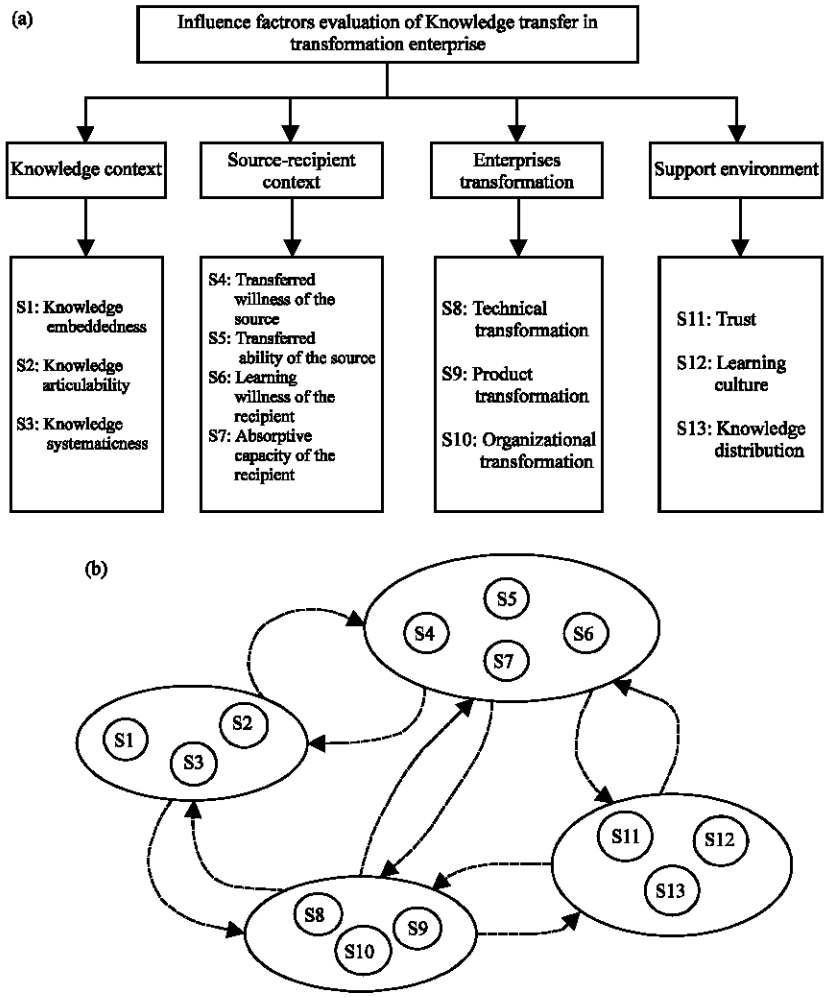

Fig. 3(a-b): Model architecture (a) Control layer and (b) Network layer

(transferred willingness of the source) and S5 (transferred ability of the source), S4 and S7 (absorptive capacity of the recipient),

S4 and S8 (encouragement mechanism), S5 and S7, S5 and S8, S7 and S8. The largest eigenvalue was 4.1981, consistency index:

$$CI = \frac{\lambda_{max} - n}{n-1} = 0.066$$

consistency check result:

$$CR = CI/RI = 0.0742$$

Table 2: Judgment matrix for example

S1	S4	S5	S6	S7	Eigen value
S4	1	4	1/3	1/4	0.1429
S5	1/4	1	1/4	1/6	0.0594
S6	3	4	1	1/3	0.2630
S7	4	6	3	1	0.5347

Table 3: Global sequencing of index weight

Index	Weight	Rank
S1 Knowledge embeddedness	0.0053	12
S2 Knowledge articulability	0.0029	13
S3 Knowledge systematicness	0.0103	10
S4 Transferred willingness of the source	0.1047	4
S5 Transferred ability of the source	0.0482	5
S6 Learning willingness of the recipient	0.2819	1
S7 Absorptive capacity of the recipient	0.2411	2
S8 Technical transformation	0.0432	6
S9 Product transformation	0.0166	8
S10 Organizational transformation	0.0105	9
S11 Trust	0.2090	3
S12 Learning culture	0.0187	7
S13 Knowledge distribution	0.0077	11

lower than 0.1, indicating that the consistency of this judgment matrix was acceptable.

Hyper matrix and limit matrix: With the help of supper decisions software, it can be easy to deduce un-weight matrix, weight matrix, hyper matrix as well as limit matrix through the judgment matrix.

Index weight: Through the calculation above, the global sequencing of index weight was shown in Table 3. The results indicated that during the enterprise transformation process, the rank highest indexes were learning willingness of the recipient, absorptive capacity of the recipient, trust relationship, transferred willingness of the source and transferred capacity of the source. This result matched the reality. In knowledge attribute criterion, the knowledge embeddedness index weight was the highest. Usually, the embedded knowledge is not easy to exactly express only through words, pictures and sound. The essence of embedded knowledge could only be learned through frequently interactivities. Among the transferred knowledge, explicit knowledge was like the tip of iceberg and the large amount of high-value knowledge exists as embedded form. Therefore the embedded knowledge has great impact on the smooth transferring of knowledge.

CONCLUSION

Influence factors assessment of knowledge transferring is a multi-rule, half-structural problem. To achieve the assessment, qualitative, qualitative index needs to be quantitatively handled and the correlativity among indexes also needs to be handled. Therefore, with a brief overview of literature from the KT fields, this study selected thirteen key factors affecting KT inner transforming enterprise across four broad contextual domains, constructing assessment model based on ANP theory. Through the case study, the study obtained findings that are consistent with extant knowledge management theories and several prior empirical researches:

- **Drive:** In particular, difference from the prior study, the study found the learning willingness of the recipient was the basic drive force in KT inner transformation enterprises. Knowledge was the result of long-term accumulation of experiential knowledge, suggesting its self-value. Knowledge owners won't positively or willingly transfer knowledge with others Therefore, knowledge recipient was stronger decisive power during knowledge transferring. Enterprises should design effective knowledge transferring encourage mechanism to stimulate the learning willingness of the recipient, promote knowledge transferring and gradually form the organizing culture of knowledge transferring and sharing
- **Trust:** Whether the knowledge source were willing to share knowledge with others, in what degree would they be willing to share with others, were significantly effected by the trust between the both sides. Trust relation directly decides the effect of knowledge transferring and in return would promote cooperation again. Therefore, enterprise must construct a common goal and enterprise culture based on mutual trust
- **Transferring mechanism:** Tacit knowledge had the feature of non-coding and monopolizing, meanwhile also lies in high value level knowledge. Explicit knowledge transferring had more obvious contracting feature but tacit knowledge transferring was hard to effectively contract. Therefore, enterprise need to select proper transferring mechanism according the features of the transferred knowledge, such as encouraging organizing non-formal teams, adopting tutorial mechanism in managers, adopting apprenticeship system in operators

Compared with the prior research, the study made some improvement in data collecting and analyses. Firstly, the research integrated ISM and ANP methods and adopted the method of expert questionnaire to collect data, making the structure of the model more strict and the result more careful. Secondly, the study focused on enterprise transforming background which making the research more aiming and enriching knowledge

transferring studying system. Thirdly, research result had guiding for the knowledge management during enterprise transforming, could help enterprises systematically and fully analyze knowledge resource configuration optimization problem, promote the sharing and transferring of heterogenous and complementary knowledge and ensure the smooth application of transformation.

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