

Research on the Influencing Factors of Knowledge Transfer in Cooperative Network: A View from the Effect of Network Structure

Wang Ying*

School of Economics & Management, Beijing Information Science & Technology University, Beijing, 100192, P.R. China

Abstract: Knowledge transfer amid organizational units provides chances for shared learning and contributes to making innovation of organizational unit's ability. Cooperative network offers a platform for knowledge transfer among organizational units. So to understand the process of knowledge transfer of several inter-organizations accurately and improve the effectiveness of knowledge transfer in the cooperative network is one of the most important problems that enterprises are confronted with commonly. In this article we investigate the critical influencing aspects of knowledge transfer amid member organizations in the cooperative network from the perspective of network structure. We analyze the relationship between the critical structure characteristics (including network density, network range, network tie strength and network centrality) and the efficiency of knowledge transfer and we get the conclusion that the four network structure characteristics are closely contacted with the easiness of knowledge transfer.

Keywords: Cooperative network, influencing factors, knowledge transfer, network structure.

1. INTRODUCTION

Knowledge has become the most strategic significance resource of the company [1]. The capability of transfer extraneous knowledge to the inter-organization has emerged as a key component to a company's assets for innovation, due partly to the fact that this "second-hand" experience could be gained faster and more inexpensively than "first-hand" [2].

With the knowledge innovation increasing enterprises can not only create knowledge themselves, but also have to extend external cooperative network to get competitive advantage [3]. On one hand, the division of knowledge and knowledge distribution made companies innovate and integrate knowledge themselves. On the other hand, they also sought and spread their outside cooperative network out to become profitable. So, the cooperative networks surrounding the knowledge transfer has become a very important way of knowledge capture and knowledge flow amid member organizations. With the unceasing changes of the relationship among member organizations and the evolution of the network structure, the procedure of knowledge transfer among member organizations in the cooperative network become increasingly complex. Therefore, to understand the key influencing factors of knowledge transfer processing in the cooperative network accurately is to improve the effectiveness of knowledge transfer in the cooperative network, which is one of the most important problems that enterprises are confronted with commonly.

Although there exist multiple factors influencing the procedure the knowledge transfer in cooperative network according

to most research, many recent researches mainly converge on two parts of knowledge transfer: One is from the perspective of characteristics of knowledge, the other is the characteristics of knowledge sender and knowledge-receivers [4]. Network structures under which surrogates operate and spread knowledge and information out have been not taken seriously. So in this article we will investigate the critical influencing factors of knowledge transfer among member organizations in the cooperative network from the perspective of network structure.

2. LITERATURE REVIEW

2.1. Cooperative Network

Richardson is the first to come out with the concept of cooperative network which is considered as a type of organization form existing between market and bureaucracy [5]. The term "cooperative" means that traditional competitors promise to work together in a team to reach a common goal [6].

According to the knowledge-based view, the companies use the cooperative way to acquire knowledge and then internalize it in the method of learning for using it organizationally [7]. The view resembles the resource-based view, which leads to research on cooperative network.

Even if the concept of cooperative network is of deficiency in the literature, a lot of famous examples could be quoted in practice. VISA International is a classic example of cooperative network. Banks of high competition, undertaking very similar operations, accede to the VISA payment network, due partly to the fact that any single bank cannot use a worldwide transaction processing system that enable credit card transactions at any of 22 commercial spots around the world.

*Address correspondence to this author at the School of Economics & Management, Beijing Information Science & Technology University, Beijing, 100192, P.R. China; Tel: +86 010 82427130; E-mail: yeaishuijiao@126.com

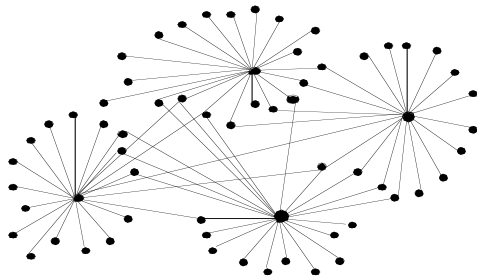


Fig. (1). Cooperative network consists of main automobile manufacture enterprises and parts suppliers.

Additionally, another representative cooperative network is developed by the automobile manufacture enterprise. Fig. (1) shows that Benz, Toyota, Honda and Cadillac automobile manufacture enterprises and parts suppliers form the cooperative network.

2.2. Knowledge Transfer

Although issues of knowledge transfer are very much en vogue today, they are not new to the corporate world. In spite of the topic of knowledge transfer is very much popular, it is not fresh to the companies. Teece was one of the founders of this trend; he focusses on the transfer of technological know-how [8]. Szulanski gives the definition of Knowledge transfer, or what is usually treated as “best practice transfer”, that a duplication of an practice inside that is carried out in a better way in certain part of the organization and is referred to superior alternate practice inside and well-known alternatives outside the company [9], and where “practice” adopts a regular use of knowledge [10].

Knowledge transfer of inter-organization is the process where an organization is affected by another organization’s experience. In the view of network, knowledge transfer is the process through which a member organization’ experience affects another organization [11].

According to an increasing number of researches, more scholars hold the opinion that organizations that is capable of transferring knowledge efficiently from one organizational unit to another organization unit are more prolific than ones that are less able of knowledge transfer. Fresh knowledge, especially outside knowledge, could be a strong encouraging factor for change and improvement of organization. Organizational profits will promote from knowledge transfer amid member organization when concerning the network context more definitely [12].

2.3. Influencing Factor of Knowledge Transfer in Network

We are interested in conditions that facilitate knowledge transfer in cooperative networks. The process of knowledge transfer among member organizations is influenced by many kind s of factors that finally affect the efficiency and the effect of knowledge transfer. To analyze these factors deeply will be helpful for member organizations to make full use of these factors and improve the efficiency and effect of knowledge transfer. Table 1 shows the main research about the influencing factors of inter-organizational knowledge transfer.

From Table 1 we can find that the recent research about influencing factors of inter-organizational knowledge transfer mainly concentrates on the characteristics of knowledge and the behavior characteristics of knowledge sender and knowledge receiver. Network structure as a key factor has received little attention. So in this paper we will try to analyze the influence of the network structure on the process of knowledge transfer.

3. NETWORK STRUCTURE AND KNOWLEDGE TRANSFER

According to social network theory, the main network structure characteristics include network density, network range, network tie strength and network centrlicity. So we will analyze the influence effect of the four network structure characteristics to knowledge transfer in cooperative network.

3.1. Network Density and Knowledge Transfer

Network density is defined as the degree of direct association between member organizations [19]. In cooperative network, the association among member organizations is considered being a passage and carrier of knowledge transfer [9].

Firstly, in the cooperative network with high density, with more direct association among member organizations, knowledge senders in the network can make knowledge get to knowledge receivers quickly. The direct association can decrease the resistance exists in the process of knowledge transfer and facilitate the knowledge transfer among member organizations. On the opposite way, in the cooperative network with low density, less directness associations make the network with more structure holes. The structure holes will hinder the efficiency of knowledge transfer among member organizations.

Table 1. Main Research about the Influencing Factor of Knowledge Transfer [13-18].

Factors	Research Perspective	Representatives
Knowledge	Tacitness, Dispersion, Specificity and Embeddedness of knowledge	Constant, Kiesler and Sproull, 2000; Simonin1999; Bhagat, 2002; Cummings and Teng, 2003; Xue qiuzhi, 2006; Liu qin, 2007
Knowledge sender and knowledge receiver	The transfer ability of knowledge sender and the absorptive capability of knowledge receiver	Cohen and Levinthal, 1990; Simon, 1991; Hamel, 1991; Eric, 2000; Loasby, 2001; Lai Xianghong and Wang Wenping, 2006; Cummings and Teng, 2003
Network structure	Types of network and size of network	Ray Reagansand Bill McEvily, 2002; Cowan,2004; Tang fangcheng, 2008

Secondly, in the cooperative network with high density, the behavior and activity between member organizations will be more easily observed by other members by direct associations. It will be helpful to form common behavior regulations among member organizations and opportunism behavior in the process of knowledge transfer can be able to prevented by other member organizations. So the high density means less supervision and transaction cost of knowledge transfer and will be beneficial and incentive to knowledge transfer among member organizations.

Proposition 1: The network density is positively associated with the ease of knowledge transfer.

3.2. Network Range and Knowledge Transfer

A relationship crossing organizational, institutional, or social boundaries is the superior feature of network range [20]. It is a fact that knowledge transfer crossing boundaries and organization in or out could improve performance. While influencing member organization’s ability, network range is expected to upgrade the efficiency of knowledge transfer through transporting complex ideas across separate parts of knowledge. Thus, member organization linked to multiple parts of knowledge face more opinions around the world. Gradually they have a stronger need for debating because the portion of their regular network activity is the issue from the view of separate contacts. And they will make their communication in a same language that a conference could understand. [21]. One member organization in a same kind network is surrounded by conferences that view issues in similar ways. The majority of member organizations view the world in a homogenous way so that considering multiple perspectives is unnecessary. All of these things make it easy that communication and knowledge transfer in the network, but on the other hand, it is difficult for associate member to communicate what they have learnt to the external world. On the contrary, associate members in networks features by range will find it more facilitate to transfer knowledge on account of the behaviors who ease knowledge transfer that are part of their everyday network activity. Member organizations accustomed to interacting with contacts from diverse communities of practice are presented with a greater opportunity to learn how to convey complex ideas than are member organizations limited to interactions within a single body of knowledge [22]. Member organizations are possessed with a better chance to acquire how to transport complicated ideas than member organizations restricted to a alone body of knowledge because the former is used to interrelating with contacts from various communities of practice.

Proposition 2: Network range is closely connective with the ease of knowledge transfer.

3.3. Network Tie Strength and Knowledge Transfer

Network tie strength could have a positive impact on knowledge, basically through stimulate the initiative of member organizations to contribute sweat and time to helping others. Tie strength influences the initiative of a member organization, just as cohesion, to convey knowledge to other cooperation companies, even if the source of that initiative is different. However the association between knowledge sender and the acceptor is the origin of initiative with tie

strength, strong ties to reciprocal third parties are the origin of initiative in a cooperative network. Member organizations are expected to work in a team when strong ties surround their association due to a fact that if they refuse to cooperate, information of their noncooperation actions will transmit to other member organizations very fast and restrict their capability to interact with them in future. And once the third parties are connecting, they will know the news right away. There is no advantageous for the uncooperative.

In addition, in the cooperative network with strong tie, the association frequency and the degree of trust and reciprocity among member organizations will be high. Judging from the process that knowledge transfer, the frequent association will promote the deep communication among member organizations and will be beneficial to the transfer of recessive knowledge. Secondly, Strong tie means deep emotion and strong trust among member organizations. The trust to other cooperation members indicates that enterprises believe that their cooperation partners will transfer reliable knowledge to them and the trust will reduce the cost of knowledge verifying. Besides, the trust will increase the probability of sharing secret information to other members and it will facilities the process of knowledge transfer. Thirdly, the stronger the tie among member organizations, the more reciprocity exchanges they have. In the condition of strong tie, the reciprocity relationship among cooperation partners can promote the cultivation of knowledge sharing routine and the formation of cognition pattern. Strong tie will facilitate the exchange of valuable information and will be beneficial to knowledge transfer.

Proposition 3: The network tie strength is closely related with the ease of knowledge transfer.

3.4. Network Tie Strength and Knowledge Transfer

The centrality of member organization in the cooperative network is decided by two different kinds of conditions. The first kind of condition is that one member organization has much more direct and indirect associations with other members and the other cooperation members will have to exchange knowledge through this member. In this condition, the network centrality means the location centrality in the cooperative network. In Fig. (2), organization A is in the centre of the network and there is no direct associations among organizations B, C and D. As the intermediary agent of knowledge transfer, organization A has much more chances to contact and gain knowledge, thereby organization A will have the key position in the process of knowledge transfer and will decide the efficiency of knowledge transfer among member organizations.

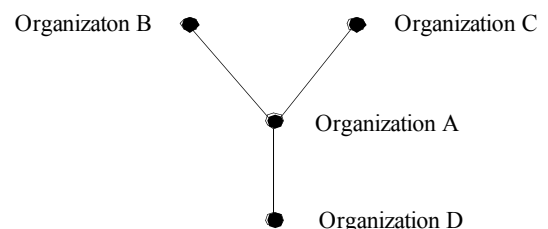


Fig. (2). Star cooperation network.

Another kind of condition is that one network member owns unique resource (what can be fund an technology) in the network. Other members that own little or none of these resources will be dependent on this rich member. So, in this kind of condition, the network centricity is considered as the centralization of network authority. The higher the network centricity, the greater the authority it owns in the network. The network member will high network centricity can make use of network authority to suggest or affect other members to transfer knowledge to it and it will gain stronger advantage position and more knowledge in the network.

Proposition 4: The enterprise network centricity is closely related with the ease of knowledge transfer.

CONCLUSION

This article analyzes the key influencing factors of knowledge transfer among member organizations in the cooperative network from the perspective of network structure. We analyze the relationship between the main structure characteristics (including network density, network range, network tie strength and network centricity) and the efficiency of knowledge transfer. We get the conclusion that the four network structure characteristics are closely related with the ease of knowledge transfer. To get the conclusions, we also deeply analyze how these network structure characteristics influence the process of knowledge transfer. These conclusions will erect a bridge which connects cooperative network theory and knowledge transfer theory and will make up the deficiency of research on knowledge transfer from perspective of network. We believe that these conclusions have certain actual reference value in guiding organizations in cooperative network to improve their abilities of network administration and knowledge acquisition.

CONFLICT OF INTEREST

The author confirms that this article content has no conflict of interest.

ACKNOWLEDGEMENTS

This work was financially supported by the specialty construction (PXM2014-014224-000669) and Beijing Planning Office of Philosophy and Social Science Foundation (Research on the lean operation mode for the advanced service industry of Beijing).

REFERENCES

[1] R.M. Grant, "Toward a knowledge-based theory of the firm", *Strategic Management*, vol. 17, pp. 109-122, 1996.

- [2] G. Hamel, "Competition for competence and inter-partner learning within international strategic alliances", *Strategic Management Journal*, vol. 12, pp. 83-103, 1991.
- [3] I. Nonaka, "A dynamic theory of organizational knowledge creation", *Organization Science*, vol. 5, pp. 14-38, 1994.
- [4] R. Cowan, and N. Jonard, "Network structure and the diffusion of knowledge", *Journal of Economic Dynamics and Control*, vol. 28, pp. 1557-1575, 2004.
- [5] G.B. Richardson, "The organisation of industry", *Economic Journal*, vol. 82, no. 327, pp. 883-896, 1972.
- [6] C. Shapiro, and H.R. Varian, *Information Rules: A Strategic Guide to the Network Economy*. Harvard Business School Press, 1999.
- [7] W. Cohen, and D. Levinthal, "Absorptive capacity: A new perspective on learning and innovation", *Administrative Science Quarterly*, vol. 35, pp. 128-152, 1999.
- [8] D. Teece, "Technology transfer by multinational firms: The resource costs of transferring technological know-how", *The Economic Journal*, vol. 87, pp. 242-261, 1977.
- [9] G. Szulanski, "Exploring internal stickiness: impediments to the transfer of best practice within the firm", *Strategic Management Journal (special issue)*, vol. 17, pp. 27-44, 1996.
- [10] R.R. Nelson, and S.G. Winter, *An Evolutionary Theory of Economic Change*, Belkman Press: Boston, 1982.
- [11] L. Argote, and P. Ingram, "Knowledge transfer: A basis for competitive advantage in firms", *Organizational Behavior and Human Decision Processing*, vol. 82, pp. 150-169, 2000.
- [12] M. Kotabe, X. Martin, and H. Domoto, "Gaining from vertical partnerships: Knowledge transfer, relationship duration, and supplier performance improvement in the U.S. and Japanese automotive industries", *Strategic Management Journal*, vol. 24, pp. 293-316, 2003.
- [13] D. Constant, S. Kiesler, and L. Sproull, "What's mine is ours, or is it? A study of attitudes about information sharing", *Information System Research*, vol. 5, pp. 400-421, 1998.
- [14] M. Jesen, and W. Meckling, "Specific and general knowledge, and organizational structure", *Main Currents in Contract Economics*, vol. 5, pp. 251-274, 1991.
- [15] F. Tang, J. Mu, Douglas, L. MacLachlan, "Implication of network size and structure on organizations knowledge transfer", *Expert Systems with Applications*, vol. 34, pp. 1109-1114, 2008.
- [16] H.A. Simon, "Bounded rationality and organizational learning", *Organization Science*, vol. 2, pp. 125-134, 1991.
- [17] B.L. Simonin, "Ambiguity and the process of knowledge transfer in strategic alliances", *Strategic Management Journal*, vol. 20, pp. 595-623, 1999.
- [18] L. Xianghong, and W. Wenping, "Simulation of the spread knowledge inside knowledge-based organization based on cellular automata", *Chinese Journal of Management*, vol. 3, no. 5, pp. 514-518, 2006.
- [19] T. Williams, "Cooperation by design: structure and cooperation in interorganizational networks", *Journal of Business Research*, vol. 58, pp. 223-231, 2005.
- [20] R.S. Burt, *Structural Holes: The Social Structure of Competition*. Harvard University Press, Cambridge, MA, 1992.
- [21] J. Padgett, and C. Ansell, "Robust action and the rise of the Medici", *American Journal of Sociology*, vol. 98, pp. 1259-1319, 1993.
- [22] R. Reagans and B. McEvily, "Network structure and knowledge transfer: The effects of cohesion and range", *Administrative Science Quarterly*, vol. 48, pp. 240-267, 2003.

Received: September 16, 2014

Revised: December 23, 2014

Accepted: December 31, 2014

© Wang Ying; Licensee *Bentham Open*.

This is an open access article licensed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/3.0/>) which permits unrestricted, non-commercial use, distribution and reproduction in any medium, provided the work is properly cited.