Network in Transformation: How Organization Manages its Relations with Partners

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The purpose of this paper is to identify the transformation process of network which is based on structural dimension and relational dimension. Since network constitutes a kind of social resources that organization can strategically manage, the changes in the underlying pattern of relationships can be evidenced by significant variations over time to meet the specific objective of organization. It may be through either the changes in network structure or the changes in the content of relationships between organizations. The theoretical hypotheses and analysis are also supported with the examination of both the TOYOTA's supplier network transformation in the automobile industry and the IBM's network transformation in the computer industry.

I. Introduction

A key question in organization theory and strategy management is why organization differs in its conduct and profitability. To explain variation in the performance of organization, I examine beyond the internal characteristics of organization itself to the circumstances of the external relations organization competes to form with other organizations. Interorganizational network is considered as strategic resources which can potentially be shaped by the organization. Thus, the production of appropriate network can be regarded as a kind of general social resource for the focal organization to exploit. Currently, network researches have led to the important and unanimous insight that building cooperative relations with others is considered to be potentially a valuable resource and the pattern of network is meaningful in terms of competitive advantage (Rowley, Behrens & Krackhardt, 2000; McEvily & Zaheer, 1999; Uzzi, 1996; Burt, 1992).

Rowley, Behrens, Krackhardt (2000) illustrate that there are two types of network dimensions relevant for addressing this question: relational dimension and structural dimension. Since prior researches have tended to focus on either structural dimension or relational dimension of interorganizational network, there are a variety of opinions on the configurations of network the focal organization would form with other organizations (Rowley, Behrens & Krackhardt, 2000; Konno, 2002). Structural dimension refers to the setting of network among organizations (Burt, 1992).

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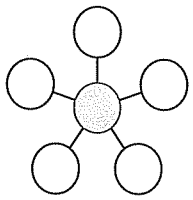
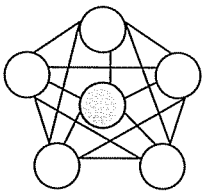
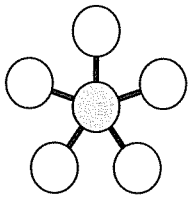
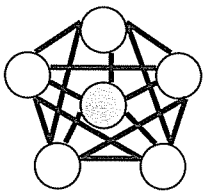
It has its primary impact on the efficiency of the network. However, how to exploit these opportunities and govern the cooperative relations is also an essential component of the strategy (Rodan & Galunic, 2004). Based on the relationships between organizations in the network, the effect of network structure and the contents between network relations on the behavior of the focal organization depend on two variables: (1) how the focal organization links to its partners and (2) the composition of the network that the focal organization is linked to, that is the pattern of the relationships among other organizations except the focal organization. Thus, according to structural dimension and relational dimension, four possible types of network can be identified (Table, 1).

Since organizations linked with each other in the network operate in different segments, and utilize different technologies, they are considered to possess different kinds of information. Dense connections mean that all the member organizations in the network have relationships, more or less, with each other. Consequently, dense connections can enable member organizations to enjoy information benefits. However, structural hole theory (Burt, 1992) proposes an alternative view of the interorganizational relationship patterns and the potential benefits. Rather than stressing the diversity of information, structural hole claims that advantages result from the brokerage opportunities created by the lack of connections between other organizations except the focal organization in the network. That is, the

Table 1 : Four Possible Network Patterns

Structural dimension / Relational dimension	Sparsely connected	Densely connected
Weak ties	Figure. 1 	Figure. 3 
Strong ties	Figure. 2 	Figure. 4 

focal organization who occupies brokerage positions can enjoy the competitive control advantages.

With regard to relational dimension, for any one organization, to build and maintain cooperative relations with others is not costless (Burt, 1992). If the organization invests time and energy to manage or maintain the ties, it is meanwhile constrained by these relations. In view of this, the organization might be better off in establishing weak ties which unnecessitate the specific investment into the cooperative relations and enable organization to maintain its autonomy. Correspondently, on the occasion of strong ties established between organizations, trust relations can be developed when extra effort and specific relational investment is willing to be given and reciprocated among each other. As a result, strong ties can impede the opportunism through the establishment of cooperative environment.

Based on these considerations, organization can potentially shape or reshape their network configurations so as to provide a favorable context. Accordingly, network is a kind of social resources that organization can manage and design to meet its objective. Thus, when we consider the particular relationship between member organizations and the possible pattern of relations in the network with the performance of the focal organization, the fact that the focal organization can manage the factors of its structural and relational dimensions in its network would seem significant. Then, how do the patterns of interorganizational relations evolve and change in response to the change in the external environment? How should the focal organization manage its relations with partners?

II. Relational Changes in Network —How Organization Adjusts the Contents of Ties—

The contents of interorganitional ties which act as a source of competitive advantage can play an important role on the performance and behavior of member organizations. Network will remain stable if it serves the interests of its member organizations. Indeed, organization does not have to restructure the patterns of relations in response to each event occurring in the external environment. The following will explore the nature of relational changes and the directions of how organization adjusts the content of ties with partners in the already structured network in response to the event.

1. Strengthening Process of Interorganizational Ties

Network relations are considered to be strengthened if the strength of interorganizational ties that connect

individual member organizations is becoming strong in the network. Strong ties mean broader and deeper in terms of specialized relational investment and commitments than weak ties which require less coordination or mutual understanding between individual organizations in the network (Uzzi, 1996). As a result, weak ties can not produce or serve as part of social control mechanisms to govern partnership cooperative behaviors.

In the sparse-connected network, although the focal organization is awarded control advantages between disconnected partners, who rely on the organization to facilitate exchange flows across the network, it still needs the cooperation of other organizations to assist them in meeting their specific goals. Thus, the focal organization will tend to increase its relational investment into cooperative relations with its strategic partners for the aim of reducing the uncertainty from the exchanges of significant resources. Strong ties can produce the formal contracts, as well as the informal safeguards. The relational trust and norms of mutual gain and reciprocity is considered to play an important role of guaranteeing mutual cooperation And gains from cooperation can be enhanced with the increase of specific relational investments.

Therefore, positive relationship between continuous investments of relational assets in interorganizational relations and the performance of organization in the sparsely-connected network can be proposed. The focal organization will gain much more benefits from the establishment of governance mechanism supplied via strong ties.

2. Weakening Process of Interorganizational Ties

Network relations are considered to be loosened if the strength of interorganizaitonal ties that connect member organizations is becoming weak in the network. With the weakening process of ties, member organizations are not connected closely with each other because communications are only conducted at the necessary conditions and there are no incentives to motivate positive contributions afterwards. In other words, organization can enjoy the freedom to define and manage their cooperation with other partners at its autonomy.

In the densely-connected network, trust relations between member organizations created by strong ties may turn such a dense network into something that loses the value of existence. That is because, although interconnectedness involves the effective norm creation capable at the network level of punishing disobedience, strong ties can also create trust relations at the dyadic level. In this view, although interconnectedness and strong ties lead organization to trust different aspects of their network, both serve as governance

mechanisms in the network. Consequently, by accessing the densely-connected network through strong ties, both the focal organization and other players will lose their deserved autonomy to negotiate their role because they are wholly constrained by the relations they established with each other (Rowley, Behrens & Krackhardt, 2000).

Therefore, when member organizations are densely connected with each other, the focal organization might be better off establishing relatively weak ties with each other to enjoy the autonomy of activities, rather than investing time and energy to form or maintain strong ties which will finally embarrass them.

Ⅲ. Structural Changes in Network — How Organization Adjusts the Pattern of Interorganizational Ties—

Structure represents relatively stable patterns of behavior, interaction, and interpretation, and the well-structured network is the basis of superior returns which play a significant role in the performance of member organizations (Brass & Burkhardt, 1993). From the pure structural point of view, both connections between the focal organization and other member organizations, and connections between other member organizations and the focal organization constitute the overall structure of interorganizational relations of the focal organization. Network structure can be viewed as the relatively enduring pattern of relationships, because it does not change merely because some members leave a network position or some others enter (Madhavan, Koka & Prescott, 1998; Burkhardt & Brass, 1990; Walker, Kogut & Shan, 1997) However, it does not mean that network structure can not be changed. Organizational behavior that occurs within the constraints of network structure can gradually modify the structure. Organization disadvantaged as a result of its current structural position may actively seek to change it. Then in the following, the process of structural changes, that is, how organization adjusts the pattern of interorgnaizational ties with other partners, will be discussed and clarified.

1. Tightening Process of Network Structure

The structure of a network is considered to be tightened if, in general, the focal organization decreases his network power in order to enjoy information benefits by allowing or enabling the establishment of cooperative relations between otherwise disconnected partners. That is, all the member organizations including both between the focal organization and other organizations and among the disconnected other organizations are connected with each other. Following the structural changes,

network power is redistributed within the network, to some extent benefiting the former network 'poor' (the peripheral players) at the expense of the former network 'rich' (the focal organization) and as a result, all the member organizations can equally and simultaneously obtain the deserved benefits from the network.

Instead of enjoying control benefits by creating structural holes between other organizations, information benefits can come about through the formation of dense connections among member organizations that facilitate action of members. The frequent interactions between member organizations in the network facilitate the exchange of diverse information. Furthermore, the exchange and flows of rich and diverse information among members can also enable the establishment of trustworthy environment, which means that obligations will be repaid and deviant actions that sacrifice the benefits of others are reduced because information on deviant behavior would be readily disseminated (Walker, Kogut & Shan, 1997). Thus effective incentives for long-term cooperation will be produced in the network.

That is to say, the focal organization can gain access to information benefits at the loss of control advantages through tightening the structure of network toward the densely-connected one.

2. Loosening Process of Network Structure

Network structure is considered as being loosened if, in general, the focal organization can be powerful enough to cut the cooperative ties between other organizations except the focal organization and increase his influence in the network, while other peripheral players become relatively less powerful. Member organizations become sparsely connected in the network when other organizations are connected with only the focal organization and are not connected with each other. Following the structural change of loosening process, since all the other organizations become not to be connected with each other but only connected with the focal organization, power in the network is redistributed and the power of the focal organization becomes extremely strengthened. In other words, it is just the strengthened power provides opportunities for the focal organization to restructure the patterns of relations. As a result, structural holes between other organizations created by the focal organization enable the focal organization to enjoy the control benefits of being the broker in the relations at the expense of losing information benefits.

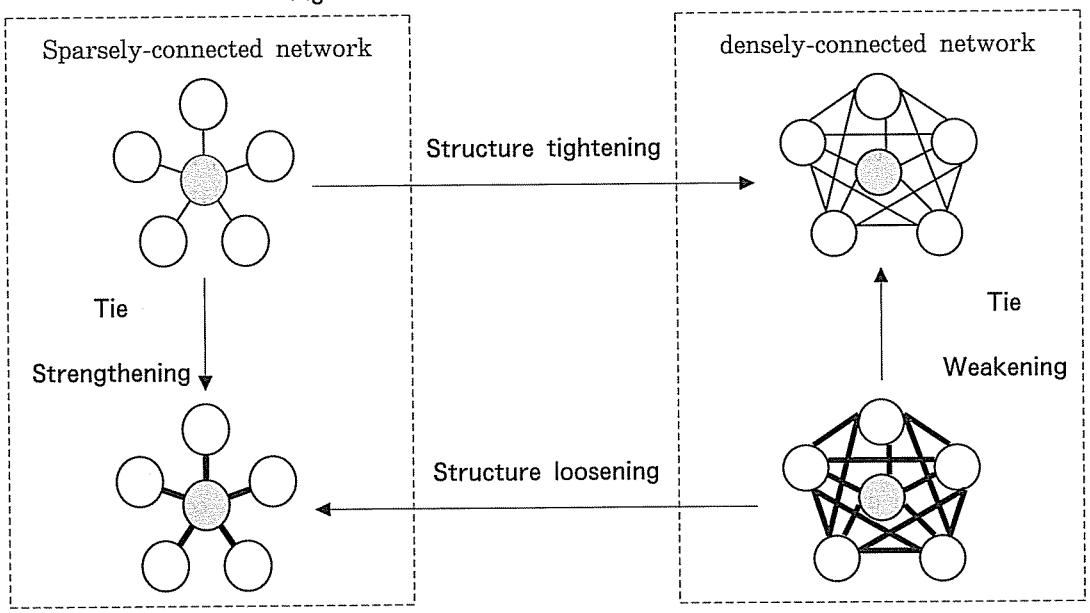
The focal organization who occupies brokerage positions between separate players can enjoy the comparative advantages in negotiating relationships,

which allow them to know about more opportunities and to secure more favorable terms in the exchange (Burt, 1992, 1997; Gargiulo & Benassi, 2000). However, in such a loosened network, a normative environment that facilitates cooperation is unlikely to be fostered. Since sparse connections in the network do not possess the control or coordination mechanisms which can govern the cooperative behavior of member organizations, the focal organization will establish strong ties with other partners to reduce the threats associated with opportunisms.

Therefore, when it becomes significant and necessary for the focal organization to obtain the necessary and important resources at a competitive price through the cooperative relationships with other players, rather than competing for the same resources which means a zero-sum game, the loosening process of network structure from dense connections to sparse connections is considered to be preferred for the focal organization.

In sum, according to what have been discussed above, organization can manage either the content of linkages between organizations or the structural pattern of interorganizational relations in response to the environmental changes. The impact of events on the contents or properties of the relationships between organizations may be either strengthening or weakening, that is the rate of the activities or interactions between organizations may be increased or decreased. Therefore, the strengthening process of ties in the sparsely-connected network and the loosening process of ties in the densely-connected network initiated by

Figure 5 : Network Transformation Process



the focal organization to manage the relations with other member organizations can be examined. On the other hand, in response to an event that may even potentially change the basis of competition, organization may seek to restructure the relations with other organizations to generate additional advantages from the network. Thus, the management of structural dimension and relational dimension of its network the focal organization establish with other organizations can be shown as the following (Figure 5).

Ⅳ. Case Study

In this chapter, I attempt to test my theoretical model of network in transition. Based on structural dimension and relational dimension of network, I will analyze and interpret changes in the patterns of networks respectively established by IBM in the computer industry and TOYOTA in the automobile industry. First, the computer industry is an appropriate context for the study both because it has witnessed significant strategic changes over the last few decades and because the relations between organizations in the network have been significantly influenced by this industry evolution. Then strategic cooperative relations in the automobile industry are also an appropriate network to be focused on because there have involved considerable amount of interorganizaitonal activities between organizations in the automobile industry and the formations of these activities are continuously changing themselves to adapt to the industry evolution.

As the representative firm of each industry, both IBM and TOYOTA experienced their respective significant industry evolution and witnessed the change of interfirm relations in their ego networks. Therefore, using detailed clinical studies of networks established and continuously managed by IBM and TOYOTA, I would provide critical insights into how cooperative ties are better managed to cope with exogenous shocks in the external environment.

1. TOYOTA's Network Transformation Process

Japanese automakers have been very successful in the auto industry since three decades ago. Among them are world-famous and representative firms like TOYOTA, HONDA, or NISSAN. As we move ahead into the twenty-first century, these large automakers seem likely to continue to proliferate. Why? Here let us examine the reasons of the success through analyzing how TOYOTA establishes and manages its cooperative relations with its suppliers of components.

The automobile is a complex product with ten thousands of components that must work together as a system. Since

each component is part of a larger system, mutual adjustment and coordination is required on the part of suppliers and automakers in order to produce a well-functioning vehicle. However, the uses of the vehicles are pretty fixed and there are only a few forms of transportation (such as cars, trucks, and vans) (MeKenna, 1989). Since the industry boundaries are relatively fixed, new types of vehicles or new uses of vehicles are not so easily to appear. They have been continuing to play the important and indispensable role of transportation of people or goods. Thus, the production of vehicles can be standardized to provide low cost and high volume, and then the auto industry is built on mass production and mass market. There are clear economies of scale.

The suppliers of components are typically organized into overlapping pyramidal structures of primary, secondary, and tertiary suppliers with firm size diminishing as one goes down the hierarchy (Sako, 1992). This structure of network headed by a large auto-manufacturing company, TOYOTA, is known as a vertical keiretsu in Japan. Traditionally, to obtain one of the important components of vehicles at the most competitive price and favorable terms, TOYOTA usually keep cooperative relations with more than 2 suppliers (Asamuma, 1992) and cut the exchange of information among the suppliers to enjoy the benefits as the broker in disconnected relations. On the other hand, all the keiretsu members are maintained and reinforced around TOYOTA by the ties which are becoming strong gradually over time. Firstly, it is from the demands of the technology of the manufacture of vehicles. To achieve a higher level of quality for the automakers to gain the competitive advantages, the vehicle as the final product should be comprised of parts which have been customized to fit vehicle rather standardized parts which the final product is designed around. Thus, in order for suppliers to be more willing (or be required) to create customized parts, TOYOTA must make special and relational investments in customized tools, dies, jigs, etc, and even provide technical supervision at the necessary time (Konno, 2002). Secondly, strong ties enable the establishment of trust relations to act as an effective control mechanism in place to enforce the punishment of opportunistic behavior or incompetent member firms. When a member is in financial distress, for instance, TOYOTA has the ability to compel them to take necessary actions, including dispatching new directors to and replacing top managers of the firm. More specially, TOYOTA arranges a collective or group-wide rescue operation.

In short, TOYOTA who has relatively stronge power in his vertically

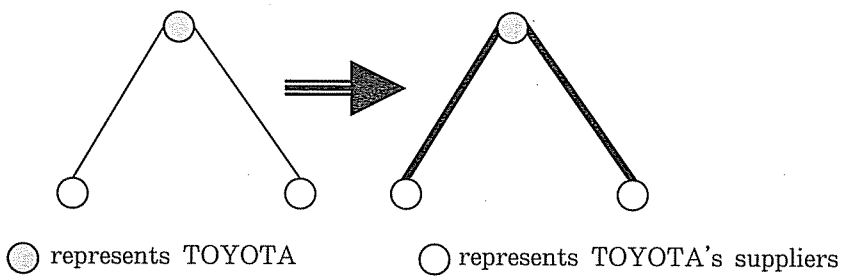
cooperative relations with suppliers is likely to strengthen the ties in order to use the power in his favor and focus more on his own growth benefits, while those that have relatively weak power are constrained by the network in focusing more on how to enhance their competitiveness through the network. As such, by recognizing the presence of power-dependence relationships in this pattern of network, it is important to realize that both TOYOTA and those member organizations like Denso and Aishin can enjoy more and different benefits because these firms that make up the network are likely to be interdependent on the different aspects of cooperative relations.

2. IBM's Network Transformation Process

In this section, I will clarify the reasons behind the rise and fall of IBM that went along with the practical use and development of personal computer (in the following it is called PC) by analyzing the change in the compositions of cooperative networks IBM has established and maintained with his partners since 1980s.

The PC business kicked IBM's revenue and earnings into overdrive in the early 1980s, helping IBM produce the greatest profits any company has never turned in. With the rapid development of computer technology, however, even the powerful IBM who could obtain the temporary success in the PC business squandered its opportunities to turn the PC into a business that would wax as mainframes waned. It is not a history that IBM did not have opportunities in the PC business along the way. IBM actually got the PC right for the first few years. But that did not last long although IBM realized the radical technological change in the PC technology and tended to make a significant change in the cooperative relations with partners to seize them. Then what happened in the computer industry in that period? Why and how did IBM make an alternation in the cooperative strategies and change itself to adapt to this radical change in the PC industry? What can we learn from these?

Figure 6 : Network Transformation Process between TOYOTA and Its Suppliers



(1) Times of Vertical Cooperation between Firms

Mainframe times were IBM's times. IBM did everything itself from the research and development to the production of every part of the product; and consequently almost owned the whole market share of the computer industry. During the last twenty years, however, the emergence of PC has been completely destroyed the balance of competitive and cooperative relations between firms in the computer industry along with the redefinition of the role of computers. In 1975, IBM first put together special task forces to start the research and development of the first-generation minicomputer in actual meaning (Carroll, 1993). In 1981, IBM's PC group succeeded to enter PC markets as expected and received an extraordinary success in this business by setting the PC standards. Everybody would agree that IBM's success was owing to the collaboration with Intel, the CPU's manufacturer and Microsoft, the designer and developer of the operating system, both of which enabled IBM to catch up with the speed of the PC business and realized the promise to produce a machine more powerful than Apple's in less than one year. It is no doubt that there was discussion about whether using outsiders' parts would mean that IBM could not control the direction PC market would take. First, IBM's failure in the earlier PC market, promotes Lowe and other executives to make the choice to follow the path of least resistance. For example, one of the biggest problems is software. The Series 1 operating system got so far out of control that hardware had to be redesigned twice to accommodate the increasingly large operating system. Consequently, IBM set out to buy the rights of good hardware and software packages, which they would then "publish" under IBM's label. Second, with the rapid change of technology, if IBM continuously tried to do everything on his own, it would be most likely to miss the next wave of technology and get stuck playing catch-up forever. Therefore, it makes sense to focus on what they can do best and to acquire the rest from the others.

Thus, for the beginning few years of PC times, vertical cooperation was the name of the game in the computer industry and it was the way to build and maintain a successful computer company (McKenna, 1989). They treat all outsiders as the suppliers. Within vertically connected network, the producer of computer could collaborate with the designers of operating system and also searching for help from the developer of hardware. This collaboration can lead to designs that are specialized for high performance in the computer operation. IBM went outside the company to buy almost all the parts for his PC,

including the processor from Intel and the operating system from Microsoft (Carroll, 1993). Then they tailored them specifically for their own PC system and ran only those applications designed for IBM PC system. As a result, as what we have seen later, IBM succeeded well enough to take care of them that competitors knew they had to follow IBM's choice-using the Intel processor, not one from Motorola, using Microsoft's DOS operating system, not AT&T's Unix.

(2) Radical Technological Innovation in PC

However, the game changed since the middle of 1980s and everything related to computers has changed dramatically after the technology of PC became mature. Computers are being used in new ways, and by new types of users. Computers even turn up in every kind of business imaginable. In 1970, fewer than 50000 computers were in use. Today, more than 50000 computers are produced every day (McKenna, 1989). Radical changes in the technologies and uses of computers mean radical changes for the companies that produce computers. First, the development of the processor which becomes just one sliver of silicon in a system made the computer from the former enormous giant to a product which can be even carried around. Second, in the mainframe business, changes in technology occurred so gradually and IBM always managed it so carefully that long planning horizons were possible, however, in the PC times, the speed of technological innovation is undeniably and unbelievingly fast.

With the increasing sophistication of such radical technology, computers as a product are becoming more and more complex and practical for common users. Customers are expecting all these features when they buy a computer. One more important is that unlike the auto business, these pieces are often more important than the combination, that is, the computer itself.

(3) Times of Horizontal Cooperation between Firms

With the increasing cost of developing the products and the technologies of PC changing so rapidly, no one company in the computer industry including the most powerful IBM can possibly stay at the forefront in all areas and maintain the power to control the behavior of its partners. Such radical changes in the PC technologies are weighing against vertical integration. Since the vertically-connected network in which long-term cooperative relations is expected tend to make the company lose touch with the newest technology or products, this pattern of network may be going out of style. For companies in the computer industry, essentially horizontally strategic partnerships make much more sense than vertically integrated cooperation.

Among challenger companies, strategic partnering takes place very frequently and very openly. Whatever their reasons, companies can expand and have the chance to exploit their opportunities successfully inherent in cooperative relations when they are connected with each other to enjoy information benefits. And at the same time when much better opportunities come out, they are not restricted by the existing relations and seize the opportunities of obtaining success.

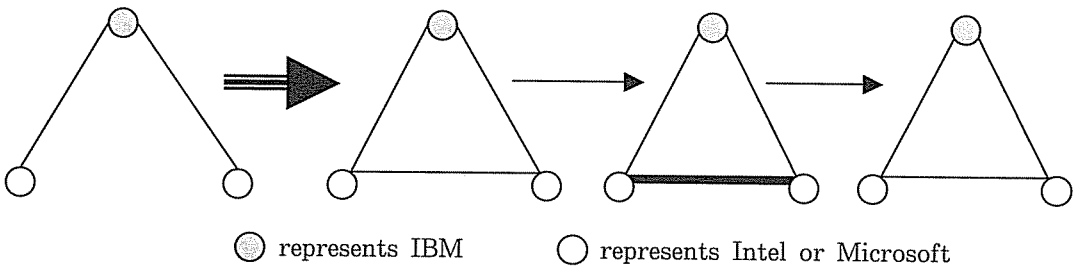
In its early days of PC times, however, Microsoft had no special relationship with Intel. For example, Microsoft worked with Apple and Radio Shack, which used non-Intel CPUs and established parallel deals with PC-clone makers such as Compaq. However, as the PC technology and the range of PC uses progressed, hardware and software came together quickly (McKenna, 1989; Carroll, 1993). In the past, computer users generally bought all of their equipment from a single vendor because computers and peripherals from different vendors could not work together. However, from then on, computer users are no longer willing to make such compromises. They have their systems tailored to their own individualized needs. They might buy a computer from one vendor, printers from another, and the operating and application software packages from one or more other vendors. Thus, as a computer producer, IBM needed to have lots of the operating and application software packages available, and they needed to be good enough to make people actually want to buy the hardware. As a result, although it should not seem to happen, it did happen in the following days in the computer industry. IBM had to place great weight on speed of development in the PC business, and vertical disintegration, that is the establishment of horizontal cooperative relations with the former vertical cooperators, was IBM's choice. It made this choice because it saw this as the only way to establish a new platform against existing and rapidly advancing platforms (Venkatraman & Lee, 2004). Indeed, the cooperation between Intel and Microsoft supported the success of IBM computers. The vast majority of Microsoft software was written on Intel processors and Intel processors were designed to run Microsoft software. And the system integration was clearly a big plus for IBM. On the other hand, IBM deal gave Microsoft control over two-thirds of the critical software running on the PC-the operating system and development software, and gave an opportunity for Intel's 8080 to become one of the first widely used microcomputer CPUs. Thus, such triangle win-win-win collaboration network was established by IBM in the computer industry since the end of 1980s and the beginning of 1990s.

However, with the development of computer technology, Microsoft and Intel were closely tied together and the alliance of Microsoft and Intel which is called 'Wintel' duopolied and even took over the whole PC market. Nobody can forget that in 1995 the introduction of Windows95 combined with the dominance of Pentium processors on the desktop has led to a banner year for two companies (Joshua, 1995). However, in fact will the close relationships between Microsoft and Intel last forever? As researchers expected and discussed, the answer is no because they are competitors and will always being one of the never-say-die enemies of each other.

Since the late 1990s, some unusual occurred in the win-win collaboration. Intel has invested millions of dollars into supporting non-Microsoft operating systems, and Microsoft has been trying to create a non-Intel computing platform with many processor manufacturers (Glaskowsky, 2002). For example, the New York Times has reported that Microsoft put pressure on chip giant Intel to prevent it from developing software at its architecture laboratory and backed up its pressure by supporting Intel's rival, AMD (Magee, 1998). Intel was also involved in deals with the Red Hat software in 1999 to support alternative operating system 'Linux', who is the old enemy of Microsoft. However, despite all their efforts to succeed to escape from restricts of each other, the two companies seem to remain together for this or that way. Microsoft's strategic planning remains Intel focused, and Microsoft is one of the main partners of Intel. Almost certainly, Microsoft will keep looking for Intel alternatives and Intel, vice versa. No matter IBM, Microsoft or Intel, they are all benefiting from the collaboration with each other.

In sum, what out study of IBM's network transformation has shown is that radical technological innovations must be followed by network changes from one type to another. We can also propose to conclude that in the horizontal relations, weak ties and dense connections between organizations are preferred from the point of view of the focal organization.

Figure 7: Network Transformation Process between IBM & Intel and Microsoft



V. Discussion & Implications

The formation of network with regard to interorganizational cooperation has important consequences for strategy theory and organization theory. The view of competitive advantage I present here is fundamentally a social one. The interrelationships and interaction with other organizations constitute a kind of valuable resources to be exploited and managed by the focal organization. Thus, the primary objective in this paper is to provide new insights for the manager of the organization towards understanding how to manage these relations with its partners

I proposed the possible patterns of network basing on structural dimension and relational dimension. Within a network, structural dimension and relational dimension differ significantly not only in the mechanisms of benefits that they can provide to the focal organization, but also the nature and type of benefits from either of them, indicating a need to treat them as separate but integral components. In order to understand how organization should manage and adjust the relations in the network, I argue that the underlying patterns of interorganizational relations can be transformed through either structural changes or relational changes.

The changes in network structure can be evidenced by significant variations over time in the underlying pattern of relationships. The focal organization that is differentially endowed with the ability to change its network position will benefit differently. The focal organization may restructure the patterns of interorganizational relations by allowing the establishment of ties between otherwise disconnected organizations in order to gain access to diverse information through tightening the structure of network. Or it may cut the relations between other organizations to obtain the necessary and important resources at a competitive price through loosening network structure. However, another important issue is that not all events must necessarily be followed by the structural changes of network from one pattern to another. What my study has shown is that the focal organization can also adjust relational dimension of the network in order to meet its objective, that is, the focal organization can adjust the contents of the relationships or frequency of interactions and activities with other organizations. In the last section, I presented the empirical examples of both the TOYOTA's supplier network transformation in the automobile industry and the IBM's network transformation in the computer industry to show encouraging support for my theoretical analysis. When the relations between member organizations are cooperative like TOYOTA's supplier network, sparse

structure and strong ties enable TOYOTA to exploit the maximized benefits from this network. Nevertheless, when the relations between member organizations fundamentally change from cooperators to competitors like what IBM's network experienced, dense structure and weak ties are preferred.

In developing my idea, I have noted several limitations in this study. First, recognizing the complex interdependencies between organizations, there has been the growing demand for the analysis of network at the network level in order to understand the nature and effects of network on the focal organization as a whole. Secondly, what can not be neglected is that I provide estimates of, and insights about, the terms and conditions in which organization manages its relations in a relatively specific context or restricted conditions. Finally, these efforts, however, would require different performance data of the organization with the change of network configurations. Although this would pose a considerable data challenge, it is a fruitful avenue for my future research.

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