경영학석사학위논문

THE EFFECT OF BRIDGING TIES AMONG CONFLICTING CLIQUES IN ORGANIZATIONAL LEARNING

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ABSTRACT

The effect of bridging ties among conflicting cliques in organizational learning

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This paper explores how learning performance change when conflicting knowledge, beliefs or ideas combine and engage inside the same organization. A large body of literature on organizational learning have emphasized the importance of diverse knowledge to maintain learning and organizational performance. Despite the vast research, previous studies have assumed that members inside an organization share a common objective function. This assumption caused researchers to overlook the impact of conflicting knowledge and undermine the cost of learning. Using computer simulation, two cliques with incompatible payoff function that have various interconnection rate were devised. The model demonstrates a contradictory role of inter-clique ties as the bridge for transferring group specific knowledge that foster performance and as the route for contaminated knowledge that incur learning cost and interrupt superior learning performance

Key words : organizational learning, cost of learning, conflict of interest, interconnection between cliques

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Table of Contents

List of Tables

List of Figures

knowledge distribution

Figure 6: Effect of initial knowledge distribution on optimal level of interactions

Figure 7: Effect of initial knowledge distribution on optimal level of interaction with different level of conflict

INTRODUCTION

1984 was a year of elation for Steve Jobs and others at Apple. In 1977, Apple, a fledgling company that revolutionized the computer industry with the introduction of personal computers, launches the first personal computer known as the Apple II. It only takes a few years for Apple II to become the world's most popular computer and for Apple to grow to a $300 million corporation, being the fastest-growing company in American business history (Sculley, 1987). By early 1984, Apple had sold over 1.5 million units of Apple II. The succeeding model, Macintosh, seemed to have a bright future as that of the Apple II. In the first hours of the release, $7.5 million worth of Macintosh was sold and $53 million orders were made from schools and universities. Dealers, analysts, programmers and the media thought that the new Mac was, again, a technological revolution, for the graphic capabilities of Macintosh were unequaled by any other computers in the market. However, this seemingly successful glory turned out to be a mere hype. The company expected to sell the Mac as many as 60,000 to 85,000 units a month, when actually, they were selling around 20,000 (Sculley, 1987). In retrospect, Macintosh turned out to be a total failure, causing trouble for the company. Chairman and founder, Steve Jobs, and CEO John Sculley had different visions for Apple, therefore, had different approaches to solve the catastrophe. John Sculley favored open architecture computers (e.g. Apple II), which were sold to education, small business, and home markets that are less vulnerable to IBM. So, he believed that it was right to place Apple II, which accounted 70% of the total sales, a head of Macintosh. On the other hand, Steve Jobs wanted Apple to focus on developing a closed architecture computers (e.g. Macintosh), so that the company can sell products that are alternatives

to the computers made by IBM. Jobs wanted to lower the price of Mac, heavily advertise the product to promote it further, and divert resources from Apple II to Mac (Coursey, 2012). These different beliefs shaped the relationship among the workers inside the company. Mac division and Apple II division operated like a separate companies and their staff members were acting like competitors (Sculley, 1987). Finally, in 1985, Jobs was removed from the head of Macintosh division and he eventually left the company.

The previous case is instructive because it raises a fundamental question of the consequences of what would happen when conflicting knowledge, beliefs or ideas combine and engage inside the same organization. A large body of literature on organizational learning have emphasized the importance of diverse knowledge to maintain learning and organizational performance. The existing literature has focused heavily on three major streams. The first stream focused on the feedback process and its quality in organizational learning (e.g. March, 1991; Miller, Zhao, and Calantone, 2006; Fang, Kim, and Milliken, 2014). The other stream emphasized on organizational structure, suggesting that learning is deeply influenced by structural factors such as the level of connectivity and the existence of hubs (e.g. Fang, Lee, and Schilling, 2010; Schilling and Fang, 2014). Lastly, there were research focusing on the environmental condition, such as complexity, change of speed, and interdependency that individuals have to face with (e.g. March, 1991; Posen and Levinthal, 2012).

Despite the importance, elaboration and development of the literature remain incomplete. Organizations benefit from knowledge diversity, when their members interact to exchange and create knowledge. The process of interaction (e.g. comparing

ones performance to the performance of other members) allows individual members to learn from better performing other. However, previous research assumed that individuals inside the organization share a common objective function; what is right for her is right for me as well. This assumption caused researchers to overlook the impact of conflicting knowledge and incompatible belief, therefore, undermining the cost of learning from others. In the case of Sculley and Jobs, although the members of Mac division and Apple II division can have diverse knowledge, since their belief of the reality is incompatible, employee from Mac division can suffer from lower performance by learning from an employee from Apple II division; learning has its costs. In reality, organizational routine is a result of political bargaining between groups with various interests and objectives; routine is not developed from a conflict free setting (Cyert and March, 1963; March, 1991). Thus, it is natural to ask how incompatible belief or different knowledge of the reality affect the performance in organizational learning. Also, given these incompatible interests, what could be the optimal structure for superior learning performance?

Focusing on these key questions, I constructed an instrumental model incorporating the concept of conflict. I demonstrate, using computational methodology, (1) that under certain level of conflict, the organizational learning performance and the level of inter connectedness between cliques have an inverted U-shaped relationship. Moreover, I show (2) that the optimal level of overlap between the cliques varies with the level of conflict, forming an inverted U-shaped relationship. Lastly, I found that (3) given certain amount of conflict, the optimal level of interconnectedness have an inverted U-shaped relationship with the initial knowledge distribution or the group

specificity. With these results, under conflicting knowledge settings, I found a contradictory role of inter-clique ties as the bridge for transferring group specific knowledge that foster performance and as the route for contaminated knowledge that incur learning cost and interrupt superior learning performance. In addition, interpersonal structure with conflict plays a role of a wall that restrict the transmission of knowledge.

Overall, this article makes two contributions. First, this paper establishes a foundation for a quantum jump in organizational learning literature by introducing a baseline model dealing with conflict of interest among members in an organization. The new model provides opportunity for other researchers to explore the moderating role of conflict. Second, never before have conflict of interest between groups in organizational learning literature been systematically investigated. By bringing the conflict back in, we understand how the degree of conflict affects optimal organizational structure.

The flow of this paper is as follows. In the following section, relevant literature is reviewed. Then development of an organizational learning model that focuses on how learning is considered by the pattern of conflict between two cliques is introduced. I operationalize the degree of overlap with a single parameter that systematically varies the number of ties between cliques. We also tune the degree of conflict to find the effect of conflict on optimal level of connectedness. Finally, initial knowledge distribution that sets the two clique apart is operationalized by another parameter. The results and their limitations and implications for future research is discussed last.

THEORY

Organizational Learning

Organizational learning is perceived as a property that emerges when members inside the organization exchange and recombine their knowledge to create new knowledge. After March (1991) highlighted the importance of balancing between exploration and exploitation with a conceptual model for organizational learning, subsequent studies have elaborated this baseline model in various ways (e.g. Fang et al, 2010; Schilling and Fang, 2014; Fang et al, 2014). The types of modification can be categorized into three sectors; elaboration in organizational structure (network structure), imperfect feedback process, and various environmental condition.

First, numerous studies have revealed how organizational structure, especially formal structure, influences learning process with the baseline model that members in organization interact indirectly through an organization code (Cohen, 1991; Cyert and March, 1963; Daft, 1983; Lawrence and Lorsch, 1967; March, 1991; Stinchcombe, 1990). However, such indirect learning concept is too restrictive and unrealistic. The adoption of interpersonal learning has provided a chance to explore the effect of structure on organizational learning with realistic view. With this departure from the classic model, researchers have revealed how various factors of interpersonal structure affect performance in organizational learning process. For example, Schilling and Fang

(2014) showed that hubs in interpersonal network can play as regulator for balancing exploration and exploitation. Also, Fang et al. (2010) illuminated that semi-isolated group outperform fully connected or completely separated groups.

Second, there were elaborations on the feedback process that relaxed perfect information transfer assumption. For instance, Lant (1994) showed that feedback can be vague and contaminated in complex environment (Levinthal, 1997; Rivkin, 2000); it can be postponed or absent (Sterman, 1989, 1994; Denrell, Fang, and Levinthal, 2004). Moreover, while some distortions are caused by unintentional cognitive bias, Schilling et al. (2014) argued that there could be motivation for actors to 'sugar coat' their performance. Interestingly, such positively biased feedback was shown to bring positive effects by making organization sustain proper level of exploration. In addition, Schilling and Fang (2014) demonstrated the role of hubs when hubs distort information deliberately or inadvertently.

Third, several studies have brought various environmental conditions into consideration in organizational learning. These changes were incorporated as moderating variable in the model. After March (1991) showed that optimal exploration level is positively related to the degree of turbulence, various studies have illustrated that specific optimal level of exploration varies with environmental change. For example, Posen and Levinthal (2012) found an inverted U shape relationship between exploration level and turbulence and Fang and her colleagues (2010) suggested that partly isolated structure performs better in complex environment. Especially, the adoption of NK-model in the literature enabled researchers to explore organizational learning with various level of environmental complexity (Kauffman and Weinberger,

1989; Rivkin, 2000).

Organizational learning has been explored and elaborated by numerous researchers. Despite these endeavors, the fundamental concept of organizational learning that organizational routine is built among individuals with different interest in an organization has been largely disregarded (Cyert and March, 1963; March, 1991). Regardless of the direction of modification from the March's model, nouveau models still implicitly assume that every members in an organization share an identical learning function. This means that the conflict of interest in building routine by organizational learning is non-existent. This neglect on conflict of interest (or difference in belief) in organizational learning is largely due to the absence of a baseline model to deal with it. In this paper I develop an instrumental model to discover how degree of conflict affects organizational learning and its optimal structure. Before I construct the basic model of organizational learning with conflict to systematically discover the cost involved with recombining conflicting knowledge, I will briefly review previous literature on conflict in an organization and link this to organizational learning.

Behavioral theory of the firm and conflicting beliefs

A central concept in the Behavioral Theory of the Firm is that routine is the core of an organization and such routine is developed and shared with members in organization by performance feedback process, known as organizational learning (Argote and Greve, 2007; Cyert and March, 1963; Levitt and March, 1988). Cyert and March argues that these goals or routines that are formed by performance feedback

process are outcomes of bargaining amongst various coalitions with different goals and perspectives; business firms are sets of political coalitions (March, 1962). Within this setting, some coalitions exert greater influence and make greater demand on policy, ultimately affecting the organizational goal. The objectives are then stabilized by various internal processes and adjusted overtime. This is the development of firm's routine and such routine is the result of a long-run adaptive process of organizational learning of the objectives.

Cyert and March (1963) depicted this process of routine formation as the quasi resolution of conflict. Quasi resolution of conflict can be described as the tendency of organizations to approach disparate goals through coalitions that represent 'temporary' compromises between distinct interests. These conflicts of interests can involve tradeoff between goal dimensions and adoption of mutually admissible alternatives (Gavetti, Greve, Levinthal, and Ocasio, 2012). Complete goal consistency, or unified objectives are almost impossible to achieve. The Behavioral Theory of the firm precisely posits this point. According to Cyert and March (1963):

> *"...there is no internal consensus. The procedures for 'resolving' such conflict do not reduce all goals to a common dimension or even make them internally consistent."*

Thus, like the discussed case between the Mac division and Apple II division, business firms are gathering of numerous political coalition with diverse belief and knowledge (March, 1962). We can safely argue that routine does not emerge from conflict free setting and that organizational members learn from routine although the

conflict of interest has not been completely resolved. However, despite the theoretical backup that members inside an organization face a conflicting constraint during learning, organizational learning literature lacks this realistic assumption.

Group specificity, cliques, and initial knowledge distribution

A clique is a subset of a network in which the members are more intensely tied to one another than they are to other members of the network. Depending on the nature of the overlap of characteristics, the force that ties members into cliques emerges (Gibson and Vermeulen, 2003). In other words, when individuals share overlapping characteristics it is likely that they share similar perspective, leading to the creation of subgroups. For example, coalitions of a firm can be interpreted as cliques because members that share interest or goals are more closely tied among who share that goal than they are to those who do not.

It is highly likely that formation of cliques may cause subgroup members to cohere and share knowledge more often within the subgroup than with others (Asch, 1952; Gibson and Vermeulen, 2003). As a consequence of richer exchange of information and knowledge, members within the same clique create and share specific knowledge (Azzi, 1993; Stasser, 1999). As discussed earlier, the specific knowledge of a clique might not be totally aligned with the firm's routine. In the previous case of Apple, Mac division and Apple II division can be interpreted as distinct cliques. Respective division share specific knowledge or belief (e.g. Mac division believes in closed-

architecture and Apple II division believes in open-architecture) and members interact more freely and openly within the cliques.

The goal of this paper is to relax the implicit assumption that the payoff function for individuals while learning is unified and that recombining diverse knowledge do not incur cost. I try to demonstrate the possibility that learning from better performing individual may actually hinder organizational learning performance. Depending on which subgroups they belong to, individuals face a problem of a more complex problem: the choice is no longer just learning from a better performer, because, if the learning target's belief is different from the individual, his performance will be jeopardized.

Interconnectedness and inter clique learning behavior

Not every clique automatically engages in inter-clique learning behavior (Gibson and Vermeulen, 2003). Research on subgroups and organizational learning demonstrate that while some groups are able to break routines and generate new knowledge that enhance their performance by learning from other cliques, other groups gets trapped in previously adopted behaviors (routines), unable to develop and change their conduct (Argyris, 1976; Argyris and Schon, 1978; Hedberg, 1981; Argote, 2012; Edmondson, 1999, 2002; Levinthal and March, 1981, 1993).

One of the factors that could enhance the organizational learning and generate new knowledge is the level of inter-connectedness between cliques. Granovetter (1973) introduced the concept of strength of weak ties and brought sensation to the world of social science. The seemingly paradoxical finding that generative alienation is crucial to social integration (Granovetter, 1973) is germane to organizational learning as well.

Weak inter-clique ties aid cliques to search for and find valuable knowledge in other cliques (Hansen, 1999). Fang et al (2010) simulated an organization divided into subgroups to see how inter-group connectivity influences balance between exploration and exploitation. They concluded that moderate level of cross-group linking is optimal for highest learning performance. It is evident that inter-connectedness between cliques is a crucial variable in organizational learning.

THE MODEL

To reveal how incompatible (conflicting) objective functions of respective subgroups inside an organization affect the optimal structure of organizational learning, I elaborated the March's (1991) classic model in two ways, especially, focusing on the degree of overlap between cliques. First, we incorporated the concept of interpersonal learning, so that individuals learn directly from connected actors rather than from organizational code indirectly. Based on this departure, we build an interpersonal network with two subgroups with varying degree of inter-connectedness. Second, I designated two idiosyncratic payoff functions to two separate subgroups. Thus, our model is composed of three entities: *organizational network structure, payoff function and two subgroups (cliques)*.

Organizational Structure and degree of overlap

To construct an interpersonal network with varying degree of inter-clique ties, I extend the ER random graph model (Erdös, P. and Rényi, 1960), which chooses and

links two nodes randomly in each step. We tuned the ER model by using parameter α as the degree of overlap that indicates proportion of inter-clique edges to intra-clique edges. For example, when α equals to 0.3, the proportion of inter-clique edges to total number of edges equals to 30%. We expect that using ER process to build an interpersonal network structure enables us to provide a simple baseline model and opportunities to further elaborate it by modifying structural assumptions. Figure 1 visualizes an example of an interpersonal network structure with varying degree of α.

Insert Figure 1 about here

External Reality and Payoff Function with conflicting belief

As March (1991) designed in his classic model, I construct the external reality with *m*-dimensions. However, for each dimension value of 1 was assigned, whereas the classic model sets a value of 1 or -1 with the probability of 0.5. This modification of external reality gives us the ability to deal with levels of individual knowledge at initial stage by adjusting probability distribution of value assigned without destroying generality.

Insert Figure 2 about here

To generate two different objective functions in respect of conflicting subgroups (G_A and G_B), the model divided the m-dimensions of reality into two parts: the conflicting part and group specific part (see Figure 2). First, for the conflicting part, the payoff function for individuals depends on which group they belong to. For part A (B), individuals in G_A (G_B) have the incentive to deviate from organizational optimum respect to the size of β. In Table 1, parameter β indicates the incentives to deviate, which is equivalent to the degree of conflict. For instance, when β equals to 0.5, in part A, individuals in G_A will get 0.5 point for each dimension with 1, whereas they will get 1.5 point with -1. On the other hand, individuals in G_B will get 1.5 point for each dimension with 1, whereas they will get -1.5 point with -1. In other words, individuals in G_A will show superior performance with -1, but organization will show its optimal performance with 1. The members have different beliefs regardless of the reality, depending on which subgroups they belong to.

Second, for the group specific part, individuals share the identical payoff function indifferent to their group origin. Each individual will get 1 point with each dimension with 1 otherwise 0. To represent group specific knowledge, we assign initial value for this dimensions with different probability for each group, which will be presented in the following section.

Insert Table 1 about here

Organizational members divided into two subgroups and group specificity

The simulated organization is comprised of n individuals holding *m*-beliefs, each of which has a value of 1, 0, or -1, about the external reality. At initial stage, each actor has idiosyncratic set of beliefs that is given randomly. For the conflicting part, we assigned 1, 0, or -1 with probability 1/3 for each individuals. On the other hand, for the group specific part, we assigned 1 or 0 for each part of the *m*/2-dimensions with different probability distribution for different affiliation to the subgroups, because individuals in a subgroup share clique specific knowledge. To control the degree of group specificity, we adopt a control parameter γ. As γ increases, in the group specific part, individuals in different groups tend to have heterogeneous belief at the initial point. For instance, when γ equals to 0.3, in part A' from Figure 2, individuals in G_A will have 65 (50 + 30/2)% chance of having correct beliefs at the initial point, while those in G_B have 35 (50 - 30/2)% chance. Conversely, in part B', individuals in G_B will have 65% chance of having correct beliefs at initial stage, while those in G_A will only have 35%.

Learning process : Inter personal learning

The model adopts interpersonal learning, meaning that the members of the organization learn from those that are connected to them. In learning stage, I largely followed 'Majority Belief' concept introduced in the classic model (March, 1991) and 'Multiple Objective Optimization' model in Genetic Algorithm that evaluates each actor with their objective function before learning from each other. In other words,

individuals evaluate others that are connected based on their performance, and they learn from majority belief of superior performers.

Furthermore, to verify whether their beliefs are aligned with the organization when they reach the equilibrium, we calculate not only average performance scored with their objective function but also average number of correct bits measured by external reality. By calculating performance using both criteria, we can find out whether the routine is aligned with the external reality.

RESULT

In all results reported below, I computed the average of 1000 simulated performances. Unless otherwise mentioned, the following parameter settings, summarized in Table 2, was used. The external reality consists of 200 dimensions (m = 200). Each clique consists of 100 individuals, totaling 200 members (n = 200) inside the organization and I fixed the learning rate at 0.3. The simulated results are iterated until the organizational learning performance (the average of individual performance) reaches equilibrium.

Insert Table 2 about here

Analysis 1: the moderating effect of conflict (β)

Organizational learning performance with varying level of inter-connectedness

Figure 3 presents the organizational performance for different levels of inter-clique connection rate for two different levels of conflict: $\beta = 0$ (no conflict) and 0.5. By comparing these two different levels of conflict, we can see the moderating effect of conflict in organizational learning. Other parameters (number of individual, level of conflict, total number of edges, initial knowledge distribution) are set as Table 2 (n = 200, d = 300, $\gamma = 0.2$). For each time step, ties link members according to the level of α according to the ER process. Then the individuals start the learning process for subsequent time periods. As mentioned earlier, organizational learning performance is measured as the average of all individuals' performance. We continue the process of learning for 1,000 periods, until the equilibrium is obtained (i.e. no further change in any organizational performance).

Insert Figure 3 about here

As seen in Figure 3, performance tends to reach a steady state, and the inter connectedness (parameter α) affects the overall performance of organizational learning. For both level of β, when α is zero the organization can be characterized as fully isolated and members only interact within the cliques they belong to. The absence of ('weak') ties hampers the exchange of diverse ideas and beliefs (e.g. including clique specific knowledge) across cliques, trapping organization in a local peak. However,

higher interconnectedness does not equate to greater long-run performance. As the results show for both graphs, the long run performance tends to be higher when $\alpha = 0.1$ than when $\alpha = 0.8$. Performance appears to be highest when $\alpha = 0.4$ for $\beta = 0.5$ and when $\alpha = 0.2$ for $\beta = 0$ (i.e. performance is highest when the cliques are 'moderately' connected). The level of connectivity and organizational learning performance has an inverted U-shaped relationship. Our reasons for the results will be discussed subsequently.

The fact that the proportion of inter-clique ties (α) and organizational learning performance has an inverted U-shaped relationship is not very radical. Previous research has already proven and reasoned this phenomenon (e.g. Fang et al, 2010; Posen and Levinthal, 2012). To understand why the relationship between the level of inter-connectedness and long term learning performance is curvilinear, it is crucial to understand why the two extreme cases (fully connected and fully isolated) produce inferior results. When the cliques are strongly divided (low level of α), specific knowledge from one clique that is useful cannot deeply penetrate into the members that belong to the other clique. This is because, members cannot interact freely among themselves and learn knowledge that is contradictory to their own belief and objective function shared within the clique. On the other hand when the inter-connectedness between two cliques are too strong, members have open access to other members belonging to the other clique. Free inter-learning jeopardizes correct but unique belief, since members of respective cliques lack time to preserve and nurture knowledge from their own clique. When the two cliques are fully connected to each other, the cost of learning from diverse knowledge is maximized, because members are exposed to

knowledge that is detrimental to their payoff function, leading to a faster loss of clique specific knowledge.

The interesting part of Figure 3 is that the graph reveals β as a moderator for α in organizational learning. The level of conflicting knowledge works as an additive combinations of latent mechanism, so that the turning point is shifted to the right hand side of the graph (Haans, Pieters, and He, 2016). When members inside the organization faces more complex setting, not knowing what to learn, the increased cost of learning leads individuals to have more diverse knowledge compared to less complex setting. The moderating effect of conflict is important, because, many researchers have neglected the role of conflicting knowledge in previous research. Also, this can be the starting point of focusing on where the 'balance' between exploration and exploitation is.

Analysis 2: the effect of size of conflict (β)

Optimal degree of overlap with varying level of conflict

Our results in figure 4 show the optimal level of connectivity with varying degree of conflict. As seen in the graph, the optimum level of overlap has an inverted U-shaped relationship with degree of conflict. As we have stated above, an organizational structure with moderate level of connectivity outperforms that with excessive level of overlap or completely separated structure. We argue that clique specific knowledge should be nurtured inside a clique and spread to other cliques at the same time. In this sense, to understand how the degree of conflict influences the optimal level of overlap in organizational learning, we should investigate how such conflict affects spreading and preserving knowledge in organizational learning process.

Insert Figure 4 about here

First of all, conflict impedes the transfer of knowledge between cliques. Thus, as degree of conflict increases, more inter-clique ties are needed to permeate clique's specific knowledge to other cliques. This force drives the optimum level of overlap to increase with increasing degree of conflict. However, as conflict increases, marginal effect of additional inter-clique ties will decrease. Second, with high degree of connectivity, learning between individuals in opposite cliques is much more complicated and easily be misled, since those individuals are not able to figure out which knowledge (belief) is proper for them in blind learning; members have larger and more complex pools to learn from. Moreover, such complexity is amplified when degree of conflict increases. In this sense, an excessive overlap between cliques drives members to lose the direction and this force clearly increases with higher degree of conflict. As a result, such interacting relationship between degree of conflict and degree of overlap brought such curvilinear relationship shown above.

Insert Figure 5 about here

To confirm the relationship between conflict and optimal level of interaction, I have examined the model with different level of initial knowledge distribution: when the value of γ is low, moderate, and high. As seen in Figure 5 the patterned

relationship is almost identical, being inverted U-shaped. However, the interesting part of Figure 5 is how γ act as a moderator that weakens the curvilinear relationship between conflict and optimal level of interaction. To understand why such flattening happens, we need to understand the latent mechanism that shape the moderation effect (Haans et al, 2016).

Analysis 3: the effect of initial knowledge distribution (γ)

Optimal degree of overlap with varying initial group knowledge distribution

The next experiment tries to figure the relationship between clique specific knowledge and optimal level of inter-clique connectedness. For presentation purposes, Figure 6a shows the relationship between the initial knowledge distribution (clique specific knowledge) and performance at equilibrium for three levels of α – 0, 0.2, and 0.4. As seen in the graph, when α=0 the relationship between initial knowledge distribution and organizational learning performance is negative. This means that when members of respective cliques have no routes to learn from each other, the bigger the clique specific knowledge gets the worse organizational performance. On the other hand, when the conflicting cliques are moderately overlapped, initial knowledge distribution and organizational performance has a positive relationship. This itself is not a very innovative finding, because, this only shows the importance of diversity in learning.

Insert Figure 6a about here

The interesting finding can be noted from Figure 6b. Figure 6b indicates the optimal level of interconnectedness across different level of clique specific knowledge. While, Figure 6a only shows the traditional argument of how diversity can be beneficial to the organization, we can infer from Figure 6b that learning can incur cost. If clique specific knowledge reaches a certain point (around 0.45) it is better for the organization to have lower level of overlap between the two cliques. Even though, individuals are faced with larger pools of knowledge to learn from, if the contents itself are in conflict they incur cost so that individuals have to face with lower organizational performance. If the body of knowledge is too diverse and complex, learning comes with costs.

Insert Figure 6b about here

Lastly, I varied the value of β to illustrate the robustness of the relationship between α and γ. The baseline model set beta as 0.5, because it is the most extreme case where conflict is highest. By setting the value of beta to 0.1 and 0.3 we can confirm how the relationship is unchanged between the clique specific knowledge and optimal level of connectivity.

Insert Figure 7 about here

DISCUSSION & CONCLUSION

In this study an instrumental model is built to examine the influence of conflict and inter-connectedness on organizational learning. The first focus of the analysis was on the extent of connectivity between two cliques by varying a single parameter α. Controlling for the level of conflict, I find that modest amount of cross-clique linking (i.e., around α =0.4) are associated with higher equilibrium performance levels. Moderately connected cliques help preserve unique knowledge and enhance learning by members of the other clique. The study also finds, rather surprisingly, that the interacting relationship between the degree of conflict and the degree of interconnectedness is curvilinear. High degree of conflict hinders the transfer of knowledge between cliques. In order to exchange clique specific knowledge more easily, more inter-clique ties are needed. These two opposing forces drive the optimum level of overlap to increase with higher degree of conflict. However, the marginal effect of inter clique ties will degrade. On the other hand, when two cliques are highly connected, learning complexity becomes higher for members because the knowledge to be learned is obscured; members do not know whom to learn from. This complexity rises with increased conflict between cliques. Lastly, we designed the model to have knowledge conflict between two subgroups and these subgroups have their specific group knowledge parameterized by γ. The experiment showed how the relationship between group specific knowledge and optimal level of overlap is inverted U shaped. With this results I concluded that under conflicting knowledge, even when individuals are exposed to diverse and correct knowledge, their performance can be lowered because the knowledge conflict act as a cost of learning.

Limitation and Future research

Since our study has focused on the effect of conflict on organizational learning, we deal some constructs as given, not because they are not important, but because they are outside of our focus: our goal is to introduce a baseline model for organizational learning with conflict and verify the impact of conflict on the optimal organizational structure. I believe that future studies may shed light on issues stated below by using and elaborating our model. Possible variations of the model for future research is discussed.

First of all, the model assumed that inter-clique ties play an identically role compared to that of intra-clique ties in organizational learning process. However, frequency of interaction will vary with strength of ties so that inter-clique ties might be dominated by intra-clique ties in interpersonal learning process (Granovetter, 1973). Also, the quality of transferred knowledge might vary depending on whether the ties are formed inside a clique or between cliques.

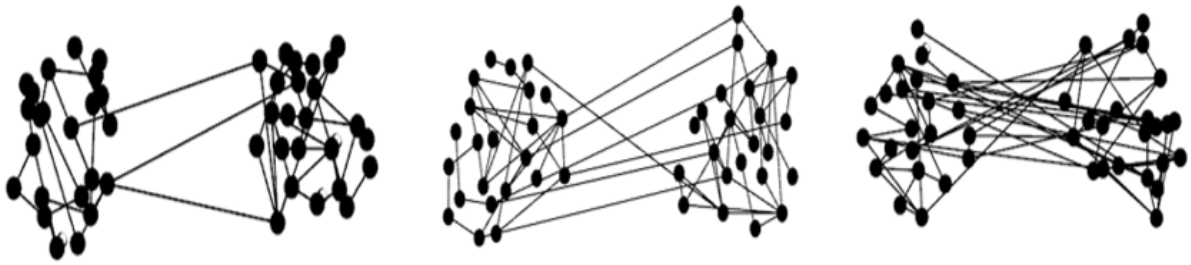
Second, we can vary the configurational properties of the clique (e.g. group size and group number). The configurational properties greatly affect the ways members act (Csaszar, 2012; Chen, Crossland, and Huang, 2014). By modifying and elaborating the properties I expect a more sophisticated model that reflect the reality much better. For instance, two groups in our model have the same size and symmetric objective function. In terms of size and symmetry, future researchers will be able to explore organizational learning with dominating subgroup by adjusting the size and assigning asymmetric objective function. Also, we can enlarge the number of cliques that are present inside

the organization. By elaborating the configurational properties of subgroups future research can effectively combine the organizational power literature to organizational learning to better understand the reality.

Third, in the model, we fixed and assigned the same degree of specificity of knowledge in each cliques. By modifying this assumption, future research might reveal the relationship between knowledge specificity and organizational learning with varying degree of conflict.

Lastly, we assumed that the relationship between the degree of conflict and the degree of overlap is independent. However, there are numerous reasons to believe that the two concepts are closely interrelated. By acknowledging the limitation, there are areas to improve. To sum up, we believe that our basic model opened up new area of organizational learning by bringing the conflict back in and provided plenty of opportunities for researchers to further develop the literature.

Figure 1. Example of a network structure varying the degree of overlap: a model with N(*n, d, α*); where *n*=the number of nodes, *d*=the number of total edges, *α* =proportion of inter-clique ties to m



(a) N (50, 75, 0.05) (b) N (50, 75, 0.1) (b) N (50, 75, 0.3)

Figure 2. External Reality divided into two parts: Conflicting Part & Group Specific Part

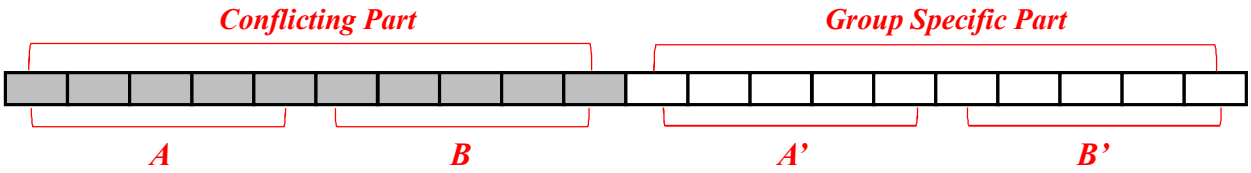


Table 1. Payoff Structure for individuals in $G_A(G_B)$ in Conflicting Part & Group Specific Part

- Conflicting Part -

Belief held by individuals In Part A (or B)	Individual's Payoff	
	Individuals in G_A (or G_B)	Individuals in G_B (or G_A)
1	1-β	1+β
0	0	0
-1	1+β	-1- β

- Group Specific Part -

Belief held by individuals In Part A', B'	Individual's Payoff
	Individuals in G_A ,G_B
1	1
0	0

Table 2. Summary of Parameter Values for Presented Results

Parameter	Remarks	Range of values
n	Total number of individuals	200
d	Total number of edges in organization	300
m	Number of dimensions in external reality and individual belief	200
ρ	Learning rate	0.3
α	Proportion of inter-clique ties	Vary
β	Degree of conflict between cliques	Vary
γ	Clique specific knowledge (initial dispersion of clique belief)	Vary

Figure 3. Effect of inter-clique ties with given level of conflict (Beta = 0 and 0.5)

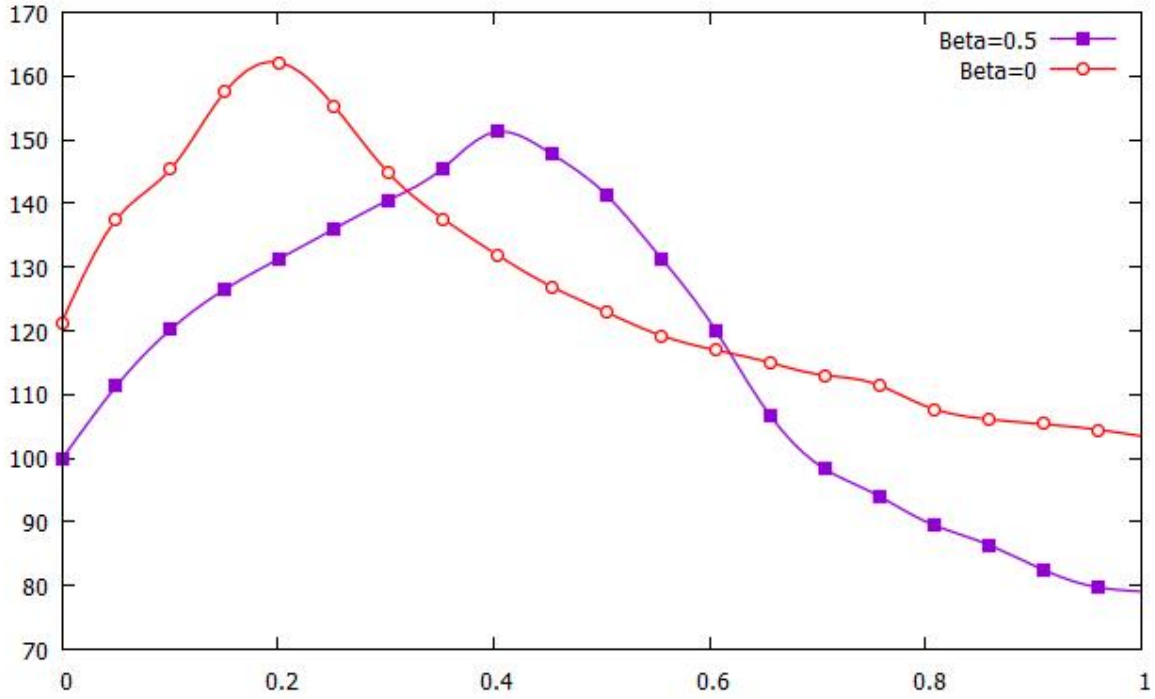


Figure 4. Effect of level of conflict on optimal level of interaction

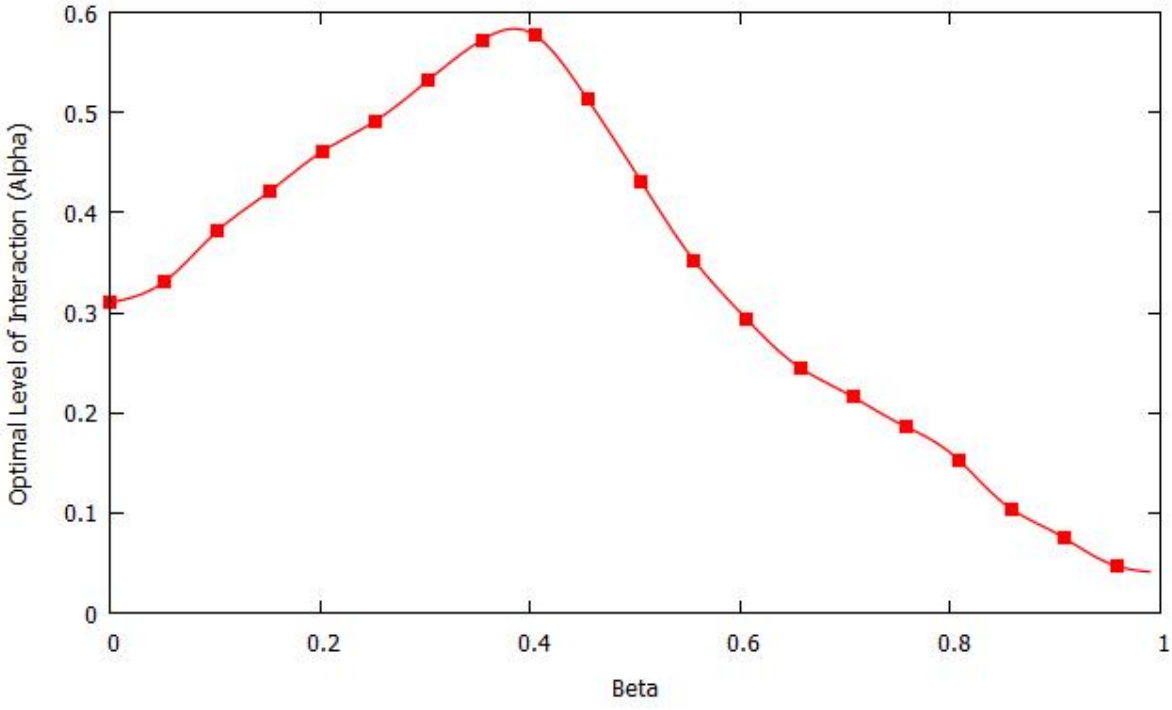


Figure 5. Effect of level of conflict on optimal level of interaction with different initial knowledge distribution

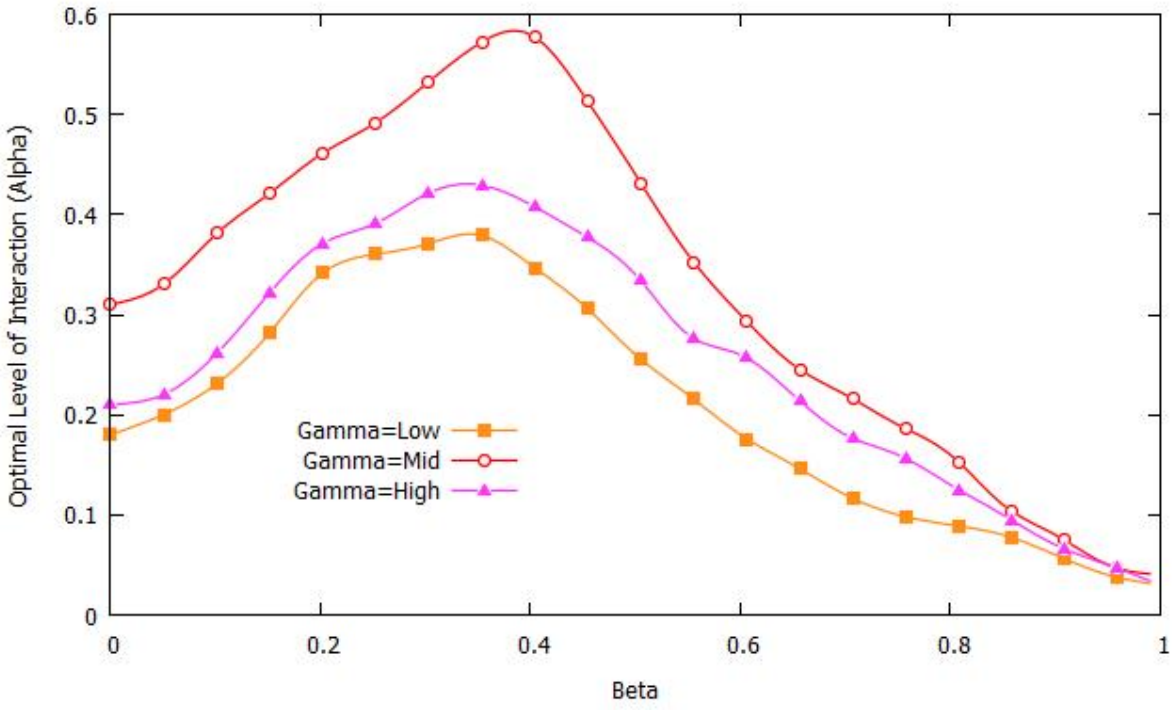
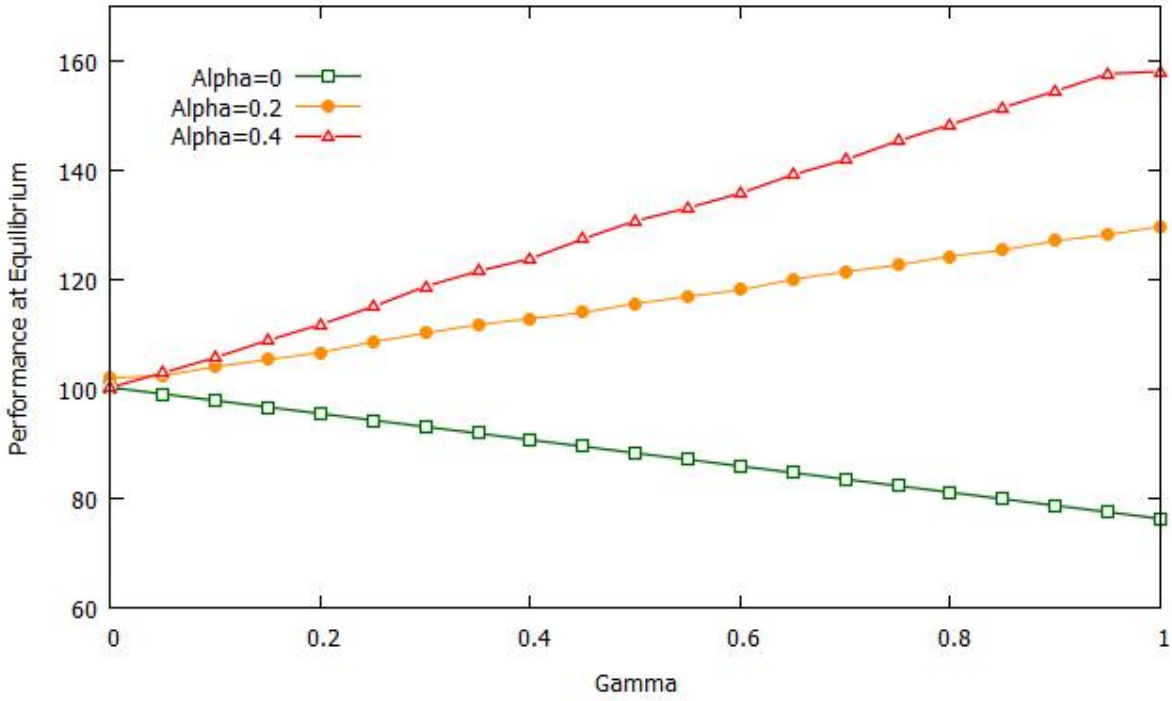


Figure 6. Effect of initial knowledge distribution on optimal level of interactions

(a) Initial Knowledge Distribution and Performance at equilibrium



(b) Initial knowledge distribution & optimal inter-connectedness

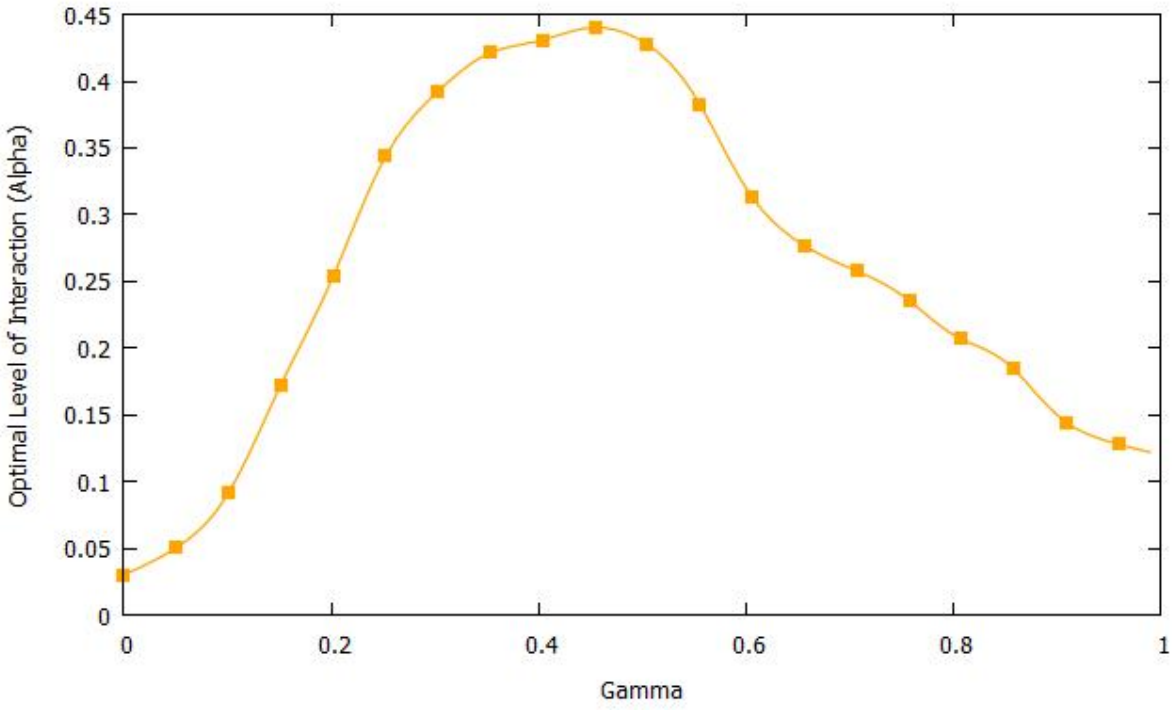
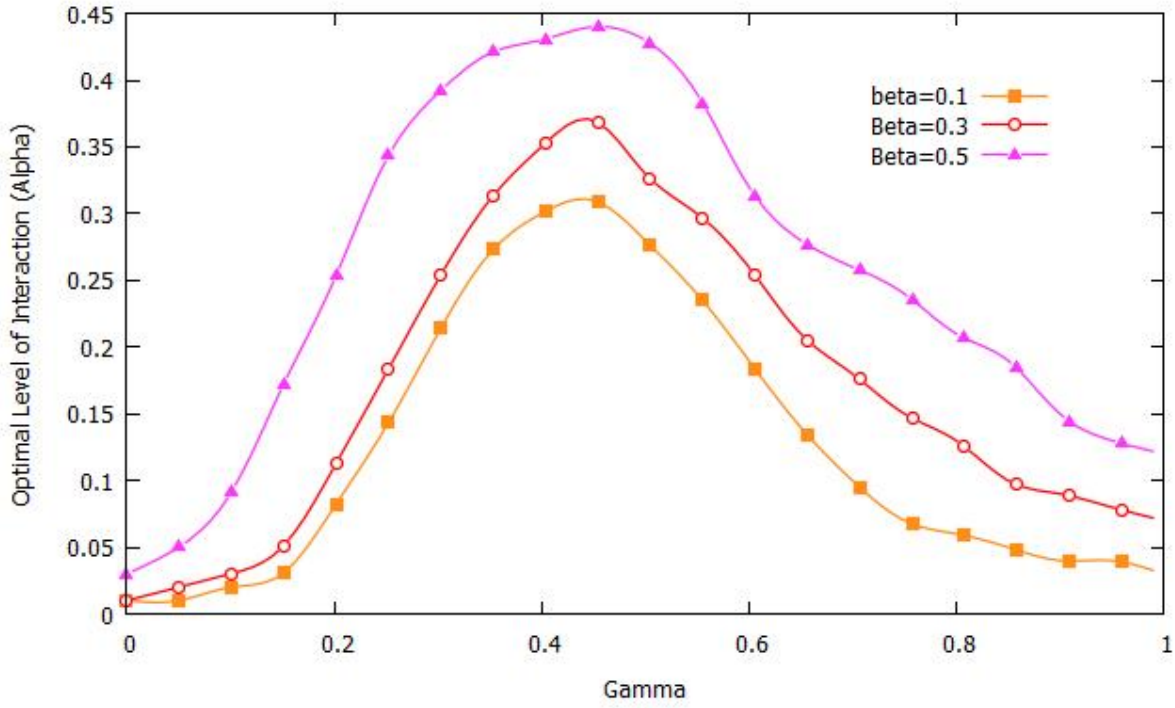


Figure 7. Effect of initial knowledge distribution on optimal level of interaction with different level of conflict



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국 문 초 록

대립 되는 파벌 간 연결 정도가 조직학습 성과에 미치는 효과

엄태웅

전 략

경영대학

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본 논문은 하나의 조직 안에서 대립되거나 양립할 수 없는 믿음, 목표 혹은 생각들이 융합되고 조합될 때 조직학습의 성과가 어떻게 변하는지 연구하고 있다. 기존의 조직 학습 연구는 다양한 지식이 조직의 학습에 긍정적으로 미치는 영향에 집중을 해왔고 대다수의 연구들이 조직 구성원이 동일한 목표를 추구한다는 가정을 하고 있다. 이러한 비현실적인 가정은 다양한 지식이 서로 상충 될 때 초래 될 수 있는 학습비용을 간과한다. 컴퓨터 시뮬레이션을 통해 대립하는 생각을 갖고 있는 두 개의 파벌을 만들고, 그들간의 연결 정도에 변화를 주는 모형을 만들었다. 이를 통해 두 파벌을 연결하는 고리가 각 파벌 고유 지식이 퍼져 조직 성과에 긍정적인 영향을 미치는 역할과 조직 구성원으로 하여금 잘못된 지식을 학습하게끔 하는 학습 비용을 유발 하는 이중적인 역할을 발견했다.

주 요 어: 조직학습, 학습 비용, 대립, 파벌간 연결

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