

Cohesiveness of Internet Based Virtual Teams in the e-business: Roles of Various Types of Leadership[☆]

함 상 우*
SangWoo, Hahm

ABSTRACT

A virtual team consists of various members with a range of professional skills. An IT virtual team can confer such advantages as improving creativity and solving problems in e-business. However, virtual teams are less cohesive than off-line based teams, at least partly because they do not meet face-to-face to solve problems. If the cohesion of the members in a team is weak, overall performance can decrease. Therefore, this study seeks to understand the specific types of leadership needed to increase the cohesiveness of the members in a virtual team. Leadership is the most important factor for the successful operation of a virtual team. Leaders engage members with goals, and motivate them by creating positive relationships. This study describes the idealized influence of transformational leadership in which a leader directly engages members in a goal, and the role of participative goal setting in which members set their own goals. In addition, this research demonstrates the benefits of a positive attitude of a leader towards their team members and the influence of leader-member exchanges. If the cohesion of virtual teams is improved through specific leadership, the team members will be more committed to their teams and work, and the team's performance will improve. Furthermore, the successful operation of virtual teams will provide an opportunity for companies in e-business to gain a competitive advantage in the contemporary environment, where creativity is important.

☞ keyword : virtual team, cohesiveness, leadership, IT industry, e-business

1. Introduction

Today in e-business, lots of organizations are faced with the need to make constant drastic changes due to intense competition. Enterprises need to consider diverse solutions to adapt to a constantly changing environment [1]. The importance of diversity and creativity are increasing day by day. One of the strategies available to secure diversity and creativity is to utilize and organize virtual teams. As technology develops, companies utilize it to expand their information base and improve their technological competence through such things as mobile applications [2]. These information technologies support “business operations

benefits of convenience, efficiency, flexibility, accuracy, productivity, and innovation”[3; p.5420]. Moreover, these technologies have led to new types of teams such as the virtual team. The term virtual is related to “concepts such as the virtual knowledge network, the virtual organization, the virtual team, the virtual community of practice, and the virtual workplace” [4; pp. 20-21]. A virtual team generally consists of team members with different skill sets and expertise in problem solving. Thus, a virtual team has the advantages of diversity, creativity and higher performance [4], [5]. Members in a virtual team do not work together in the same place. Virtual team members work on a specific project, and the team is dismantled when the task is resolved or completed. After a specific mission is completed, the members are scattered and do not meet again [5]. Hence, members of virtual teams are less cohesive than the traditional or offline-based teams such as are commonly found in finance or marketing departments. If the members lack cohesiveness, the overall performance of the organization may be suboptimal. Conversely, members in a

* College of Business Administration, Soongsil University, Seoul, 06978, Korea.

* Corresponding author (bload@ssu.ac.kr)

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highly cohesive team work together, and frequently display high levels of organizational citizenship behavior and information sharing, and achieve high performance overall [6], [7]. If the members of a virtual team have high cohesion, the team will be more creative. Members of teams with high cohesion will share information and collaborate with one another [7]. Hence, a cohesive virtual team will be able to accomplish tasks more successfully.

This research explores ways to improve cohesiveness in order to improve the performance of virtual teams which are disadvantaged by low cohesiveness. Leadership is the most valuable influence on virtual team performance [8]. The role of a leader is particularly important for a virtual team or a temporary task-force team [4], [8]. Leaders should ensure that team members feel engaged in the team's goals in the short term. Leaders must exert influence so that members can cooperate and sometimes make sacrifices to achieve goals [9]. Therefore, this research focuses on the most important roles of a leader in the performance improvement of a virtual team. A leader is a person who interacts with and influences members to achieve the goals of an organization or team [9]. A leader should have a positive relationship with the members and motivate them to achieve the team's goals. Thus, an important dimension of a successful leader is their relationship with members and the achievement of goals. In relation to goals, a leader can direct members towards the goals, and can encourage members to set or achieve their own goals. The most representative type of leadership in which leaders immerse members in goals is transformative leadership [10]. Further participative goal setting encourages members to set their own goals [11], [12]. Therefore, in this study, we set the idealized influence of transformational leadership and the participative goal setting of the members as the characteristics that leaders needed to improve the cohesiveness of the virtual team. Furthermore, the quality of the relationship between the leader and the members is closely related to the performance of the team or the organization [13]. The most representative research concerning members has been conducted in the area of leader-member exchange and leader's attitudes [13], [14]. If a leader adopts an attitude of sharing information and knowledge with the members, the relationship between the leader and the members will be improved [13]. LMX

(Leader Member Exchange) theory further explains that a team's performance is enhanced if the leaders and members have mutual trust and respect [13]. Therefore, we set a leader's attitude towards sharing and LMX as leading factors of cohesiveness improvement.

This study will explore what leaders need to focus on to increase the cohesiveness of virtual teams. In a virtual team, the leader will immerse the members in the goals by receiving their feedback on the goal setting process, and have a positive relationship with the members, which will improve the cohesiveness of the members. Therefore, through these specific aspects of leadership, we will be able to improve the overall performance of virtual teams.

2. Literature review

2.1 Virtual team

The term virtual involves concepts such as virtual teams, virtual workshops, virtual knowledge networks, and virtual communities [4]. By developing informational technology in e-business, companies need to use virtual teams to secure creativity and enhance performance [5]. The virtual team has a unique form where members are geographically dispersed and have few or no face-to-face meetings [4]. Despite the geographical distance, separate team members individually have crucial capacities in the team. Members of a virtual team are specialized in quickly solving problems, demonstrating creativity, respecting diversity and cross-functionalities [5]. Today, companies need to leverage virtual teams to improve their performance. The successful operation of virtual teams will ensure a company's creativity and competitive advantage [15].

2.2 Cohesiveness

The cohesiveness of a team is the degree to which members are motivated and attracted by their team members. Members are usually satisfied and co-operative when their team has a higher level of cohesiveness. When members have lots of respect, security, and loyalty for team members, their team has cohesiveness. A high level of cohesiveness in a team encourages members to participate in team activities

and reduces their intention to leave the team. On the other hand, when people have lower cohesiveness for the team, they are less satisfied [16].

A virtual team has no or little face-to-face interaction and resembles a task-forced team that is dispersed after problem solving. Thus, virtual teams have the disadvantage that cohesion is innately relatively low [15]. Since cohesiveness is related to organizational outcomes such as organizational citizenship behavior and information sharing, the cohesiveness of virtual teams is also closely related to team performance [6, 7].

2.3 Leader's attitude to sharing and cohesiveness

Leader's attitude to sharing refers to the degree to which a leader adopts an attitude of sharing information and knowledge with members. When a leader has this attitude, members can easily obtain information from the leader, and conversely the leader can acquire knowledge through the members [14], [15]. Knowledge sharing plays a very important role in the virtual team. Diversity is secured when members share knowledge and information. Members of diverse teams understand and respect each other, and the creativity of a virtual team is also improved by diversity [15], [17]. Hence, the leader's attitude to sharing will affect the performance of the virtual team in the IT industry [18].

A leader's positive attitude to sharing will improve the cohesiveness of a virtual team. Leaders become strong role models for their members. Factors such as leader's behavior, values, and attitudes influence the members. Additionally, the members may come to resemble or behave in a similar manner to their leader by adopting a leader's values and attitudes. By acting in a similar way to a leader, members feel that they will be rewarded and will be able to achieve high performance within the team [9]. Therefore, the specific attitude of the leader has a great influence on the attitude and behavior of the members. When leaders have a positive attitude towards sharing information and knowledge with members, members also have a positive attitude to sharing information and knowledge with each other. In particular, information and knowledge are critical to virtual teams, and sharing them will lead to better performance for the virtual

team. Leaders' attitudes to sharing can enhance team cohesiveness and performance by allowing members to share information and knowledge with one another [14], [15], [17]. Based on this logical relationship, this study sets the following hypothesis:

H1. Leader's positive attitude to sharing will have a beneficial relationship on the cohesiveness of a virtual team.

2.4 LMX and cohesiveness

Leader-member exchange assumes that one leader is not discriminatory with multiple members, but has a differentiated relevance. Leaders have different relationships with their team's individual members, and this differentiation involves admiration, respect, and trust. Thus, a high quality of LMX means that the leader and the members admire, respect and trust each other. When the quality of the LMX is high, the members are satisfied with their job and perform to a high level. [13], [19].

LMX involves a positive relationship between a leader and members. If a leader has a good relationship with a member, he or she will be more supportive and helpful. Thus, those members who are well supported by their leader become more satisfied and in turn make a greater effort for the team [19-20]. Leaders also focus on improving team performance through team representatives. Members who receive positive support from the leader are immersed in the team's goals as presented by the leader. [21] Furthermore, the LMX causes additional efforts to be made by members. A member who has a good relationship with their leader will often undertake to do more than their basic responsibility for the team. [22] Thus, if the quality of LMX is high, members will recognize themselves as being part of a group who are working for a team and act so as to mutually help their co-members [13], [19], [21-22]. Therefore, if the quality of LMX is high, cohesiveness among members can be improved. Based on these relationships, the following hypothesis was established.

H2. LMX will have a positive relationship on the cohesiveness of a virtual team.

2.5 Participative goal setting and cohesiveness

A goal should have appropriate difficulty and clarity. Goals that are too difficult or too easy can actually decrease motivation. Setting ambiguous goals can also reduce efforts to achieve goals. Properly set goals motivate individuals and lead to improvements in performance. Goals encapsulate the reasons and direction of work. Further, well set goals may have a positive impact on sustainability until they are achieved. Hence, goal setting is related to motivation and performance improvement [12], [23].

Participative goal setting means that members directly participate in the team's goal setting process. Leaders do not arbitrarily set goals, but rather listen to followers' opinions and set goals together. Members who are involved in the goal setting process are generally more committed to the goal. Participative goal setting involves high levels of motivation [23], [24]. When a member of a team participates in a task or goal setting, the member believes that he or she is more autonomous and important to the team. Members who consider themselves important to the team are more committed to the interests of the team. Therefore, such participation of the members in a team increases cohesiveness [25].

Members who have experienced goal setting for the team have a greater affinity for the team, and are more committed to the team. Through participative goal setting, team members work together. Hence, setting goals at the team level also increases cohesiveness [26].

Participative goal setting increases the motivation and satisfaction of the members and makes them more dedicated to the team. These members will work for the team and the cohesiveness of the team will also improve. Based on these relationships, the following hypothesis was established.

H3. Participative goal setting will have a positive relationship on the cohesiveness of a virtual team.

2.6 idealized influence and cohesiveness

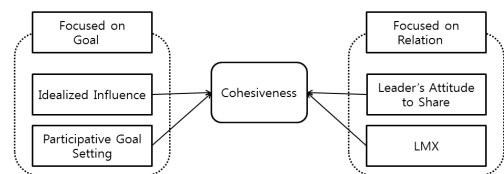
Idealized influence is similar to charismatic leadership. Leaders motivate members by offering attractive goals and

encouraging them to be dedicated to the team. Followers respect, trust, and admire leaders with these traits. Leaders ensure that the efforts of members are sustained and that they are fully committed to meeting their goals. Furthermore, the idealized influence is a tendency to emphasize the value of the team. Hence the members of the team sacrifice for the team, help each other and act to achieve the team's goals together [10].

Leaders motivate members by presenting visions and engaging them in team values and goals. In particular, the leader presents an attractive vision to its followers through idealized influence and becomes a behavioral model, encouraging members to follow their example. Members with such leaders become more committed to the team's goals [27]. Therefore, when the leader is motivated to set goals and actively engage team members, they will act to help each other to achieve their goals. In addition, the members consider the value of the group to be important, and the cohesiveness of the team is also enhanced to achieve team goals [28].

The idealized influence of the leader allows the members to immerse themselves in the team's goals and to improve cohesiveness. Therefore, the following hypothesis was set.

H4. Idealized influence will have a positive relationship on the cohesiveness of a virtual team.



(그림 1) 연구모형

(Figure 1) Research model

3. Participants and Measurement

Data was collected from 125 workers who were members of virtual teams in e-business or IT related companies. Demographic information on these 125 workers is as follows: In terms of gender, there were 98 males (78.4%) and 27 females (21.6%). In terms of age, 9 were in their twenties (7.2%), 95 in their thirties (76%), and 21 were

older than 40 (16.8%). In terms of academic background, 12 had completed high school (9.6%), 41 had bachelor degrees (32.8%), 56 had master degrees (44.8%), and 16 had doctorates (12.8%). In regards to their length of employment, 6 had worked for less than 1 year (4.8%), 86 had worked 1-5 years (68.8%), and 33 had worked longer than 5 years (26.4%). In addition, all items were measured by a Likert 7 point scale.

First, cohesiveness was measured by 4 items, including, "People are warm and friendly", "People work well together as a team" [6],[7],[20].

Second, leaders' attitude to sharing was measured by 5 items, including, "My leader always sets a good example in sharing his knowledge with others", "My manager allows me to share my knowledge with my colleagues though it may influence the present job process" [14].

Third, LMX was measured by 5 items, including, "I like my leader very much as a person", "My leader would defend me to others in the team if I made an honest mistake" [13].

Fourth, participative goal setting was measured by 3 items' including, "To set team's goals, I use my work teams members' suggestions to make decisions that affect us", " I give all work group members a chance to voice their opinions" [11], [12].

Finally, idealized influence, which is one of the sub dimensions of transformational leadership was measured by 3 items, including "My leader is enthusiastic about the value and importance of our team", "My leader presents a clear vision for the future" [10].

4. Analysis

For empirical analysis, this study used exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) for validity, Cronbach's for reliability, correlation, and structural equation modeling (SEM). Table 1 suggests the results of the EFA, and Table 2 indicates the results of the CFA. The results demonstrate that the measurements have significant validity, thus they are adopted.

(표 1) 탐색적 요인분석 결과
(Table 1) Results of EFA

KMO .827 (sig=.000)	Component				
	1	2	3	4	5
a1	.289	.736	.196	.033	.364
a2	.301	.849	.229	.191	.151
a3	.186	.860	.149	.319	.019
a4	.292	.785	.267	.006	.271
a5	.201	.866	.102	.182	.283
p1	.163	.224	.027	.496	.598
p2	.309	.286	.140	.085	.802
p3	.258	.256	.198	.123	.822
t1	-.017	.092	.394	.796	.137
t2	.275	.231	.068	.792	.153
t3	.222	.125	-.041	.872	.040
m1	.849	.273	.199	.177	.013
m2	.827	.245	.204	.268	.258
m3	.836	.252	.278	.193	.214
m4	.822	.291	.215	.222	.243
m5	.851	.195	.181	-.015	.278
c1	.219	.235	.836	.087	.169
c2	.230	.177	.859	-.044	.212
c3	.155	.053	.826	.172	-.014
c4	.278	.420	.683	.151	.074
Eigen Value	4.356	4.230	3.239	2.715	2.358
% of Variance	21.779	21.151	16.195	13.574	11.790
cumulative %	21.779	42.930	59.125	72.699	84.489

(표 2) 확인적 요인분석 결과
(Table 2) Results of CFA

	AVE	Composite Reliability
Leader's attitude to sharing	.553	.813
Participative goal setting	.541	.906
Idealized influence	.742	.900
Cohesiveness	.634	.916
LMX	.829	4
absolute fit index	$\chi^2=425.238$ $\chi^2/df=3.059$	
incremental fit index	CFI=.906, IFI=.907	
parsimonious fit index	PNFI=.635, PGFI=.507	

Table 3 indicates descriptive statics and the reliability. Since Cronbach's values of all variables are higher than 0.8, all factors have sufficient reliability.

(표 3) 신뢰도와 기술통계
(Table 3) Reliability and descriptive statistics

	Cronbach's α	Mean	Std. Deviation
Leader's attitude to sharing	.954	5.062	1.205
Participative goal setting	.838	5.171	1.197
Idealized influence	.853	4.843	1.157
Cohesiveness	.94	5.318	.879
LMX	.966	4.982	1.456

Table 4 shows the results of the correlation analysis. All factors have positive relationships at a significant level. In particular, cohesiveness has a positive relationship with all antecedent variables. Hence, each hypothesis was supported.

(표 4) 상관관계 분석
(Table 4) Correlation analysis

	1	2	3	4	5
1	-				
2	.607**	-			
3	.416**	.468**	-		
4	.612**	.587**	.441**	-	
5	.533**	.419**	.349**	.551**	-

***:p<.001, **:p<.01, *:p<.05

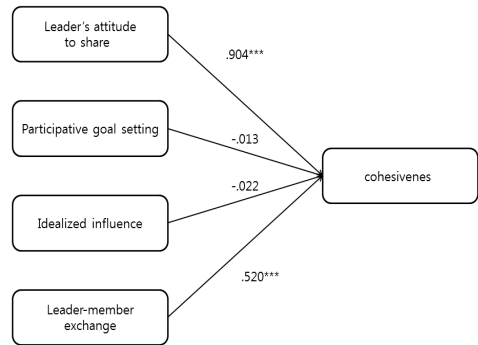
1= Leader's attitude to sharing, 2= Participative goal setting, 3= Idealized influence, 4=LMX, 5= cohesiveness

Figure 2 shows the results of the SEM analysis. According to the analysis, leader's attitude to sharing has the most critical influence on cohesiveness and LMX also has a very important effect. Therefore, we could assert that the relationships between leaders and members (leader's attitude to sharing and LMX) are more important than goal associated leadership (participative goal setting and idealized influence). Model index, absolute fit index ($X^2=454.997$, $X^2/df=3.421$), incremental fit index (CFI=.894, IFI=.896), and parsimonious fit index (PNFI=.601) showed acceptable indicators.

5. Conclusion

5.1 Conclusion and Implications

A virtual team has the innate disadvantage of low



(그림 2) 구조방정식 분석 결과
(Figure 2) The result of SEM analysis

cohesiveness. If the team's cohesiveness is low, levels of cooperation and the team's overall performance will decrease. On the other hand, teams and organizations can achieve diversity, creativity, and performance through high cohesiveness. This study explores the roles of leadership in improving the cohesiveness of the virtual team, which plays an important role in the IT industry.

Leadership behavior theory suggests that a leader may focus on goals and work, or focus on relationships with members [9]. These behaviors influence and motivate members. This study distinguishes leadership that focuses on goals as goals simply presented by the leader or goals set by the members themselves. Idealized influence is leadership in which the leader presents goals directly to their members. Participative goal setting is leadership in which members set their own goals, or at least play a major role in the goal setting process. In addition, this study also explains the influence of LMX and leader's attitudes as relationship focused leadership. LMX is the degree to which a leader and members respect, like and trust each other. A leader's attitude to sharing refers to leadership that shares knowledge and information with members

The empirical study demonstrated that idealized influence, participative goal setting, LMX and leader's positive attitude to sharing beneficially influence cohesiveness. In particular, this study demonstrated that a leader's positive attitude to sharing and LMX, which were established as relationship-focused leadership, improved cohesiveness to a higher level than goal-oriented leadership such as idealized influence and

participative goal setting..

These results suggest the following.

First, in virtual teams, leadership plays an important role in enhancing team cohesiveness. Therefore, leaders should make concerted efforts to improve cohesiveness which will have positive flow on effects for the overall performance of the virtual team.

Second, relational leadership has been proven to enhance cohesiveness. In particular, a leader's attitude to sharing proved to be the most important factor. If the leader demonstrates initiative to share knowledge or information, the members will also be affected [20]. These shared attitudes can improve cohesiveness among members in the virtual team.

Third, relational leadership such as LMX is also crucial to increase cohesiveness. LMX involves trust, admiration and respect between leaders and members. Hence, as leaders strive to earn the trust and respect of their members, the quality of LMX will improve and the cohesiveness of the team will also improve.

Fourth, presenting goals and receiving feedback on them from members can improve cohesiveness. Although it has been suggested that goal-orientated leadership is not more important than relational leadership, traditionally leaders have to make their members a part of the team's goal setting process. These efforts will affect not only cohesiveness, but also positive results such as motivation.

5.2 Limitations and Potential Areas of Future Study

This study focused on specific leadership as a cohesiveness enhancement measure. However, the cohesiveness of a team can be improved by other factors, such as team climate and compensation schemes. Furthermore, other types of leadership will also affect cohesiveness. Therefore, future studies should examine the influence of other types of leadership and other variables, and the interactive effects between these factors.

There is a difference between the virtual team and the traditional team. In this study, we verified that the variables used in the traditional team can be applied to the virtual team. Therefore, in future research, it will be necessary to

conduct research on leadership that is more necessary or appropriate for virtual teams.

In addition, we need to verify how actual performance improves when cohesiveness is high. If team ethical standards are low and cohesiveness is high, negative effects such as group thinking can occur [17]. Therefore, research should be carried out on ways to improve performance through cohesiveness, and the processes by which cohesiveness improves performance.

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● 저 자 소 개 ●



함 상 우(SangWoo Hahm)

2004년 숭실대학교 경영학과(경영학학사)

2007년 숭실대학교 경영학과(경영학석사)

2014년 숭실대학교 경영학과(경영학박사)

2015년~현재 숭실대학교 경영학부 조교수(경영학박사)

관심분야 : 조직행동, 융합연구, e-business, information

E-mail : blood@ssu.ac.kr