

Trust, Performance and Innovation Research in Virtual Team

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Abstract—Differentiated from FTF teams, virtual teams have been drawn with increasing attention from academicians. This article focuses on the relationship between characters of virtual team members and team trust, contextual performance, task Performance and creativity through documentation researching method and empirical approach. By using the data of L'oreal e-strat challenge, the results show that there is the forecast of creativity as well as having a positive correlation with task performance. It is expected to show the light on the virtual teamwork and thus to give suggestions to the conflict in the team operation and management.

Keywords—component; Virtual Team ; Trust; Contextual Performance; Task Performance; Innovation; Member's Characteristic

I. INTRODUCTION

With the extension of global cooperation and development of information technology, global competition changes the organizational structure and operation of the enterprise, and promotes organizational reform. Therefore, virtual cooperative mode is gradually replaced the Traditional FTF team. Virtual teams can help organizations respond in a highly changing and dynamic global business environment, reduce costs and improve resource utilization. At present, the common academic view of the virtual team is that it is a dynamic and flexible team that sharing common objectives, relying on technology, not limited by of the organizational boundaries(such as time, space and distance). Its main features are: First, as the center of the dynamic nature of the task; the second is network technology as means of communication; and third members of the group heterogeneity; Fourth, borderless nature.

From the last century since the 90s, virtual teams have been extensive attention by academic and practice areas. Research on virtual teams are increasingly becoming a hot team research issue. Virtual team as a new kind of economic organization is the advancing front of organization theory.

Researches about virtual teams have been a hot point. Foreign studies focus on the theories of the operation of the main mechanisms of the virtual team; Chinese academic

research on virtual teams mostly in the exploratory study and

Qualitative Research. Most foreign studies are based on Hackman's [1] IPO model, discussing the relationship among the team input variables, the team process variables and team performance variables. Team input variables are the structural factors which influenced the team effectiveness, such as team composition, team size, team role combinations, etc. The team process variables is the process variables about the team how to set goals, communicate and collaborate together to complete the task. team performance variables usually considers from the task performance (ie, tasks completed) and contextual performance (ie, maintain a good development team, members' degree of satisfaction), and other considerations. Therefore, this article is considered to proceed from the IPO.

II. LITERATURE REVIEW AND HYPOTHESES

A. Member's Characteristic, Trust and performance in virtual team

Mayer (1995) [2] indicates that trust refers to whether the supervision and control from others are powerful or not, people have the desire that willing to make themselves vulnerable by the other. This desire is built on the expectations of others' behavior. Virtual team members generally know little about each other. Differences between members are the important influence factor of initial trust. Moreover, the personality and background are the main source of differences in membership. After the initial formation of the trust, the interaction between members makes each member gradually knows others, including personality, ability and other aspects of perception. This perception will affect the team's further interaction and cooperation, and bring a process impact to trust. Considered the classification of the personality, Friedman and Rosenman (1974) proposed the A-and B-type classification scale of personality. The more difference in team members' Background, the team could trust each other better. Therefore proposed,

H1: Virtual team members' A type personality tendency has significant positive effect to trust.

H2: Virtual team members' knowledge background has negative effect to trust.

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Borman 和 Motowidlo (1993) [3] put forward the concept of the task performance and contextual performance. Task performance means the activities on behalf of the employee's proficiency, or by providing the necessary raw materials or services indirectly contribute to the technical aspects of the organization. Contextual performance means the employees extra effort besides the work effort, including the voluntary act, organizational citizenship behavior, pro-organizational behavior, organizational dedication and so on.

Wang Hui et al (2003) used confirmatory factor analysis method, finding out that in the context of Chinese culture, task performance and contextual performance can be distinguished in the structure. Besides, task performance can be predicted to the possibility of employees' promotion and turnover intention, while the dimension of contextual performance (dedicated work) can predict the likelihood of promotion.

Ma Yan, Li Xiaoxuan in (2004) [10] summarized that trust and performance relationship is mutual in the virtual team. Trust set up in virtual team help to improve the overall performance of the team, and the high level of performance helps to remain the trust at a high level. Wang Zhong-ming, Deng Jingsong (2005) [11] discussed the relationship of the communication methods, team trust and team performance in the virtual team, by experimental methods obtained that communication methods has a significant effect on virtual team trust and virtual team performance. Therefore proposed,

H3: trust has positive effect to contextual performance in virtual team.

H4: trust has positive effect to task performance in virtual team.

B. Trust and innovation in virtual team

Amabile[4] explicit theory of innovation shows that innovation is the result of the interaction of several factors. Woodman[5] points out that innovation come from the interaction process of team members. The interaction process concludes the motivation of achieving goals held (Bass & Avolio, 1994; Brophy, 1998[6], Team coordination ability, feedback, organization(Brophy,1998)[7], and The characteristics of the members, referring to members of the generation and sharing of different ideas, needs and perspectives of the extent (Bass & Avolio, 1994; Brophy, 1998) [6].

Simon Taggar (2002) [8] believes that innovation is affected by the interaction of the team members. Team conflict, and effective team communication are the team level factors that affect innovation. Therefore proposed,

H5: trust has positive effect to team innovation in virtual team.

III. METHOD

A. research setting, participants, and procedure

In this paper, after collecting questionnaire, we use SPSS software to analyzing the Hypotheses. In the selection of sample, we used the participant teams of the 2010 L'Oreal business strategy online contest. L'Oreal business strategy

online contest is using the well designed software which can simulate the environment of the international cosmetics market, and combine some factors of company competition to run a virtual online cosmetics company. Each participating group competed with other companies online, and finally according to the level of stock prices to schedule the team ranking. Participants in the virtual network use the full range of professional knowledge and managerial skills to make strategic decisions. As a college student contest, this game is conducted in the winter holiday, and most teams are through the Internet to contact with teammates and finished the race. Therefore, we choose the participant team in the 2010 L'Oreal business strategy online contest as our samples.

When selecting the samples, we firstly test the individual level, and then calculate the team level value.

The implementation of questionnaires sent 70 copies while the actual recovery is 48, in which 43 are valid questionnaires. The responding rate is 69%.

B. Measures

Our research used the mature scale on abroad. Background information (personal and professional skills) uses the scale of Friedman and Rosenman(1974). Trust Scale from McAllister D J. (1995), a total of 8 items. Innovation scale uses the 7 questions of Chen, MH (2006) and Liu Xiaoli et.al (2008). Task performance uses the 9 items of Goodman & Svyantek(1999)'s scale. The scale of contextual performance is formed by 9 items of Van Scotter & Motowidlo (1996) research.

C. reliability and validation

TABLE I. CRONBACH' ALPHA COEFFICIENTS

variables	Cronbach' Alpha
trust	0.84
innovation	0.81
contextual performance	0.72
task performance	0.77

We use cronbach's α to test the reliability of the scale. Table 1 shows that the Cronbach' Alpha coefficients of all the variables are above 0.7. Therefore, the scales are reliable.

IV. RESULTS

A. Descriptive Statistics

Data from TableII indicates that members' A-type personality tendency has no significant correlation with trust, while their correlation coefficient is 0.076, so H1 is denied. On the other hand, member background has no significant correlation with trust, so Hypothesis 2 is false. Trust and innovation is significantly correlated in the 0.01 level, and the correlation coefficient is 0.503. The correlation coefficient between trust and task performance is 0.518, at a 0.01 significant level. However, trust has no significant connection with contextual performance, so the H3 is not accepted.

TABLE II. DESCRIPTIVE STATISTICS

	Std. Deviation	Mean	Knowledge background	personality	trust	contextual performance	task performance	innovation
Knowledge background	.49471	1.6047						
personality	.49471	1.6047	.222	(0.76)				
trust	.53455	3.8686	-.091	.076	(0.86)			
contextual performance	.44694	3.9288	-.098	.201	.152	(0.81)		
task performance	.55128	3.7567	-.138	.127	.518***	.463***	(0.79)	
innovation	.60668	3.5467	-.187	-.004	.503***	.275	.299	(0.73)

***means at 0.01 significant level, between parentheses are the Cronbach' Alpha coefficients of the scale

B. regression analysis

According to Table III, the Regression effect of trust on innovation is significant at 0.01 level, the beta coefficient is 0.503. The regression model of Trust and innovation fits good, and trust can interpret the innovation well.

The same as the effect between trust and task performance, and the beta coefficient is 0.321. Therefore, Hypothesis 4, 5 are acceptable.

TABLE III. REGRESSION ANALYSIS (TRUST AS A INDEPENDENT VARIABLE)

dependent variable	standardized regression coefficient	F value of the Regression model
innovation	.503***	13.882***
task performance	.321**	20.12**

***means at 0.01 significant level, ** means at 0.05 significant level.

V. DISCUSSION

Using an empirical demonstration of the relationship between trust, performance (task performance and contextual performance), and innovation, the research draws a conclusion. Except Hypothesis 4 and 5, the other Hypotheses are all denied. It finds out that trust has a significant correlation with innovation, as a predictor, which shows a great guide to the virtual team. Because of the prediction effect on the innovation, when forming a virtual team, team member selection and the building of team atmosphere is particularly important.

According to the results, trust has positive effect on task performance, but it has no significant effect on contextual performance. The reason may lie that trust may bring the Smooth communication of members. After communication, it form a consensus about how to achieve the goal and the environment, and then the consensus directly influences the process of accomplish the task. However, contextual performance means the employees extra effort besides the work effort, including the voluntary act, organizational citizenship behavior, pro-organizational behavior, organizational dedication and so on. Trust cannot easily ensure

team members continue to pay an extra effort. Hence, trust has no significant effect on contextual performance.

As to the managerial implication, first, it should focus on the improvement of team trust. Our research indicates that trust can predict task performance and innovation, so company should promote the building of a harmonious, trusting corporate culture and team culture in virtual team background, and ensure every task carry out in a condition of mutual trust. Second, when select the virtual team members, should draw more attention on personality of trust. Third, at the beginning of forming a virtual team, company and leader should carry out some activities which can quickly and easily build trust among members.

VI. LIMITATION AND DIRECTION FOR FUTURE RESEARCH

The empirical study is based on questionnaire analysis, due to the L'Oreal commercial on-line contest is a team game, which is limited in promotion validity. Although the operation of the contest is similar with the virtual team, it differs in task characteristics, cooperation with the actual virtual teams, besides, the participants have no significant difference in age, education, language, and cultural background, however, it is different in real virtual team. According to this, there exists the limitation.

Second, although article analyzed the Chinese cultural background as a local study, it did not break the Western model, and selected the students at school as the main samples. Furthermore, when selecting the samples, we firstly test the individual level, and then calculate the team level value. The method should be considered in the future studies.

Third, the indigenous research should be strengthened. Viewed the research from the Chinese background studies, there is less local empirical research. Therefore, it is necessary to use the questionnaires, interviews, case and test other methods to conduct more virtual team studies in local culture. For example, in laboratory conditions, given a specific task and controlled connective disturbance variables, compared the group characteristics, team performance and innovation of the control group and the experimental group.

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