KNOWLEDGE QUALITY OF COLLABORATIVE EDITING IN WIKIPEDIA: AN INTEGRATIVE PERSPECTIVE OF SOCIAL CAPITAL AND TEAM CONFLICT

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Abstract

Collaborative editing has become one of the most popular forms of knowledge contribution in virtual communities. Wikipedia— the largest online encyclopaedia— is a representative example of collaborative work. Despite the abundant researches on Wikipedia, to the best of our knowledge, no one has considered the integration of social capital and conflict. Besides, extant literatures on knowledge quality just pay attention to task conflict, while relational conflict is rarely mentioned. Meanwhile, our study proposes the nonlinear relationship between task conflict and knowledge quality instead of linear relationships in prior studies. We also postulate the moderating effect of task complexity. Furthermore, there is little empirical research on the influence of social capital on conflict, especially the distinct effects of cognitive and relational capital. This paper aims at proposing a theoretical model to examine the effect of social capital and conflict, meanwhile taking the task complexity into account. We will make our efforts to verify our research model in the following phases, and we believe that the present work can make some contributions to both research and practice.

Keywords: Collaborative Editing, Knowledge Quality, Social Capital, Team Conflict, Task Complexity

1   INTRODUCTION

Collaborative work has been a principal form of community-based models in recent years. With the prevalence of Internet, it is much easier to form a community. Moreover, the wide reach of the Internet allows such communities to conveniently share ideas, experiences and knowledge (Kirkman et al. 2002). It has provided more opportunities for collaborative work to blossom on account of the low cost of communicating and managing. A typical pattern of collaborative work is collaborative editing, which produces articles by multiple people. While collaborative editing is implemented by different individuals, many activities in collaborative editing are often divided and conducted on an individual basis (Lowry et al. 2004). Therefore there is an increasing need to coordinate between alternative opinions and work processes in order to resolve inevitable conflicts.

To study the performance of collaborative editing, we concentrate our attention on Wikipedia, the world's largest online free-content encyclopaedia edited by users collaboratively. Anyone who can access the site and obey its rules can edit most of its articles[1]. The mechanism of collaborative editing plays a very important role in its development process (Qiu et al. 2014). Since articles in Wikipedia are collaboratively edited, whether or not the team members can work together to produce high quality articles may rely on how well their knowledge can be well integrated. However, the knowledge quality of the articles varies across different teams and articles. Thus, it is interesting to know what factors can influence the knowledge quality in the collaborative editing context.

In collaborative environment, conflict is inescapable. Though there is an increasing number of literatures on collaborative work drawing on team conflict theory in virtual network, there are several research gaps to be filled. First, prior studies may focus on the team collaboration issues in the organizational context, while few of these researches have mentioned the relationship between conflict and knowledge quality of collaborative editing (Qiu et al. 2014). Second, some studies have examined the effects of conflict on information quality (Arazy et al. 2011; Arazy et al. 2013; Qiu et al. 2014), but they mainly focus on task conflict, while little attention has been paid on relational conflict. Third, as to the relationship between task conflict and team performance, there are mixed results: some studies find that task conflict is negatively associated with team performance while others argue that task conflict is positively related to team performance (De Dreu & Weingart 2003). Thus we postulate that a nonlinear relationship rather than a linear relationship between conflict and knowledge quality may better capture the truth. Fourth, the findings about the effects of conflict on group performance have been confirmed to be mixed (Curşeu & Schruijer 2010), suggesting that the relationship between conflict and team performance may be contingent on certain contextual factors (e.g., task characteristics). Therefore investigating the influences of conflict on knowledge quality should not neglect the role of task complexity. Finally, although previous studies may examine how conflict affects team performance, less attention has been paid to the strategies or the factors associated with the resolution of conflict. Since conflict plays an important part in group outcomes, the effective management of conflict is especially crucial. Specifically, in this study, regarding the importance of the social relationships between team members, we propose that social capital generated from the social relationships between team members may be helpful to resolve team conflicts.

To fill the research gaps mentioned above, the objective of this study is to propose a theoretical model that interprets the impacts of two types of team conflict namely task conflict and relational conflict on knowledge quality as well as the relationships between social capital and team conflict. Specifically, this study tries to address the following two research questions:

1. How does team conflict influence the knowledge quality of Wikipedia articles?

2. How does social capital, as conflict resolution, affect team conflict?

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[1] Wikipedia. Feb 7, 2015. < http://en.wikipedia.org/wiki/Wikipedia >

The remainder of the paper is presented as follows. We first present the theoretical foundation for this research, describing the perspective of social capital and team conflict. Then we develop a theoretical model and build hypotheses regarding the relationships between social capital, conflict and knowledge quality. Next we describe the methodology and the survey instrument that we plan to use to empirically validate our theoretical model. Finally, the expected contributions are discussed.

2   THEORETICAL BACKGROUND

2.1   Knowledge Quality

Measuring the quality of knowledge is not an easy task: some scholars insist on the objective view and consider aspects such as accuracy and completeness etc., while others highlight the subjective view and concern how well the knowledge meets the users' expectations (Arazy et al. 2013). Many empirical studies on knowledge quality have been performed. Among the numerous opinions, Wang and Strong's framework for organizing knowledge quality dimensions (Wang & Strong 1996) has received widely acceptance. In their study, they proposed a list of dimensions used in assessing knowledge quality (KQ) including intrinsic KQ, contextual KQ, representational KQ and accessibility KQ. In our study, we only focus on a sectional set of the quality dimensions. Specifically, we adopt Chiu's assessment on knowledge quality (Chiu et al. 2006) by addressing the dimensions of relevance, ease of understanding, accuracy, completeness, reliability, and timeliness.

Knowledge has long been regarded as a valuable resource for individuals as well as groups. As high quality knowledge can improve individuals' understandings as well as the group performance in collaborative work, knowledge quality has become a primary concern of organizations and a hot research area in information system research (Lee et al. 2002). However, the biggest barrier inhibiting the knowledge quality of a team relies on the team conflicts occurring during the team collaboration process because high quality knowledge requires team members to well integrate their own knowledge.

2.2   Team Conflict

Conflicts are inherent to collaborative working process in distributed teams, thus the concept of conflict has been treated as a general social phenomenon. There has been a great deal of discussion in the conflict literature since the original chapter was written. Definitions of conflict have focused on a wide variety of different phenomena, while the Pondy's description about conflict is generally accepted. According to Pondy (1967), conflict refers to disagreements and collisions among the team members generated by perceived inconformity or divergence in antecedent conditions, affective states, cognitive states and behaviours.

Previous studies have identified three types of team conflicts namely task conflict, relational conflict and process conflict. Task conflict refers to disagreements mainly about work content, appropriate tasks, or arrangement of group activities. Relational conflict (also known as affective conflict) refers to emotional disagreements that are featured by anxiety, hostility or other forms of negative affect among group members. Process conflict refers to disagreements regarding the group's resources, operating approaches, and its group processes (Hinds & Bailey 2003). As for collaborative editing in Wikipedia, task conflict means what content should be included or deleted and how articles should be constructed (Arazy et al. 2011). Some studies showed that task conflict may impede collaborative activities (Hinds & Bailey 2003), while task conflict simultaneously leads members to rethink and reconstruct their opinions because of more alternatives, thus promoting the group performance (Pelled 1996). Relational conflict arises when there is a lack of relational knowledge, deriving from individual cultures and norms (Wakefield et al. 2008). Relational conflict can influence group performance through the negative emotions and interpersonal disagreements between members that hinder members' enthusiasm and commitment. Generally, relational conflict is considered as the obstruction of group effectiveness in distributed teams (Arazy et al. 2013). In our opinion, there are

overlaps between process conflict and task conflict because task conflict also concerned about the working process. At the same time, what we concentrate on is the outcome of distributed teams, so in our study process conflict is excluded from the analysis.

The influence of conflict has been widely examined in various fields, such as group performance (Hinds & Bailey 2003), decision making (Olson et al. 2007) and information quality (Arazy et al. 2011; Arazy et al. 2013). Despite the numerous researches on conflict, what they have observed is just the linear relationship between conflict and outcomes. However, In light of traditional viewpoints, conflict has been considered to be potentially detrimental to group processes, such as coordination and cooperation, as well as performance outcomes (Langfred 2007). In contrast, some others show its positive effects, especially in tasks that require significant cognitive effort (Arazy et al. 2011). These mixed results found in previous studies call for revisiting the impacts of team conflict. In this study, we propose two possible explanations for the mixed results. First, the relationship between team conflict (especially for task conflict) and knowledge quality may be nonlinear rather than linear. That is to say, whether the relationship between task conflict and knowledge quality is positive or negative depends on the level of task conflict per se. Second, the relationship between team conflict and knowledge quality may be moderated by other contextual factors (e.g., task complexity).

2.3   Social Capital

Besides viewing the role of team conflict from the nonlinear and contingent perspective, another research objective of the study is to find the factors that can resolve team conflict. Specifically, social capital theory which is widely used to explain knowledge sharing and knowledge integration is used to understand how team conflicts are resolved. Social capital is generally regarded as a construct with three dimensions namely structural capital, cognitive capital and relational capital. Chiu (2006) described the structural capital as the relationship intensity, interaction frequency and the amount of time spent on community members. Cognitive capital includes shared language and shared vision. Language is the means by which individuals engage in communication. Shared language can help facilitate a mutual understanding of collective goals and the proper ways of acting in groups. Tsai and Ghoshal noticed that a shared vision reflects the collective goals and desires of the participants of an organization (Tsai & Ghoshal 1998). An organization with shared vision can bind the members together and make it easy for cooperation. Relational capital refers to the emotional nature of the relationships within a collective, and it is concerned with expectations and obligations as central features of social capital. Hazleton and Kennan (2000) mentioned that trust, identification and norm of reciprocity are the three aspects of relational capital. Wasko and Faraj (2005) put forwarded that relational capital exists when members feel a strong identification with the group, trust each other within the group, and acknowledge and comply with its cooperative norms.

In Sun et al.'s study (Sun et al. 2012), they have identified that the effect of structural capital is indirect and is mediated through cognitive and relational capital. Therefore, in this study, we propose our theoretical model only concentrating on two of the three dimensions (e.g., cognitive capital and relational capital). Prior studies on conflict reduction seldom considered the distinct effects of different dimensions of social capital. Therefore we will further examine the influences of these two dimensions on task and relational conflict respectively.

3   HYPOTHESES

In this study, considering the nonlinear relationship between task conflict and knowledge quality, the moderating effects of task complexity, and the conflict resolution role of social capital, we propose a research model as shown in Figure 1. Specifically, two types of social capital, cognitive and relational capital, are proposed to affect task conflict and relational conflict respectively. There is an inverted-U effect of task conflict on knowledge quality and task complexity is proposed to moderate the relationships between task conflict, relational conflict and knowledge quality.
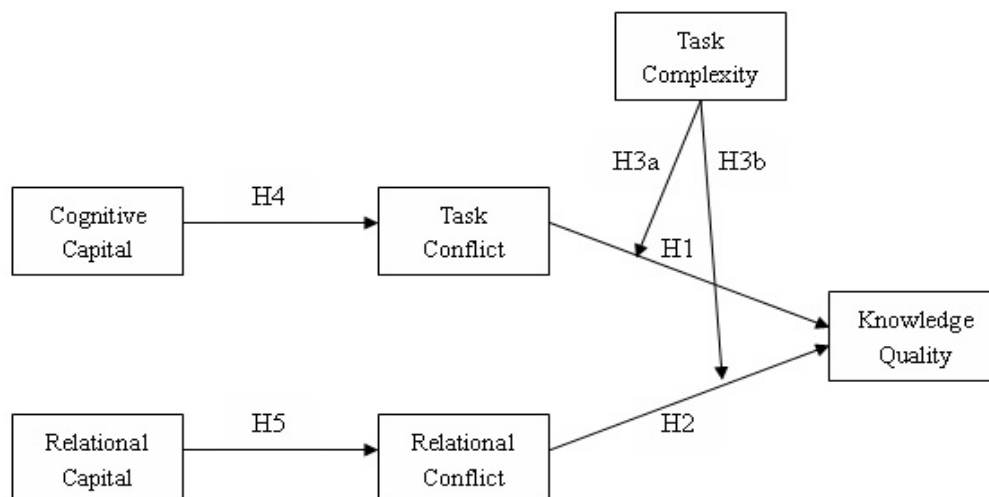
Figure 1.   Research Model

3.1   Task Conflict and Knowledge Quality

In collaborative editing, disagreements on others' viewpoints are always present. Therefore task conflict can create an atmosphere of groupthink. Disagreements among members would force a deeper analysis of one's own contribution as well as a comprehension of others' views (Olson et al. 2007). Thus task conflict enables members to achieve a better understanding of task issues and eventually leads to a deep insight of the existing knowledge. The presence of task conflict can cause participants to realise the inefficiencies and be creative. In this context, members would examine extant knowledge, challenge others' viewpoints and reorganize their articles. Knowledge quality obviously would be improved.

However, if task conflict becomes more intense and exceeds its contribution to creative thinking, it may hinder collaboration and result in negative outcomes (Arazy et al. 2011). Excessive task conflict is a burden for distributed teams and is difficult to manage. Members would immerse themselves in endless debates with others, thus hindering normal discussions and exchange of ideas. In this condition, task conflict is detrimental to group performance. Members' deviation from original intention on improving knowledge quality would result in negative consequences. Therefore the quality of Wikipedia articles cannot be guaranteed. Thus, we hypothesize:

H1: There will be an inverted-U relationship between task conflict and knowledge quality such that when task conflict is low, following the increase of task conflict the knowledge quality will increase, while after the threshold value, following the increase of task conflict the knowledge quality will decrease.

3.2   Relational Conflict and Knowledge Quality

When team members don't have sufficient mutual understanding, relational conflict arises. In general, it is agreed that relational conflict has a negative effect on team performance (De Dreu & Weingart 2003). The negative effect on traditional teams has been identified in many researches. Some investigations have proved that relational conflict is detrimental to distributed teams as well. For example, Hinds and Bailey (2003) detected that relational conflict would impair performance on distributed teams to counterbalance the benefits of avoidance. Likewise, Arazy et al. (Arazy et al. 2013) identified that relational conflict is negatively related to information quality of Wikipedia articles. Though relational conflict is not directly related to task process, the negative emotions such as anxiety and hostility may hamper the regular work thus resulting in decreased outcomes. We can

expect that the presence of relational conflict will negatively affect the group performance. Thus, we hypothesize:

H2: Relational conflict is negatively related to knowledge quality.

3.3 The Effect of Task Complexity

The theory of groups describes that task conflict can contribute to group performance when the task is complex (Arazy et al. 2011). Low task conflict would encourage members to examine and reconsider their solutions. We can expect that when the task is with high complexity, the accompanying challenge may motivate members to seek for the optimal answer to the issues, thus improve the knowledge quality. Obviously, complex task contains more uncertain elements, which brings more unknown alternatives. In the context of high task conflict, high level of task complexity would increase difficulty of management, leading team members to give up their actions to seek for better solutions. Thus, both the positive impact of task conflict on knowledge quality at the low-task-conflict condition and the negative impact of task conflict on knowledge quality at the high-task-conflict condition will be strengthened by task complexity. Thus, we propose that

H3a: Task complexity strengthens the inverted-U relationship between task conflict and knowledge quality.

With the increasing complexity, completing the task needs stronger capacity and more patience. Therefore, negative affective emotions as suspicion and anxiety may fill in the process of collaborative editing. Following the incremental task complexity, the relationship between relational conflict and knowledge can be strengthened. Thus, we hypothesize:

H3b: Task complexity strengthens the relationship between relational conflict and knowledge quality.

3.4 Cognitive Capital and Task Conflict

Effective collaboration mostly depends on good communication and mutual understanding. Cognitive capital refers to those resources that make possible shared vision and language within a team. Engaging in a task requires at least some level of shared understanding between group members (Wasko & Faraj 2005). Shared language builds a bridge of communication and goes beyond language itself. First, groups with shared language can easily get access to other people and their information (Nahapiet & Ghoshal 1998). People with common language can better understand each other. Second, shared language can help avoid potential misunderstanding and provide more opportunities to freely share various resources (Sun et al. 2012), thus leading to a more effective working group. Hence, shared language can be regarded as a facilitator that accelerates a common understanding of tasks.

Similarly, group with shared vision will be more likely to collaborate constantly, thus promoting commitment to common goals. Individuals in this kind of group tend to be more willing and more able to exchange their information and ideas in order to work effectively (Mcfadyen & Cannella 2004). As a result, group members who share a common vision will be more likely to become partners and they can interact more easily (Tsai & Ghoshal 1998). We can expect that the presence of cognitive capital can help share ideas but also enhance the efficiency of communication. Therefore, members would become more tolerant to different viewpoints, leading to a decrease of task conflict. Thus, we hypothesize:

H4: Cognitive capital is negatively related to task conflict.

3.5 Relational Capital and Relational Conflict

A group with relational conflict would separate group members, destroy the mutual trust and common values, and if not addressed can result in more serious problems. Social capital could be seen as an important asset upon which groups rely to resolve conflicts. Several studies have identified that trust has a positive effect on group effectiveness by reducing relational conflict (Curşeu & Schruijer 2010).

Trust is an available factor in alleviating perceived risk and uncertainty reflected in the studies on transaction relationships, knowledge sharing and e-commerce (Sun et al. 2012). Tsai and Ghoshal (1998) suggested that when trust exists between parties, they are more willing to engage in exchanging resources and cooperative interaction without worrying that they will be taken advantage of by other parties. Furthermore, trust will encourage group members to openly discuss even when there exist different viewpoints because members may feel that criticism will lead to a deep analysis of the issues.

Nahapiet and GhoshalIf (1998) have found the evidence that prominent identification within group not only increases the perceived opportunities for communication but also enhances the actual frequency of collaboration. We may say that if participants have a strong feeling of belonging, they may tend to be more willing to work with others. Hence we expect that identification will be available to decrease relational conflict.

The norm of reciprocity emphasizes the significance of the focus on cooperation instead of competition, on public disclosure of information, and on developing loyalty to the group (Nahapiet & Ghoshal 1998). With the norm of reciprocity, members don't need to struggle with free-ride behaviours of others. On the contrary, they may be motivated to share information with other participants, knowing that they could acquire adequate respect and could anticipate equal benefits from the collaboration (Sun et al. 2012). Therefore, they would focus their attention on how to actively find better solutions of each issue. Thus, we hypothesize:

H5: Relational capital is negatively related to relational conflict.

4 METHODOLOGY

We plan to conduct a survey to test our theoretical model. The investigation will be divided into three stages.

In stage 1, we designate the domain for each construct and generate an initial pool of items that fit to the constructs' definitions (Sorgenfrei & Smolnik 2014). We will adapt measures from existing studies that have been proven to be valid (see Table 1). To fit the particular research context, some of the items need to be revised. After that, we refine our items by inviting experts of specific field to go through these initial items and provide feedback in order to ensure that the items capture the key points. Finally, several variables including article length, education background and the number of editors are considered as control variables to exclude the effects of alternative factors.

Constructs	Literature Sources
Knowledge Quality	Chiu et al. 2006
Task Conflict	Arazy et al. 2011
Relational Conflict	Wakefield et al. 2008
Task Complexity	Campbell 1988
Cognitive Capital	Chiu et al. 2006
Relational Capital	Kale et al. 2000

Table 1.   Sources of Measurement

In the next stage, we will collect data from Wikipedia or Baidu Baike in China. We will identify over 30 virtual teams in Wikipedia or Baidu Baike whose members collaboratively work on article editing. Then we will contact with the team leaders and ask for their help to distribute the questionnaire to their team members. To encourage participation, some incentives will be provided.

In the final stage, we will test our model by using structural equation modeling (SEM) approach, which is one of the most widely used analysis techniques in IS research.

5 EXPECTED CONTRIBUTIONS

In this study, we aim to investigate the relationship between team conflict and knowledge quality, the effect of social capital on managing conflict and the moderating role of task complexity. Our study presents significant implications to both research and practice. First, this study can serve as a complement and extension of Wikipedia study by considering the role of team conflict and social capital. Second, this study advances the theoretical understanding on task conflict by figuring out the inverted-U relationship between task conflict and knowledge quality. Third, this study enriches the previous literature on team conflict by including relational conflict as another important dimension of team conflict beyond task conflict. Fourth, this study identifies the boundary conditions under which team conflict affects knowledge quality by highlighting the moderating effects of task complexity. Fifth, this study also theorizes social capital as the source of conflict resolution and empirically examines the relationships between two types of social capital and two types of team conflict. In practice, our study also can help managers have a better understanding of task and conflict, thus finding more effective strategies to solve the conflict issues.

Up to now, our study just has developed a conceptual model of knowledge quality in Wikipedia by integrating social capital and team conflict theories. Whether or not our proposed model and hypotheses is appropriate still call for empirical investigations in future research.

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