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The NPD team conflict: insights from cultural diversity and geographical dispersion

Abstract

The complexities of new product development (NPD) teams present both opportunities and challenges to organizations. Very few researches have examined the combined effect of culture and geographical dispersion on teams. Especially, the role of distance still remains an open question. This paper elaborates on the role of culture diversity and geographical dispersion in NPD team conflict. A simulation is conducted where organizations may be regarded as complex systems to affect the team conflict with a variety of influences. The results firstly indicate that there are two dimensions of NPD team conflict: stable and unstable dimensions with four elements: task characteristics, group members' relationship, cultural diversity and geographical dispersion; secondly, there are two phenomena whereby the geographical dispersion influences the NPD team interaction, and the influence between cultural diversity and the geographical dispersion is unstable and depends on the situation. Moreover, in some of its aspects the finding regarding cultural diversity is different from Hofstede's theory, while the effect of geographical dispersion changes with the difference in communication technology.

Keywords: team conflict, cultural diversity, geographical dispersion, collocated team, virtual team.

Introduction

Companies are continuously struggling to develop new products for the global market. Some of the typical problems faced by many companies are the challenges associated with the management of different types of New Product Development (NPD) team – global, virtual and collocated (McDonough, Kahnb & Barczaka, 2001). The need of dealing with the ongoing globalization processes only sharpens these challenges. For example, one of the difficulties affecting the international collaboration of NPD teams is the geographical dispersion, which is due to cultural differences, time and distance (Barczaka & McDonough III, 2003).

The current literature provides four main categories of team culture: individual, functional, organizational, and national (Smith & Blanck, 2002). By observing how these four categories of cultures correlate with the degree of dispersion, it becomes clear that a team which is dispersed overseas will experience all four types of culture. However, there is a limited understanding about the role of national culture in team working, much less new product team work, processes and performance (Daily, Whatley, Ash & Steiner, 1996). There are theories on national culture, and the most famous was developed by Hofstede (1980). The relevance of these theories is increasingly important for the analysis of the East-West cultural contrast because, due to the globalization of NPD, the collaboration between China, Europe and North America is dramatically increasing. Therefore, a better understanding of the cultural differences between Chinese and European NPD teams is critical. With the increasing demand for virtual teams due to the globalization (Warkentin & Beranek, 1999), the influence of team type (physically collocated or virtual teams) due to the geographical dispersion should be also considered in the study of cultural difference comparison.

A team's success is largely depends on the team's interaction behavior (Massey, Charles, Lundy & Fisher, 2003). Huang and Wei (2000) state that the "group interaction processes are inadequately studied". The nature of team interaction can be divided into: decision-making, problem solving and team conflict. For example, Montoya, Massey, Hung, & Crisp (2009) indicate that the team interaction is divided into decision-making and problem solving activities. Multiple research studies (e.g. Amason et al., 1995; and Jehn, 2001) have found that conflict is important to a team's effectiveness, and team interaction is critical for conflict management.

Connaughton and Shuffler (2007) state that few researchers have examined or theorized about the combined effects of culture and distribution. They suggest scholars to explore the complexities of both distribution and culture in future studies. Starting with the initial understanding of team decision-making and problem solving (Ma, Lin, Pawar & Riedel, 2009), the goal of the present paper is to consider the team conflict in answering the question: "*What are the influences of the cultural diversity and geographical dispersion on the NPD team interaction?"*

According to systems thinking, organizations may be regarded as complex systems (Berends & Romme, 1999). Systems are composed of many elements or actors that are interlinked via different kinds of relationship links, feedback loops and communication links. Berends and Romme (1999)

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suggest that simulation could be a useful tool when studying industrial or corporate systems as a whole. Since the early 1970's, it has been increasingly recognized that case studies, simulations and games are, in fact, closely inter-related. Indeed, it is now accepted that they form broad overlapping sets that can be represented by a Venn diagram of the type (Ellington, Gordon & Fowlie, 1998). New product development processes are relatively long in duration; they are complex, collective activities, and usually accomplished at geographically distributed locations across different organizations. Therefore, the context and the people involved in the development processes are varied. Such processes are also very difficult to document, especially if one wants to observe the interactive aspects of the processes. Simulation games are valuable because they allow phenomena to be reproduced, and thus enable the experimenter to derive statistical probabilities when the outcome is uncertain, and/or enable the experimenter to vary numerous aspects of the system in ways that yield profitable insights into how it operates (Raser, 1969). In addition, people generally do not know/understand their own behavior or thinking, or the interaction with others. Since the objective of this paper was especially to study the conflict between NPD team members, process simulation appeared to be a suitable method. Furthermore, because simulation aims to describe the interaction, we believed that it could help in understanding the complexity of the interaction patterns.

The remainder of this paper is organized as follows. We first review the current debates and perspectives related to the areas of team conflict and cultural diversity, followed by a discussion on the research approach adopted in this paper. Next we analyze the influence of the cultural and geographical factors on the team conflict. Finally, we conclude by discussing the contributions and implications of our findings, as well as by elaborating on the research limitations and the suggestions for future research.

1. Literature review

The majority of successful innovations is developed through the collective efforts of individuals in new product development teams (Akgün, Lynn & Yilmaz, 2006). According to Schmidt, Montoya-Weiss & Massey (2001) NPD teams can be divided into two types: physically collocated and virtual teams. A physically collocated team is one in which the NPD team members work together, are located close to one another (McDonough et al., 2001). They also stated that collocated teams face fewer project management and behavioral challenges, such as sustaining trust between the team members, developing effective interpersonal relationships, and fostering effective communication within the team. Obviously, there are many benefits of using a collocated team. For example, the team members' relationship can be built within a shorter time period, and with the face-to-face communication, it is easier to exchange the information, give feedback and discussion with the product issues (Schmidt et al., 2001). Compared to the dispersed environment, the collocation has few infrastructure requirements (Crow, 1996).

Compared with the traditional, physically collocated teams, the demand for virtual teams is increasing because of the globalization (Warkentin & Beranek, 1999). By using virtual teams, NPD projects can be allocated, the most qualified people without being overly concerned about the travel or relocation (Goldman, 1998). With the help of computer-driven communication technologies, the NPD team members can communicate and collaborate with the opportunities and challenges of cross-boundary work (Montoya et al., 2009). Recent technological advances also herald new ways of structuring, processing, and distributing work (Boudreau, Loch, Robey & Straub, 1998), especially the media technologies for the communication which provide more opportunities for the virtual collaboration (Massey et al., 2003). Compared to physically collocated teams, virtual teams are significantly different. In the physically collocated team, the members work together, and the task coordination is simple; in the virtual team, the team members are in different locations, and the team members use electronic communication methods (Bond & Smith, 1996).

1.1. Team culture. There are many different types of teams within organizations, and the number and prevalence of the different types varies by culture (Silverthorne, 2005). Many organizations use teams made up of members from different cultures, and the differences among the cultural values of team members can influence team performance and processes (Unsworth & West, 2000). Team culture simply acknowledges that different members of the team are likely to have different styles and values, and so consequently behave in distinctive ways. Previous studies (e.g. Sivakumar & Nakata, 2003) indicated that different cultural values of multicultural teams can lead to misunderstandings and conflicts, and further cause difficulty in reaching task agreement, resolving conflicts constructively, and building cohesion within the team. National culture is defined as the "collective programming of the mind distinguishing members of one nation-state from those of another" (Hofstede, 1994).

One typical example of the cultural differences can be described as the East-West contrast. A primary

influence within Eastern culture is Confucianism, while the Judeo-Christian religious worldview has a primary influence in the West. For example, Chinese culture has been described as collectivist and high in terms of power distance. In a collectivist society, in contrast to an individualistic society, cooperative behavior, group harmony, interpersonal relations and authority orientation are highly valued in organizations (Shane, Venkataraman & MacMillan, 1994). On the other hand, newly emerging innovation paradigms such as value co-creation, open and user innovation require a more cooperative and participatory organizational vision independently of a specific team culture (Cova & Salle, 2008).

1.2. The conflict management with cultural diversity. Conflict is a vital human element, and it is also a pervasive aspect in both social circles and professional interactions (Rose, Suppiah, Uli & Othman, 2007). Landau, Landau and Landau (2001) stated that "*Conflict exists in all human relationships: it always has and probably always will*". There are many definitions of conflict with multiple disciplines (e.g. Rahim, 2001; Vecchio, 2000) and two or three types of conflict (e.g. McShane & Glinow, 2003) followed by several conflict management types (e.g. Conerly & Tripati, 2004; Masters & Albright, 2005). Taking the conflict types defined by Jehn (2001) for example, the task conflict means conflicts with ideas or opinions, and process conflict is due to logistical or delegation issues. The relationship conflict is because of personal issues.

Because of the globalization and working location diversity, many scholars have turned their attention to the influence of culture on styles of handling conflict (e.g. Elsayed-Ekhouly & Buda, 1996). Rose et al. (2007) identify and list definitions for the three dimensions of culture which are likely to have the greatest impact on conflict resolution behavior: individualism vs. collectivism, high versus low context and the orientation of the culture (e.g. Hall, 1983; Hofstede, 1991). There is evidence that members of individualistic cultures adopt a more dominating style in dealing with conflict and are more likely to push for a speedy closure, while members of collectivistic cultures use more accommodating and avoiding styles (Cohen, 1991). Members of collectivistic cultures would be expected to show a great deal of concern with preserving group harmony and we predict, therefore, that members of the collectivistic Asian cultural groups would show a greater preference for the non-confrontational styles of handling conflict (avoiding and accommodating) than members of the individualistic group (Trubisky, Ting-Toomey & Lin, 1991). Members of high-context cultures are concerned with saving the face of the members of their group (both for themselves and the other party) and would be expected to back down in the face of conflict in this attempt to save face (Sadri & Rahmatian, 2003). The face conflict is one type of conflicts which can be explained as a different conflict management style for different national cultures, especially for the Eastern countries (Ting-Toomey & Oetzel, 2001). According to Ting-Toomy (1988), the face is defined as the claimed sense of self-image in a relational situation.

2. Method

The majority of previous studies on communication patterns employ a quantitative methodology (Lin & Germain, 2004; M. & E., 1997; Mishra & Lee, 1996). Although there are many advantages in such an approach, Langdridge (2004) suggests that quantitative approaches may significantly oversimplify the complexity of human nature and fail to recognize the subjective aspects of all social science research. Lynn (1990) reviews the state-of-the-art of research focusing on cross-national studies of technology management and recommends the undertaking of comparative case studies in order to improve the explanatory power of the research area. The main purpose of this paper is to study team conflict in the new product development process by focusing on the relationship between team type, cultural diversity and NPD team. The case study method is chosen because it offers the possibility of gaining a deeper understanding of the phenomena. It also provides the possibility of combining several data collection methods leading to a better validity of the final results.

2.1. Adopting the simulation game approach. This paper adopts a computer-based simulation game named COSGIA (Co-operative Simulation Games) (http://www.biba.uni-bremen.de/projects/cosiga/) as the research tool for the data collection. COSIGA is specifically designed for the purpose of reconstructing the new product development process. As introduced by Forssen-Nyberg and Luhtala (1996), the process of simulation through "role-play" was suitable for studying the group/team dynamics. The simulation used in this paper involves five participants: a project manager, design manager, marketing manager, purchasing manager and production manager who interact in a product development scenario.

2.2. Research factor control design. This paper focuses on NPD team conflict with two factors: "cultural diversity" and "geographical dispersion". The literature shows that team communication and interaction can be influenced by many factors, such as organizational strategy, task difference, etc. The potential parameters can influence the results, but

are irrelevant and need to be avoided at the beginning of the preparation stage. The simulation game COSIGA provides a scenario for the factor control which can help the researcher to avoid unexpected factors and also control the factors of "cultural diversity" and "geographical dispersion" (Table 1).

Table 1. Research factor control design

Factor level	Factors	Status	Solution
National level	Organizational factors, such as organizational culture, strategies	Avoided	The simulation game COSIGA provides a scenario which can avoid organizational factors.
Organizational level	Outside factors, such as countries' policies	Avoided	The simulation game COSIGA provides a scenario which can avoid outside factors.
Functional level	Main functional factors – task type	Controlled	The task type is the same for every experiment on the platform of the simulation game – a simplified truck development.
Personal level	Personal factors: work experience and background	Balanced	Participants in the UK experiments come from BAE SYSTEMS with a similar age and experience of manufacturing and management. Participants in the China experiments come from Tsinghua University with a similar age and background in both manufacturing and management. There are ten participants for each comparison (CN vs. UK, collocated vs. virtual) which can significantly reduce the differences in personality.
	Personality		
Factors and activities controlled by research	National culture	Controlled	Select two China teams (from Tsinghua university) and two UK teams (BAE SYSTEMS) for the experiments
	Team type (collocated vs. virtual)	Controlled	Collocated team: the participants are located in one room. Virtual team: the participants are located in different rooms.
	Communication channels	Controlled	Collocated teams use face to face, and use text chat to communicate. Virtual teams use text chat or audio conferencing (Skype) to communicate.

2.3. Data collection. Since 2000, there are many experiments done with COSIGA in different countries. This study chooses four representative cases, which were studied quite thoroughly. There are four experiments with two organizations in China and the UK designed to examine the cultural differences between NPD teams. There are ten participants from the BAE SYSTEMS Advanced Technology Centres, and another ten participants coming from Tsinghua University in Beijing. The selection of the participants depends on their relevant experience in NPD. The emerging findings are then compared with a broad range of literature. Such a comparison helps to ensure not only the new findings' internal validity, but also their generalizability and conceptualization (Eisenhardt, 1989). Additionally, the literature comparison facilitates exploring new opportunities in analyzing and interpreting the data, especially when the new findings contradict the current literature (Eisenhardt, 1989).

One issue for the data collection in this research was how to select the participants to represent the China teams. The employees in the Chinese state-owned companies have low level of English; comparatively, the Chinese workers employed by the international companies have a higher level of English, however their behaviors are already influenced by the international culture. Due to the above reasons, this study adopts participants (two PhD students and eight MSc students – all somewhat close in age) from Tsinghua University with a background in manufacturing and management to represent the China teams, and the participants from the BAE SYSTEMS, UK to represent the UK teams. The selection of students may lead the research bias for the comparative study with engineers because of the dissimilarities between them, such as age and work experience. However, according to the experienced researcher who is familiar with COSIGA, the difference between experienced or non-experienced participants is not significant in this game, and the professor who was the supervisor of some of the selected students from Tsinghua University indicates that the selected students have quite a lot of working experience.

This study uses four methods to collect the data: a text chat, audio and video records, and observation. All of these records are transcribed verbatim and compiled into one large transcript document for analysis purposes. During both experiments, the researchers also collect field notes on the behaviors and activities of the participants during the game play.

2.4. Data analysis process. For the research analysis, firstly, this research transcribes all the raw experiment data for each experiment into a full transcription. Secondly, according to the research aims and objectives, the core data which involved the new product development process is selected for the main transcription segments. Thirdly, before the detailed data analysis, the main transcription segments are categorized according to the theories. Fourthly, the within-case analysis focuses on the team members' behavior and team conflict in each selected case. Finally, the comparison

of culture difference (China vs. the UK) and team types' difference (collocated vs. virtual) is discussed.

The conflict process developed by Capozzoli (1995) is used in this paper for the analysis of team conflict. This research also divides the data of team conflict into three types (task, process and interpersonal) for a better understanding the team conflict process with different characterizations. The people's attitudes and behaviors related to team conflict were also examined.

3. Results

3.1. Information relations in NPD teams. The information relationship is critical to understand the conflict in the NPD teams which refers to the relationship between the team members who are involved in each of the information sharing sessions. There are two basic members: the information seeker/provider and the information receiver/giver. This study finds that the information relationship does not change with the cultural differences. The core team members involved in the information sharing in the COSIGA game are the designer and production manager. The designer is in charge of the design specification which is the main information storage for the other roles. The production manager makes some important design input, such as cabin constraints and the progress requirements to the designer and other team members, and he was also a high information seeker especially for the designer (see Figure 1 below).

3.2. Task conflict. Task conflict is quite common in the COSIGA games, and the core member involved is usually the designer. There are three potential team members who may engage in task conflict with the designer: the marketing manager, the production manager and the purchasing manager (Figure 2a). For example, the input of the production always comes from the designer and the purchasing manager. However, there are also the factory constraints existing in the production department, and the production cannot always follow the design specification, so sometimes task conflict happens if the production constraint and the design specification cannot match together.

3.3. Process conflict. In the COSIGA game, one of the major process conflicts is the 'time' conflict. The COSIGA game builds a scenario of a concurrent environment that participant can start his/her own task at the same time. However, because of the information flow, some team members have to wait for the information input from others, as shown in Figure 2b. The task priority is managed by the project manager, who decides what and who is the first priority at which stage, and all the recourse and time is for this priority. At the first half of time, the time control can easily satisfy every team member, but, due to the time pressure at the end of the game, the time demand for most of the team members increases dramatically.

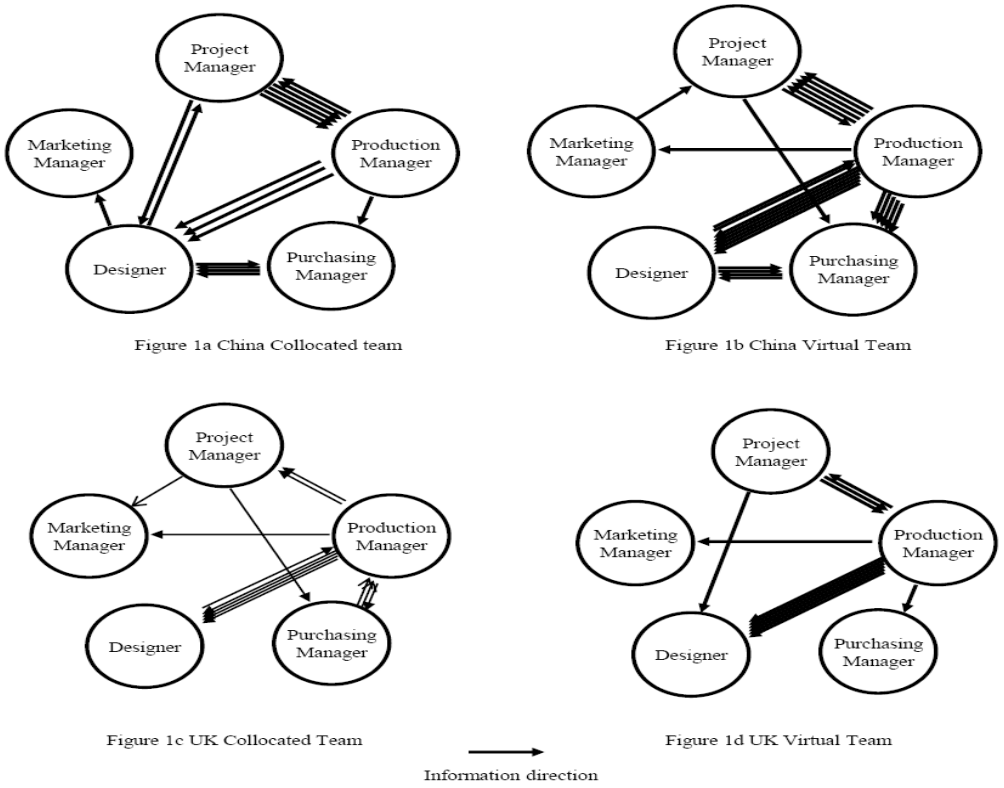

Fig. 1. The information relationship in the NPD teams

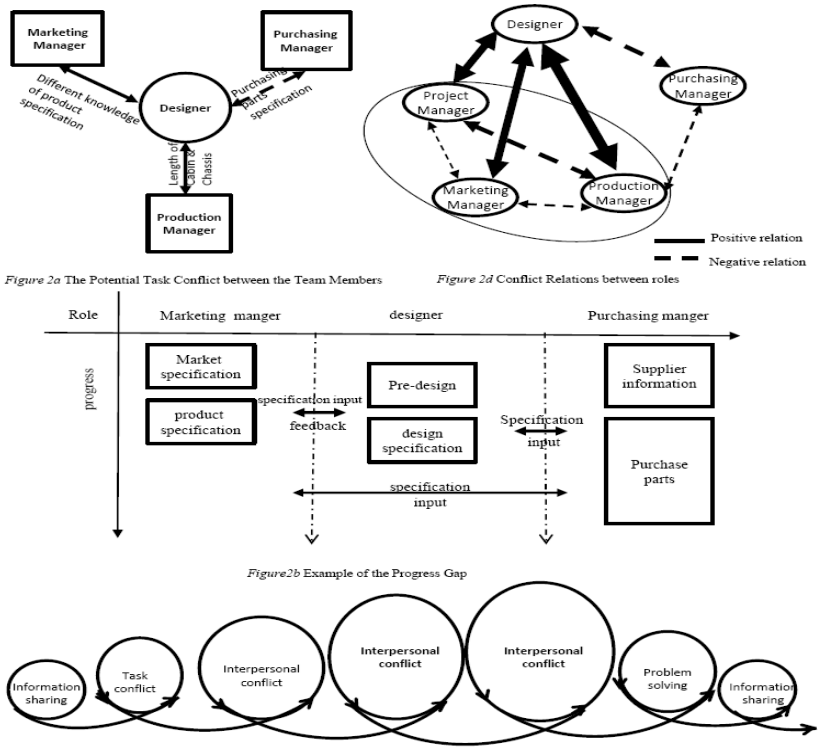

Fig. 2. Conflicts in the NPD teams

3.4. A Face issue – interpersonal conflict. Interpersonal conflict does not often raise in the COSIGA games. It appeared only once at the beginning of the COSIGA game in the China collocated team. In records of the COSIGA experiments, there are some cases where the team members were unhappy with one participant, and they expressed their feelings indirectly, e.g. complaining to the researchers, or ignoring the person. The interpersonal conflict does not happen suddenly that always a premonition before it happens (Figure 2c). There are two typical reasons for interpersonal conflict: the process conflict or the task conflict when they cannot be solved immediately or correctly. Once the interpersonal conflict happens, it takes quite a long time to solve it. The conflict relationship is shown in Figure 2d that the main participants were the designer, production manager and project manager due to the different opinions about the cabin length. At the initial stage, there was only a task conflict between the production manager and designer because of the information exchange.

3.5. Cultural diversity to NPD team conflict. People's attitudes normally are soft and indirect in the China teams, and strong and direct in the UK teams. When conflict happens in the UK teams, the team members usually directly point out the different opinions, and the attitudes are quite strong; "Yes" or "No" quite often happens in the UK teams. Comparatively, when any conflict happens in the China teams, the team members usually express their opinions softly and indirectly, and, generally, they would use some explanations.

The China teams were more collaborative, while the UK team more compromising/accommodating. The UK team members use "convince" quite often to make decisions when conflict happens. When the task or process conflict happened in the China teams, the team members' attitudes were quite positive and collaborative. For instance, because of the production manager's mistake, there is a conflict between the production manager and marketing manager due to the different opinions about the cabin length. Although the whole team takes much time to solve the problem, the other team members still collaborate with the production manager, such as the project manager, who said *"It doesn't matter; we will wait for you. I will move the time"*.

3.6. Uncertainty – avoidance orientation to NPD team conflict. People are motivated by perceived uncertainty to seek information (Hofstede, 1991; Knobloch & Solomon, 2002). This study found that the level of uncertainty-avoidance orientation in the China collocated team is quite high that communication sessions of information seeking take more portion than information providing. However, the result is opposite in the China virtual team, although information seeking still occupies quite a large proportion which states that the China virtual team adopts a high uncertainty-avoidance orientation. However, at the

same time, the team members also encourage themselves to become familiar with the situation as soon as possible.

The level of uncertainty-avoidance orientation in the UK collocated team is quite low that information seeking occupies less portion than information providing. Comparatively, the level of uncertainty-avoidance orientation in the UK virtual team is quite high that information seeking more than information providing in the UK virtual team.

3.7. Geographical dispersion to NPD team conflict. This research finds that more direct conflicts are in the collocated teams than the virtual teams. The reason may be because each team member in the virtual environment seems to be in an isolated island, therefore, they have to trust each other. If conflict arises in the virtual team, it may be quite difficult to solve because the information cannot be shared abundantly. For example, task conflict can be more easily avoided in a collocated team than in a virtual team, because people can explain the situation/problem not only face to face but also by demonstrating their task in front of the computers in the collocated situation. Comparatively, in the virtual environment, communication is by speaking and typing, and it is difficult to show the current progress on their screen to others. Process conflict sometimes happened in the virtual teams. The main process conflicts were due to the communication channel jam. In the virtual teams, the communication quality usually is not the same as in physically collocated teams. For example, in the virtual teams, the team members cannot use body language, and people cannot easily grasp other people's feelings. The issues on the communication priority within team members due to the limitation of communication tools arise easily.

4. Discussion

This study finds that there are two basic dimensions of NPD team conflict: stable and unstable dimensions with four elements: task characteristics, group members' relationship, cultural diversity and geographical dispersion (Figure 3). Meanwhile, there is correlation within the four elements.

First of all, this study finds that task characteristics and group members' relationship belong to the stable dimension to the NPD team conflict, similar to the research by Griffith et al. (2006) that there are no cross-cultural differences for the relationship between information and problem resolution when comparing the Japanese and American teams. Task characteristics determine the information flow which influences the task and process conflict, and the group members' relationship is also related to the interaction purpose controlled by the task characteristics. The three types NPD team conflicts can be predicted by group members' relationship.

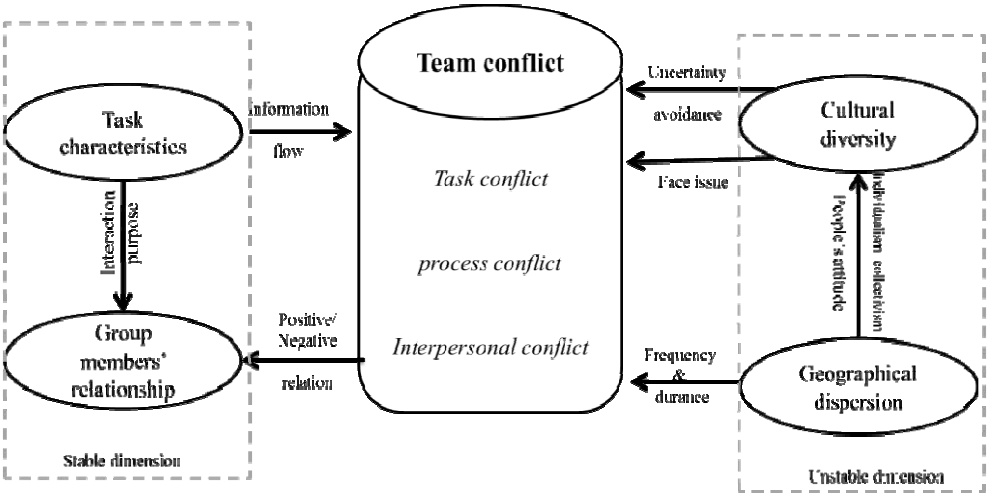

Figure 11 Conceptual framework

Fig. 3. Conceptual framework

Compared to the stable dimension of task characteristics and group members' relationship, cultural diversity and geographical dispersion is more complex and unstable to the NPD team conflict.

Our study demonstrates that the phenomenon of culture on the NPD team conflict in the physical collocated environment is similar to the previous theory, such as China is in strong uncertainty avoidance cluster, while UK is in the weak uncertainty avoidance according to Hofstede (1994), Duarte and Snyder (1999); and China teams are more collaborative, and the UK teams are more compromising /accommodating similar to Ting-Toomey et al.'s (1991) study. Although the cultural differences in

the conflict management between China and the UK NPD teams are found, meanwhile, this study also finds that there will be no significant cultural difference if the conflict is simple.

Face issue is one episode of culture that is the way people want others to see them and treat them. Ting-Toomy argues that the strategies in maintaining, saving and honoringone's face differs across cultures (1988). She finds that the people with the collective culture would more concern the face saving for both themselves and others. They prefer using the indirect conflict styles to solve the interpersonal conflict. However, this study finds that, when there are some different opinions on the same conflict in both China and the UK teams, the China team members may more easily relate to the personal face issue.

Armstrong and Cole (2002) report that there is lack of study on conflicts in geographically distributed teams compared to studies on conflicts in collocated teams. This study finds that, if a conflict arises in the virtual team, it would be more difficult and take longer to solve than in the collocated team. Hinds and Bailey (2003) reveal that task conflict is useful for the traditional teams' performance, but have the same result for the distributed teams as this study. This study finds that there are more conflicts in the collocated teams than in the virtual teams, because each team member in the virtual environment seems to be on an isolated island, and so they have to trust each other. Kankanhalli and Wei (2000) indicate that there would be two more factors leading to conflict in the geographically distributed teams which are distance and technology media communication. Meanwhile, the study also finds that the people's attitudes of the virtual teams were stronger and more direct than the collocated teams which are soft and indirect.

The results of this study indicate that the culture becomes an unstable element to the NPD team when both geographical distance and culture influence NPD teams. Zakaria et al.'s (2004) research states that the team members with collective culture may feel isolated without frequent group input due to the geographical distance in the global virtual environment. However, the results of this study show an opposite phenomena that the frequency and amount of active information sharing of China virtual team is more than the physically collocated team, and the information seeking is more than the information sharing in the UK virtual team. It is also a conduct to the "uncertainty avoidance" for the collectivists to avoid the uncertainty in the virtual environment. According to the Hofstede's cultural dimension, the collectivists more concern others than the individualists. Therefore, we can argue that the collectivists prefer the "active information sharing" to reduce other team members' uncertainty.

In summary, the major factor affecting team interaction in a physically collocated environment is culture diversity, but, in a virtual environment, the team type can also influence the nature of team interaction. Comparatively, the task related relationship is more stable in different situations of team conflict. Therefore, for a successful NPD team with a better performance, it is essential to consider the effect of cultural diversity and geographical dispersion with the circumstance variety. Within NPD team development, the team behavior and interaction can be influenced by the organizational culture or other factors, such as personality, national policy, etc., and further training can be provided for the teams to give them an understanding of team behavior and interaction and how to improve them. Therefore, it is important to be aware of the potential impact of the correlation between team interaction, cultural diversity and geographic distance. This study argues that a balance between these three elements is vital for NPD team success.

Contribution and limitation

Our objective in this paper is to elaborate the roles of culture diversity and geographical dispersion in the NPD team conflict, which fill the gap indicated by Connaughton and Shuffler (2007) that the role of distance still remains an empirical question about whether distance is necessarily a challenge to team processes and outcomes, and "*this variation points to the need for future research to clarify the role of distribution and its effects (or lack thereof) on team processes and outcomes"* (p. 400). This paper not merely substantiates the existing research, but also uses the geographical dispersion, both the collocated and virtual environments, to examine the effect of cultural diversity on the team conflict for a thorough study. Evidence abstracted from the analysis suggests that there are two phenomena whereby the geographical dispersion influences the NPD team conflict. One is the difference between the collocated and virtual environments, and another is the influence of the appearance of the cultural diversity on the NPD team conflict. That is to say, the façade of cultural diversity on the team conflict may be different in different environments. However, the influence between cultural diversity and the geographical dispersionis is unstable and depends on the situation. In a physically collocated environment, the major factor affecting the team conflict is culture; but, in a virtual environment,

team type can also influence the team conflict. The result regarding cultural diversity is different from Hofstede's theory (1980) in some conditions, when the geographical dispersion changed with the communication technology difference. The quality of the communication technology also can influence the performance of the team conflict. This finding not only points out the limitation of the current theory, but also indicates that cultural change exists, and should be considered and examined further in the research on global NPD teams.

This study obviously has some limitations that have not yet been overcome and call for more research efforts. Firstly, there are many factors that can influence the performance of the NPD team interaction, such as the organization structure/culture, team size, task difference, personality, and work experience. With the objective of exploring the influence of national culture on NPD team conflict, this paper tries to narrow down the influence of other factors using the simulation game. The simulation game can offer an equitable platform with the same task, the same team size, and a controllable environment and communication channels. With the advantages of the simulation game, some of the factors still cannot be avoided.

Secondly, this paper presents an outline of the novel and innovative use of simulation to study the team conflict within the new product development team with cultural diversity. Using traditional research techniques, such as participant observation or design protocol studies, the richness and interactive dimension would be less visible. The results of this application were encouraging. Despite the realistic case representation of a new product development process provided by COSIGA, there are some aspects of the real new product development process that cannot be replicated in the simulation game. However, due to the abundant experience done with COSIGA, by both academic and industrial purposes in multi-countries since 2000, the gap between the simulated environment and real process is believed to be small from the participant's point of view.

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