

ABSTRACT

Title of dissertation: TMT DIVERSITY, CEO PROCEDURAL FAIRNESS,
AND TMT CONFLICT

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The purpose of this dissertation was to address three research questions: (1) What are the antecedent conditions that contribute to the development of conflict within TMTs? (2) how can TMTs develop constructive conflict profiles – those that simultaneously have relatively high levels of cognitive conflict but low levels of or little affective conflict? and (3) how does TMT conflict relate to firm performance? Two complementary studies were conducted to enhance both the internal validity and the generalizability of this research: an experimental study of 77 project teams with senior business-major undergraduates at a US-based university, and an in-depth field study of 61 TMTs of US-based high-technology firms. The consistent results from both studies revealed that: (1) TMT informational diversity was positively related to TMT cognitive conflict, however, TMT power centralization was negatively related to TMT cognitive conflict; (2) TMTs with higher levels of CEO procedural fairness were more likely to report constructive conflict profiles; and (3) TMT affective conflict was detrimental to firm performance. Contributions to the literature, methodology and managerial practices, and limitation and future research directions were discussed.

TMT DIVERSITY, CEO PROCEDURAL FAIRNESS, AND TMT CONFLICT

by

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DEDICATION

To Xue-yang Jiang (my father) and Gui-lian Wang (my mother), without your belief on my capability and potential, I would not have succeeded in my life thus far.

To Emily Jiang (my daughter), you are the source of joy.

To Mei-Hsiang Chen (my wife), every single achievement I have reached, to which you contribute more than I do.

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CHAPTER 1: INTRODUCTION

Top management teams (TMTs) make strategic decisions that determine the shape and direction of the firms (e.g., Hambrick & Mason, 1984; Simons, Pelled, & Smith, 1999). During the decision making process, top executives with diverse values, knowledge bases, and experiences are likely to have different perspectives regarding the optimal strategic choices firms should pursue (Eisenhardt, Kahwajy, & Bourgeois, 1997b). As a result, conflict may emerge as TMT members interact with each other in the course of making strategic decisions (Eisenhardt, Kahwajy, & Bourgeois, 1997a; Simons et al., 1999). Conflict is particularly prevalent within the TMTs of high-technology firms, because top executives embedded in such dynamic environments, compared to those in stable environments, are more likely to confront overwhelming and ambiguous information inputs (Haleblian & Finkelstein, 1993), interpret them primarily from their own background perspectives (Fiske & Taylor, 1991), and, therefore, propose conflicting viewpoints during decision making. In this dissertation, therefore, I examine TMT conflict in a setting of high-technology industries.

TMT conflict, defined as an interactive process manifested in incompatibility, disagreement, or dissonance among top executives while making decisions (Boulding, 1963; Jehn & Mannix, 2001), affects TMT and firm outcomes. On the one hand, conflict may help TMTs develop a more complete understanding of strategic choices, create a wider range of options, and make higher quality strategic decisions; consequently, conflict may lead to more favorable TMT and firm performance (Eisenhardt et al., 1997b; Simons et al., 1997). For instance, Eisenhardt et al.'s (1997b) study of 12 high-technology firms found that those firms with a high level of conflict during the TMT

decision making process tended to have better financial performance than others. On the other hand, conflict can be detrimental because it may limit team cohesiveness, cost energy and resources, and, therefore, impair TMT and firm outcomes (e.g., Amason, 1996; March & Simon, 1958). For example, with the data of 76 TMTs of high-technology firms, Knight, Pearce, Smith, Olian, Sims, Smith, & Flood (1999) observed that TMT conflict adversely affected strategic consensus.

It is important to identify the antecedent conditions through which TMT conflict emerges (Amason, 1996; Eisenhardt et al., 1997a). Team diversity variables such as age diversity, gender diversity, race diversity, value diversity, tenure diversity, functional background diversity, educational diversity, and informational diversity have been addressed as the antecedents to conflict in the literature (e.g., Jehn, Northcraft, & Neale, 1999; Lovelace, Shapiro, & Weinart, 2001; Pelled, Eisenhardt, & Xin, 1999). While the observed effects of other diversity variables have fluctuated across studies, informational diversity has been consistently argued as a dominant predictor to conflict (Jehn et al., 1999; Lovelace et al., 2001). Informational diversity refers to the diverse knowledge bases and experiences of team members that they draw upon in making decisions (Jehn et al., 1999). For instance, In Jehn et al.'s (1999) study with 92 work teams in the household goods moving industry, they found that conflict was more likely to emerge when a high level of informational diversity was present. Such a finding was further confirmed by other studies of work teams (e.g., Lovelace et al., 2001; Pelled et al., 1999).

However, informational diversity has yet to be addressed in the context of firms' upper echelons. It is important to advance the empirical investigation of information diversity into the TMT context because of the following reasons: (1) TMTs have distinct

task nature, team composition, structure and team processes separate from those of work teams (Ancona & Nadler, 1989; Mintzberg, 1971). In particular, the fundamental tasks for top management teams (TMTs) are to make strategic decisions, which are much more complex than those for other types of teams because they involves the creation of favorable decision making context (e.g., appropriate organizational structure), thorough examinations of internal operations, and complicated information processing of external environmental elements such as customer demand, competitor move, technology trend, and market dynamics as well (Mintzberg, 1971; Hambrick & Mason, 1984). Therefore, it is risky simply to project the findings of the studies of work teams onto the TMT level (Cohen & Bailey, 1997); (2) diverse knowledge and experiences composition is natural to the TMTs of high-technology firms (Finkelstein & Hambrick, 1996); and (3) the associations between TMT diversity (e.g., informational diversity) and TMT process variables (e.g., conflict) have been largely ignored and remain unknown in TMT research, which accounts for the ambiguity regarding how TMTs affect firm performance (Finkelstein & Hambrick, 1996; Smith, Smith, Olian, Sims, O'bannon, & Scully, 1994).

Another diversity variable that deserves research attention is TMT power centralization (Priem, Lyon, & Dess, 1999). TMTs are the power nexus of firms, and are likely to involve salient power differences among top executives (Finkelstein & Hambrick, 1996). Power centralization refers to the extent to which the levels of influences over strategic decisions within a TMT are centered on the CEO or a few “core executives” instead of evenly distributed among all the TMT members (Bunderson, 2002; Finkelstein, 1992; Finkelstein & Hambrick, 1996)). The more disproportionately the power is consolidated on the CEO or a few “core executives”, the higher the level of

power centralization. Several TMT studies have indicated the likely important effects of power centralization on conflict (Pitcher & Smith, 2001; Priem et al., 1999). For instance, in a case study of a financial service corporation, Pitcher and Smith (2001) observed that the more opportunities other top executives besides the CEO were deeply involved in making strategic decisions, in other words, the lower the level of power centralization - the greater the likelihood that decision making would be typified by a high level of open debate and discussion as opposed to a hierarchically driven decision. However, no empirical study has explicitly addressed such a relationship. Therefore, the first research goal of this dissertation is to examine the effects of TMT informational diversity and power centralization on TMT conflict. *The first research question is this: How do TMT informational diversity and TMT power centralization affect TMT conflict?*

As noted, conflict has been observed as being both beneficial and detrimental (Amason, 1996; Knight et al., 1999). Recent studies have attributed the mixed effects of conflict to its multidimensional nature. Cognitive conflict is task-related and arises from differences in judgment or perspectives; affective conflict, however, is emotional and arises from personalized incompatibility or clashes (Amason & Sapienza, 1997; Simons & Peterson, 2000). A relatively high level of cognitive conflict appears to improve strategic decision making and therefore TMT and firm outcomes by stimulating different perspectives and promoting critical examinations of the decision making criteria (Amason, 1996; Bantel & Jackson, 1989). Affective conflict appears to impair TMT and firm performance, because it limits team cohesiveness and interferes with the TMT decision making (Amason, 1996; Simons & Peterson, 2000). Affective conflict may confound the effects of cognitive conflict as well. When a high correlation between

affective conflict and cognitive conflict is present, cognitive conflict may turn to negatively affect team and firm outcomes (De Dreu & Weingart, 2003).

This research suggests that to optimize TMT decision making, it is important to establish a constructive conflict profile, namely, one with a relatively high level of cognitive conflict, but with a low level of or little affective conflict. However, such a process is not straightforward, because these two types of conflict are highly coupled (Amason, 1996; Simons & Peterson, 2000). Simons and Peterson (2000) reviewed previous empirical conflict research and found that cognitive conflict and affective conflict were positively related across studies. A high level of cognitive conflict may lead to the emergence of affective conflict because harsh language that is often generated during a task-related debate may be taken as personal attacks by other team members (e.g., Jehn, 1995). Furthermore, affective conflict may contribute to cognitive conflict as well. Individuals who feel angry with other members of the team may have a greater propensity to openly dispute the ideas of those other members (Pelled et al., 1999).

Thus far, we know little about how a TMT is able to establish a constructive conflict profile (Except Amason & Sapienza, 1997; Simons & Peterson, 2000). With a study of 48 food processing firms, Amason and Sapienza (1997) found that TMT openness, defined as a team's propensity to tolerate, encourage, and engage in open, frank expression of views, was positively related to TMT cognitive conflict but negatively associated with TMT affective conflict. Despite their contributions, an examination of the direct relationship between openness and conflict did not provide solutions to conflict decoupling. Basing their study on 70 TMTs of US-based hotels, Simons and Peterson (2000) suggested that when a high level of intrateam trust was

present in a TMT, cognitive conflict was less likely to lead to affective conflict. Unfortunately, they did not address how to further encourage cognitive conflict at the same time while minimizing affective conflict. *Therefore, the second research question is this: How can a TMT establish a constructive conflict profile, namely one with a relatively high level of TMT cognitive conflict and a low level of or little TMT affective conflict simultaneously?*

Recent research has suggested looking into the role that CEOs play for solutions to establishing a constructive TMT conflict profile (Eisenhardt et al., 1997a). As the central members of TMTs (Jackson, 1992), CEOs are not only responsible for envisioning a strategic direction for other team members, but can have a strong influence on the way TMT members interact with each other (Barnard, 1968; Hitt, Ireland, & Hoskisson, 2003). While the importance of CEO characteristics on TMT interaction (i.e., conflict) sounds almost self-evident, there are few studies investigating the nature of this relationship. As an exception, Eisenhardt et al's (1997a) case study on 12 TMTs of high-technology firms found that there was a high level of cognitive conflict but a low level of affective conflict in the TMTs wherein the CEOs followed a fair procedure in making strategic decisions. Similarly, Finkelstein & Hambrick (1996) proposed that TMTs which have a CEO who is able to effectively incorporate diverse and even opposing perspectives from team members experience higher levels of cognitive conflict but lower levels of affective conflict, compared to TMTs with a CEO who is unable to integrate different perspectives. Inspired by and in line with these studies, my second research goal of this dissertation is to address how a TMT is able to establish a constructive conflict profile by focusing on the moderating role of an important aspect of CEO

leadership - the CEO's ability to provide procedural fairness. Specifically, I will examine (1) the moderating effects of CEO procedural fairness on the relationships between informational diversity and power centralization, and TMT conflict, and (2) the moderating effects of CEO procedural fairness on the relationship between TMT cognitive conflict and TMT affective conflict.

Finally, it is important to systematically examine the effects of TMT conflict on firm performance because of the following two reasons. First, while the outcomes of conflict have been widely addressed in the teams literature, comprehensive examinations of the consequences of TMT conflict are rare. For instance, Eisenhardt et al.'s (1997b) study only focused on the effects of cognitive conflict on firm financial performance. Knight et al. (1999) simply examined the relationship between affective conflict and TMT strategic consensus. More importantly, because of the covariance of cognitive conflict and affective conflict and the potential confounding effects of affective conflict on the consequences of cognitive conflict (De Dreu & Weingart, 2003), an examination of any single type of conflict of these two without having the other one put into the equation will very likely bias the results. Therefore, the third research goal of this dissertation is to investigate the relationship between both types of TMT conflict and firm performance. *The third research question is this: How does TMT conflict affect firm performance?*

This study makes four contributions to the literature. First, it contributes to conflict research by advancing the examination of conflict antecedents into the context of TMTs. Specifically, I examine the effects of TMT informational diversity and power centralization on TMT conflict. In so doing, the goal is to provide a more complete

understanding of conflict in TMTs. Second, this study contributes to the conflict management literature by offering a solution to establishing a constructive TMT conflict profile. I address this question by investigating the moderating effects of CEO procedural fairness on the relationships between TMT informational diversity, power centralization and conflict, and on the cognitive conflict-affective conflict association as well. Third, this study contributes to the TMT conflict literature. It is the first study, to my knowledge, to systematically examine the effects of both TMT cognitive conflict and TMT affective conflict on firm performance. Finally, this study makes a contribution to the broader TMT literature. While a CEO usually plays a much more important role than other top executives in making strategic decisions (Finkelstein, 1992), most TMT research tends to equalize the CEO's influences with those of other members (Finkelstein & Hambrick, 1996; Pitcher & Smith, 2001). This simplifies the work of measurement; however, it may account for the mixed results in the TMT literature regarding the effects of TMT diversity on process variables and firm outcomes (e.g., Finkelstein & Hambrick, 1996; Pitcher & Smith, 2001; Smith et al., 1994). In this study, I highlight the function of CEO procedural fairness by examining the effects of its interaction with TMT diversity on TMT conflict and its unique role in decoupling TMT cognitive conflict from TMT affective conflict.

This dissertation proceeds as follows. I next conduct a comprehensive review of the conflict research that has addressed such topics as the consequences of conflict, the antecedents to conflict, conflict coupling, and CEO procedural fairness, and develop a research model to answer the three research questions raised above, following which I propose 9 hypotheses to test the model. Next, I conduct two studies to test these

hypotheses: a game simulation with 77 project teams with business-major senior undergraduates and a field study with 61 TMTs of high-technology firms. These two studies complement each other to enhance both the internal validity and the generalizability of this dissertation. Finally, I discuss this research's contributions to the literature, methodology and managerial practices, and limitation and future research directions.

CHAPTER 2: LITERATURE REVIEW

The purpose of this chapter is to conduct a comprehensive review of the conflict literature. While the dissertation is focused on the context of TMTs, this review will review the conflict research in both the TMT literature and the broad teams literature. In the following discussion, I will first define the construct of conflict, followed with a review of the consequences of team conflict, the antecedents to team conflict, the association between cognitive conflict and affective conflict, and CEO procedural fairness, consecutively. As a conclusion of the literature review, at the end of this chapter, I will propose a research model to be examined empirically in this dissertation.

What is Conflict?

Conflict is an awareness of the parties involved of discrepancies, incompatible wishes, or irreconcilable desires (Boulding, 1963; Jehn & Mannix, 2001). It is ubiquitous across teams with a high level of task interdependence (Jehn, 1995). Past research has observed that conflict emerges when team members have developed opposing values and goals (Cosier & Rose, 1977; Eisenhardt & Schoonhoven, 1990). Recent studies have further found that conflict may still dominate the team decision making process even when team members share the same goals because people with different knowledge bases and experiences may approach the team's tasks from diverse and even opposing perspectives (Amason, 1996; Jehn et al., 1999).

The observed effects of conflict are not uniform. On the one hand, much of the previous literature on conflict has generally viewed conflict as detrimental to team and firm performance because it hurts team cohesiveness, slows the decision making process,

and undermines job satisfaction (e.g., Gladstein, 1984; March & Simon, 1958). On the other hand, recent studies have claimed conflict to be a beneficial phenomenon for team and firm outcomes in that it may improve understanding of information, uncover flawed assumptions, and enhance decision quality (Amason, 1996; Jehn, 1997). Therefore, conflict is a double-edged sword, with both beneficial and detrimental effects (Amason & Schweiger, 1994).

Recent research has attributed such double-edged effects to the multidimensional nature of conflict (Amason, 1996; Jehn, 1994; 1995). The cognitive dimension of conflict (e.g., Amason, 1996), also labeled as task conflict (Eisenhardt et al., 1997b; Simons & Peterson, 2000), issue conflict (Hammer & Organ, 1978), or substantive conflict (Guetzkow & Gyr, 1954; Rahim, 2001), is a perception of disagreements among team members regarding the content of their decisions and involves differences in viewpoints, ideas, and opinions (Simons & Peterson, 2000). The affective dimension of conflict (Guetzkow & Gyr, 1954; Amason, 1996), also labeled as relationship conflict (Simons & Peterson, 2000), emotional conflict (Pelled et al, 1999), or interpersonal conflict (Eisenhardt et al, 1997a), however, is a perception of interpersonal clashes and typically includes anger, frustration, tension, annoyance, and animosity among team members (Simons & Peterson, 2000). Cognitive conflict is task-related and arises from differences in judgment or perspectives among team members; affective conflict, however, is emotional and arises from personalized incompatibility (Amason, 1996).

Consequences of Conflict

Empirical research has shown a generally positive relationship between cognitive conflict and team and firm performance (See Table 1 for a literature summary¹). A relatively high level of cognitive conflict is able to enhance decision making quality, and, therefore, team and firm outcomes, by stimulating different perspectives on and promoting critical examinations of the decision making criteria (Amason, 1996; Bantel & Jackson, 1989). For instance, based on a study of 48 TMTs of food processing firms, Amason (1996) found that cognitive conflict was positively related to TMT decision quality. Dooley and Fryxell (1999) observed a positive relationship between cognitive conflict and TMT decision quality as well in a study of the TMTs of 86 hospitals. Eisenhardt et al.'s (1997b) qualitative study of the TMTs of 12 high-technology firms found that cognitive conflict positively predicted firm performance. With a study of 92 work teams in the household goods moving industry, Jehn et al. (1999) revealed that cognitive conflict was positively associated with team performance. Similarly, Pelled et al. (1999) observed a positive relationship between cognitive conflict and team performance with the data of 45 work teams from a high-technology company. In addition, a moderate level of cognitive conflict may enhance team attitudinal outcomes such as affective acceptance (Amason, 1996) and decision commitment (Dooley & Fryxell, 1999). Through cognitive conflict, each member has the opportunity to exercise voice over task decisions, which increases the perceived fairness that team members have

¹ This review is focused on the research in the last 12 years, from 1995 -2006, published in major academic outlets including Academy of Management Journal, Academy of Management Review, Administrative Science Quarterly, California Management Review, Harvard Business Review, Journal of Applied Psychology, Journal of Management, Journal of Organizational Behavior, Organization Science, Personnel Psychology, and the International Journal of Conflict Management. This rule is applied to the literature summary in Table 1, Table 2 and Table 3.

over how they view the decision making process (Amason, 1996; Korsgaard, Schweiger, & Sapienza, 1995).

However, when the level of cognitive conflict becomes extremely high, it may begin to impair team and firm outcomes (see De Dreu & Weingart, 2003, for a review). For instance, with a study of 80 project teams of undergraduates in business programs, Porter and Lilly (1996) observed that team performance declined when the team experienced a very high level of cognitive conflict. Jehn's (1995) study of 105 work teams dealing with nonroutine tasks found that cognitive conflict was curvilinearly (as in an inverted U) related to team performance. In other words, when cognitive conflict goes beyond a certain level, it becomes detrimental. Two plausible reasons account for this phenomenon. First, information processing research suggests that the amount of disagreement and variety in a team needs to match the level of variety of the task for the team to be effective (Tushman & Nadler, 1978). When the level of variety of different viewpoints in a team exceeds the level of task variety and the amount of information required to complete the task, the high cost of integrating diverse perspectives and evaluating solutions will lead to declines in team performance. More importantly, a very high level of cognitive conflict may hurt team members' affective acceptance of and commitment to decisions (Amason, 1996; Jehn et al., 1997; Jehn et al., 1999), and therefore negatively affect team performance (Jehn, 1995; Simons & Peterson, 2000). This is because highly critical evaluations of others' opinions can cause negative affective reactions such as tension, antagonism, and unhappiness, which distract attention and energy away from teamwork toward interpersonal attacks (Amason & Schweiger, 1994).

Table 1: Consequences of Conflict

Studies	Data	Findings
Amason (1996)	TMTs of 48 food processing firms	Cognitive conflict (+) TMT decision quality; Cognitive conflict (+) understanding of decisions; Cognitive conflict (+) affective acceptance; Affective conflict (-) affective acceptance
Dooley & Fryxell (1999)	TMTs of 86 hospitals	Cognitive conflict (+) decision quality and decision commitment; Cognitive conflict X team loyalty (+) decision quality; Cognitive conflict X team competence (+) team commitment
Janssen, Van De Vliert, & Veenstra (1999)	102 members of management teams (retrospection)	Cognitive conflict X affective conflict X positive interdependence (+) team decision making effectiveness
Jehn (1995)	105 work teams and management teams in a freight transportation firm	Cognitive conflict (-) satisfaction and the intent to remain; Cognitive conflict (reverted U) team performance; Affective conflict (-) satisfaction, liking, and the intent to remain; Affective conflict (n.s.) team performance; Cognitive conflict X task type (-) team performance.
Jehn (1997)	work teams in 6 organizations (qualitative study)	Cognitive conflict X conflict dimensions (+) team performance; Affective conflict (-) team performance Affective conflict (-) satisfaction
Jehn, Chadwick & Thatcher (1997)	88 MBA teams at two business school (quasi-experimental field study)	Cognitive conflict (n.s.) team performance; Cognitive conflict (-) team satisfaction; Affective conflict (-) team performance Affective conflict (-) satisfaction
Jehn, Northcraft, & Neale (1999)	92 work teams in the household goods moving industry	Cognitive conflict (+) team performance; Affective conflict (-) worker morale
Knight et al. (1999)	TMTs of 76 high-tech firms	Affective conflict (-) strategic consensus
Lovelace, Shapiro, & Weignart (2001)	43 cross-functional work team in 16 high-tech firms	Cognitive conflict X collaborative communications (+) team innovativeness
Pelled (1996b)	42 work teams from 2 electronics manufacturing facilities	Affective conflict (-) team productivity
Pelled, Eisenhardt, & Xin (1999)	45 work teams from the electronics divisions of 3 corporations	Cognitive conflict (+) team performance; Affective conflict (n.s.) team performance
Porter & Lilly (1996)	80 project teams of undergraduate students in business program	Cognitive conflict (-) team performance

Most recent conflict research, inspired by Jehn's (1995) work, has proposed a contingency view as a way to approach the influences of cognitive conflict on outcome variables (e.g., Alper, Tjosvold, & Law, 2000; Dooley & Fryxell, 1999). For instance, with 61 self-managing teams, Alper et al. (2000) argued that cognitive conflict was positively associated with team performance when team members perceived cooperative rather than competitive goal interdependence. In the same study mentioned earlier, Dooley and Fryxell's (1999) found that when the level of team loyalty was high, cognitive conflict was more likely to enhance strategic decision quality, and that when the team competence was high, cognitive conflict was more likely to lead to a high level of team commitment to strategy implementation. Basing their study on 43 cross-functional work teams in 16 high-technology firms, Lovelace et al. (2001) observed that in a team where collaborative communications were applied, cognitive conflict enhanced team innovativeness. Finally, De Dreu and Weingart's (2003) meta-analysis of conflict research from 1994 to 2001 found that affective conflict confounded the effects of cognitive conflict on team outcomes. Cognitive conflict is likely to negatively affect team performance, when a high correlation between cognitive conflict and affective conflict was present than otherwise.

Unlike cognitive conflict, affective conflict has been found consistently to impair team and firm performance across studies. For instance, in the same study mentioned earlier, Jehn (1995) found that affective conflict negatively affected team performance. With 42 work teams from 2 electronics manufacturing facilities, Pelled (1996b) found a negative relationship between affective conflict and team productivity. Finally, Knight et al. (1999) observed detrimental effects of TMT affective conflict on strategic consensus.

There are at least two ways through which affective conflict plays a dysfunctional role in influencing team and firm performance (Janssen, Van de Vliert, & Veenstra, 1999). First, affective conflict slows down the decision making process. It limits team cohesiveness, distracts team members' attention away from the cognitive processing of information toward interpersonal issues, and consumes time and energy needed for working on the substantive team tasks (Jehn, 1995). Moreover, affective conflict reduces the quality of task decisions. Affective conflict disturbs effective communication and cooperation among team members. The negative reactions associated with affective conflict reduce team members' receptiveness to ideas advocated by others who are disliked, decrease willingness to tolerate opposition, and give rise to hostile attribution concerning others' intentions (Janssen et al., 1999).

Affective conflict has a detrimental effect on team attitudinal outcomes as well, because the negative reactions associated with affective conflict, such as tension, annoyance, and animosity, inhibit team members' ability to enjoy their work in teams (Amason, 1996; Simons & Peterson, 2000). For instance, Amason (1996) found that affective conflict was negatively related to the acceptance of decisions among TMT members. Jehn (1995) observed that affective conflict was negatively associated with team members' satisfaction, their liking of other members, and their intent to stay in the team. This finding was further confirmed by Jehn's (1997) and Jehn et al.'s (1997) studies. Finally, Jehn et al.'s (1999) research revealed a negative relationship between affective conflict and work morale.

Antecedents to Conflict

Driven by the powerful effects of conflict on team and firm outcomes, research has also examined the antecedents to team conflict. For instance, Amason and Sapienza (1997) argued that team size positively affected both types of conflict because large teams had greater potential for dissimilarity. Amason and Mooney (1999) suggested that a high level of firm past performance lowered a TMT's affective conflict because the organizational slack produced in the past reduced the tendency toward suspicion and mistrust among top managers. Knight et al. (1999) observed that functional diversity advanced affective conflict. More comprehensive studies on the antecedents to conflict were focused on team diversity in the context of work teams (See Table 2 for a literature summary).

Table 2: Antecedents to Conflict

Studies	Data	Findings
Amason & Mooney (1999)	TMTs of 44 mid-sized public firms	Past firm performance (n.s.) cognitive conflict; Past firm performance (-) affective conflict
Amason & Sapienza (1997)	TMTs of 48 food processing firms	Team size (+) cognitive conflict; Openness (+) cognitive conflict; Team size (+) affective conflict; Openness X mutuality (-) affective conflict
Eisenhardt, Kahwajy, & Bourgeois (1997)	TMTs of 12 high-tech firms (qualitative study)	Age diversity (+) cognitive conflict; Educational diversity (+) cognitive conflict; Functional background diversity (+) cognitive conflict
Jehn & Mannix (2001)	51 MBA teams at 3 business schools (Quasi-experimental field study)	Value consensus (+) cognitive conflict Value consensus (-) affective conflict
Jehn, Chadwick & Thatcher (1997)	88 MBA teams at two business school (quasi-experimental field study)	Education (+) cognitive conflict; Value diversity (-) cognitive conflict; Sex diversity (+) affective conflict; Value diversity (+) affective conflict Age & nationality (n.s.) cognitive and affective conflict;
Jehn, Northcraft, & Neale (1999)	92 work teams in the household goods moving industry	Functional background diversity (+) cognitive conflict Educational diversity (+) cognitive conflict; Sex diversity (+) affective conflict; Age diversity (+) affective conflict; Value diversity (+) cognitive conflict; Value diversity (+) affective conflict
Knight et al. (1999)	TMTs of 76 high-tech firms	Functional diversity (+) affective conflict
Lovelace, Shapiro, & Weignart (2001)	43 cross-functional work team in 16 high-tech firms	Functional diversity (+) cognitive conflict
Pelled (1996b)	42 work teams from 2 electronics manufacturing facilities	Gender diversity (+) affective conflict; Tenure diversity (+) affective conflict; Race diversity (n.s.) affective conflict; Team size (+) affective conflict
Pelled, Eisenhardt, & Xin (1999)	45 work teams from the electronics divisions of 3 corporations	Age diversity (-) cognitive conflict; Functional background diversity (+) cognitive conflict; Race diversity (+) affective conflict; Age diversity (-) affective conflict; Company tenure diversity (+) affective conflict
Porter & Lilly (1996)	80 project teams of undergraduate students in business program	Trust (-) cognitive conflict

Team diversity refers to the dissimilarity among members in knowledge, perspectives, personality, or values (Priem et al., 1999). In terms of the difference of the nature of the diversity variables and the underlying mechanisms through which diversity variables impose their effects on conflict, Jehn et al. (1999) identified three categories of diversity: informational diversity, social categorical diversity (i.e., age, gender, and race diversity), and value diversity. In addition to these, Priem et al. (1999) and Pitcher and Smith (2001) suggested that the nature of power distribution within a team, specifically, power centralization was another important variable, particularly for TMTs, that may strongly affect team conflict as well. Since this dissertation is focused on informational diversity and power centralization, in the following I primarily review the studies of these two variables.

Informational diversity. Informational diversity refers to the diverse knowledge bases and experiences of team members that they draw upon in making decisions. Constrained by the difficulty of directly collecting and measuring the data of team knowledge and experiences, such demographic variables as team tenure diversity, functional background diversity and educational diversity have been adopted as the proxy of informational diversity, because they have been widely recognized as a reflection of team knowledge stocks and experiences (Hambrick & Mason, 1984; Jehn et al., 1999). Informational diversity has a strong effect on cognitive conflict. For instance, Jehn et al. (1999) found that functional background diversity and educational diversity were positively related to cognitive conflict. Pelled et al. (1999) observed a positive association between functional background diversity and cognitive conflict. This finding was further confirmed in Lovelace et al.'s (2001) study. The effects of informational diversity on

affective conflict were also observed. For instance, Knight et al. (1999) reported a positive relationship between functional diversity and affective conflict. Additionally, Pelled (1996b) observed that tenure diversity positively influenced affective conflict.

Power centralization. Power centralization refers to the extent to which the levels of influences over strategic decisions within a TMT are centered on the CEO or a few “core executives” (Finkelstein & Hambrick, 1996) instead of evenly distributed among all the TMT members (Bunderson, 2002; Finkelstein, 1992). The more disproportionately the power is consolidated on the CEO or a few “core executives”, the higher the level of power centralization. Power is an integral part of research on teams, particularly on TMTs (Finkelstein, 1992). As Finkelstein (1992: 505) argued: “[I]n organizations in which power is less polarized, consideration of a coalition of top managers is necessary to fully capture the range of managerial orientations prevailing. Hence, consideration of the distribution of power among top managers is an essential ingredient for research on TMTs.” Furthermore, Pitcher and Smith (2001) argued that the exclusive concentration on demographic diversity variables in extant TMT research inhibited our understandings of how TMT characteristics affect the strategic decision making process, and that power distribution as a missing variable deserved closer research attention. In fact, they found that power distribution significantly affected the cooperation and interaction among top executives. Finally, Priem et al. (1999) argued that it is theoretically important to examine those substantive distribution variables such as power heterogeneity that may challenge the established demographics-based theories. As they pointed out, “[p]ower heterogeneity, for example, would likely encourage

expression of multiple viewpoints, whereas power homogeneity, with control typically centered in the CEO, would discourage such expression” (Priem et al., 1999: 945).

No empirical research in the conflict literature thus far, to my knowledge, has explicitly examined the effects of TMT power centralization on TMT conflict. However, studies of corporate governance and executive politics may have shed insights on such a relationship. For instance, in an interdepartmental setting, Hayward and Boeker (1998) found that political interference between the equity research departments and the corporate finance departments in the same banks was unlikely to emerge, when the corporate finance department was significantly more powerful than the other one. Whereas, when the power was more evenly distributed between those two departments, the political contests in between were more likely to surface. With a study of 120 U.S. industrial corporations, Ocasio (1994) observed that when the CEO’s power and influence was lessened as a result of firm performance decline or the CEO’s technical obsolescence, in other words, the power distribution became more decentralized, the latent political contests among top executives were more likely to come to the foreground. A similar finding was further found in Shen and Cannella’s (2002) study of 387 public firms.

Association between Cognitive Conflict and Affective Conflict

Given their distinct patterns of emergence, mechanisms by which they relate to outcomes, and the generally opposite effects of cognitive conflict and affective conflict, it seems wise and straightforward that managers should simply encourage cognitive conflict and discourage affective conflict. However, empirical studies have reported that cognitive

conflict is generally highly positively related to affective conflict (See Table 3 for a review). In other words, these two types of conflict tend to be coupled and may not be easily separated (Amason, 1996; Jehn et al., 1999). Simons and Peterson (2000) summarized the literature and offered three plausible reasons for why these two types of conflict are highly correlated. First, cognitive conflict may lead to affective conflict through a mechanism of misattribution. Because of bounded rationality, some may construe others' critiques of their opinions as personal attacks. Second, the harsh language associated with cognitive conflict may trigger interpersonal animosity and tension. As a result, affective conflict is induced. Finally, affective conflict may lead to cognitive conflict as well. Individuals who feel angry with other members of the team may have a propensity to dispute the ideas of those other members (Pelled et al., 1999). Underlying the above three reasons is the lack of mutual trust among team members (Simons & Peterson, 2000).

Table 3: Conflict Correlation

Studies	Correlation
Amason & Mooney (1999)	0.42
Amason (1996)	0.39
Amason & Sapienza (1997)	0.39
Friedman, Tidd, Currall, & Tsai (1998)	0.84
Janssen, Van de Vliert, & Veenstra (1999)	0.46
Jehn & Mannix (2001)	0.55
Jehn (1995)	-0.17
Jehn, Chadwick, & Thatcher (1997)	0.48
Jehn, Northcraft, & Neale (1999)	0.55
Pelled, Eisenhardt, & Xin (1999)	0.45
Simons & Peterson (2000)	0.55

Only two studies have looked into the question of establishing a constructive conflict profile for TMTs, namely, one with a relatively high level of cognitive conflict but a low level of or little affective conflict at the same time (Amason & Sapienza, 1997; Simons & Peterson, 2000). Amason and Sapienza (1997) argued that TMT openness was positively related to TMT cognitive conflict but negatively associated with TMT affective conflict. Although this view was supported by their empirical test with 48 TMTs, Jehn's (1995) study found that norms encouraging team open discussion actually increased the intensity of affective conflict. Basing their study on 70 TMTs of US-based hotels, Simons and Peterson (2000) argued that when a high level of intrateam trust was present in a TMT, cognitive conflict was less likely to lead to affective conflict. However, they did not explain how to further enhance cognitive conflict simultaneously when affective conflict was being diminished.

A Solution to a Constructive Conflict Profile: The Role of CEO Procedural Fairness

As the central members of TMTs (Jackson, 1992), CEOs are responsible for not only creating a long-term strategic vision to guide the behaviors of other top executives, but for facilitating the coordination and interaction among top managers as well (Finkelstein & Hambrick, 1996). A successful CEO may take actions and/or create a favorable team norm to encourage team members' information exchange and participation in making strategic decisions when it is necessary (Eisenhardt et al., 1997a). While it is almost self-evident that CEOs have an important impact on the processes and mechanisms through which conflict emerges, studies investigating the nature of this relationship are few. As an exception, Eisenhardt et al. (1997b) argued that in

demographically diverse TMTs, CEOs who adopted a fair decision making procedure were able to further enhance cognitive conflict, and at the same time, decrease affective conflict. Similarly, Finkelstein and Hambrick (1996) have suggested that a TMT with a CEO who is able effectively to incorporate diverse and even opposing perspectives associated with team diversity may experience a high level of cognitive conflict, but a low level of affective conflict. These studies have yielded significant insights regarding how CEO procedural fairness may help establish a constructive TMT conflict profile.

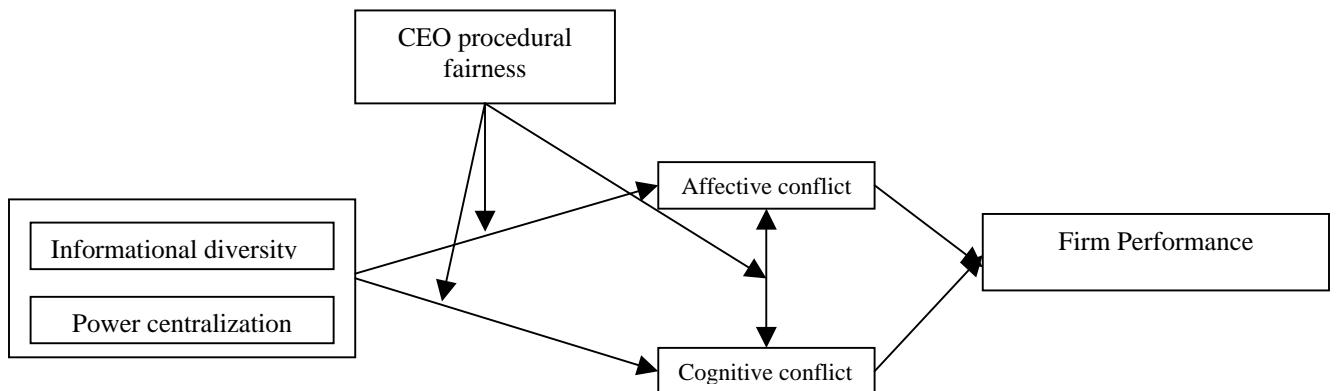
CEO Procedural Fairness. CEO procedural fairness refers to the extent to which a CEO takes into account the concerns of all team members while making decisions (Cremer & Knippenberg, 2002). Procedural fairness strongly affects the behavioral interaction of team members. For instance, with three lab studies of business school students, Cremer and Knippenberg (2002) found that a leader's procedural fairness enhanced team members' cooperation and information exchange. With a field study of 88 work teams, Colquitt, Noe, and Jackson (2002) observed that when team members were treated fairly, they were more likely to have functional disagreements over task decisions. Additionally, procedural fairness exerts a powerful influence on team members' attitudinal interaction as well. Colquitt, Conlon, Wesson, Porter, and Ng's (2001) meta-analysis of organizational justice found that procedural fairness positively affected the level of mutual trust and respect within a team. With a field study of a pharmaceutical corporation, Kernan and Hanges (2002) further found that procedural fairness was positively correlated with trust in management. The lack of fairness in the decision making process, however, may lead to negative affective results, such as mistrust, disregard, and even retaliation behaviors (Skarlicki, Folger & Tesluk, 1999). Since

procedural fairness, as demonstrated above, exerts such a strong influence over the ways in which team diversity may relate to conflict, and creates a norm of mutual trust among members that may weaken the misattribution effects through which cognitive conflict leads to affective conflict, I expect that CEO procedural fairness is likely to moderate the relationship between TMT diversity and TMT conflict and the relationship between TMT cognitive conflict and TMT affective conflict.

Research Model

Based on the above literature review, I propose a model for TMT diversity, CEO procedural fairness and TMT conflict as shown in Figure 1. As indicated, TMT informational diversity and TMT power centralization are predicted to affect TMT conflict. CEO procedural fairness is predicted to moderate the relationships between conflict antecedent variables and TMT conflict, and to decouple TMT cognitive conflict from TMT affective conflict. Finally, this model predicts that both TMT cognitive conflict and affective conflict affect firm performance.

Figure 1: Research Model



CHAPTER 3: HYPOTHESES

Antecedents to Conflict

Informational diversity. As defined earlier, informational diversity refers to the diverse knowledge bases and experiences of team members that they draw upon in making decisions (Hambrick & Mason, 1984; Jehn et al., 1999). TMT cognitive conflict is defined as the perceived disagreements among TMT members regarding the content of their decisions, and involves differences in viewpoints, ideas and opinions (Amason, 1996). TMT informational diversity is predicted to lead to TMT cognitive conflict. Top executives with different expertise and experiences are likely to propose very different and even conflicting viewpoints regarding the optimal strategic choices firms should pursue (Eisenhardt et al., 1997b). Also, because of the significant responsibility they possess, potent top managers are likely to stick to their own viewpoints, unless their concerns are well addressed by others who raise different opinions (Amason, 1996). Therefore, the higher the level of TMT informational diversity, the more likely TMT members perceive disagreements during the decision making process. I infer the following:

Hypothesis 1. TMT informational diversity is positively related to TMT cognitive conflict.

TMT informational diversity is unlikely to be related to TMT affective conflict. As I noted earlier, affective conflict refers to perceived interpersonal incompatibility and clashes characterized by anger, frustration and tension among team members (Amason, 1996; Simons & Peterson, 2000). Affective conflict often occurs through a social

categorization mechanism (Tajfel, 1972). People tend to categorize others on the basis of salient demographic variables such as age, gender and race to make the external environments more predictable and controllable (Tajfel, 1972). Once categorization takes place, members strive to develop a positive social identity by showing favoritism to the members of their own social categories and resentment and discrimination toward those in other categories (Tajfel, 1972). The intrateam hostilities derived from social categorization effects, as a result, may surface as affective conflict (e.g., Jehn et al., 1999). TMT informational diversity is job-oriented instead of socially related (Pelled, 1996b), and therefore is unlikely to trigger the social categorization effects and lead to the emergence of affective conflict.

Power centralization. As defined earlier, power centralization refers to the extent to which the levels of influences over strategic decisions within a TMT are centered on the CEO or a few “core executives” (Finkelstein & Hambrick, 1996) instead of evenly distributed among all the TMT members (Bunderson, 2002; Finkelstein, 1992). The more disproportionately the power is consolidated on the CEO or a few core executives, the higher the level of power centralization. Power centralization is predicted to be negatively related to TMT cognitive conflict. The lower the level of power centralization, the higher the likelihood that cognitive conflict may emerge. This is because a low level of power centralization, with power relatively evenly distributed among top executives, is able to ensure that each member has a real say in making decisions (Pfeffer, 1981). Also, relatively even power distribution may trigger political interference among top executives that is likely to surface as cognitive debate during the TMT decision making (Ocasio,

1984; Shen & Cannella, 2002). For instance, with a study of 120 U.S. industrial corporations, Ocasio (1994) observed that when the CEO's power and influence became lessened as a result of declining firm performance or the CEO's technical obsolescence - in other words, the level of power centralization became lower - the latent political contests among top executives were more likely to come to the foreground. Similar observation was revealed in Shen and Cannella's (2002) study of the top executives of 387 public firms. In contrast, when a high level of power centralization is present, those top executives who have significantly less power than others are likely to be discouraged from expressing their perspectives (Finkelstein & Hambrick, 1996). As a result, cognitive conflict is unlikely to appear. This is because their opinions, even expressed, will not be given as much weight as those who are more influential and powerful (Finkelstein & Hambrick, 1996). Additionally, their distinct opinions, if perceived as threats by those powerful members (i.e., the CEOs), will put them into more disadvantageous situations (Daily & Dalton, 1994).

Power centralization is predicted to be negatively related to affective conflict as well. Intense competition among top executives for privileged status, which is associated with a high level of power decentralization, is likely to lead to anxiety, stress and tensions among TMT members (Casio, 1994; Wei & Cannella, 2002). In contrast, when the power is unequally concentrated with one or a few core members - in other words, when the level of power centralization is high - others may tend to avoid challenging the core members, and the relationship clashes among team members, if there are any, are also less likely to surface (Henderson & Fredrickson, 2001).

Hypothesis 2a. TMT power centralization is negatively related to TMT cognitive conflict.

Hypothesis 2b. TMT power centralization is negatively related to TMT affective conflict.

CEO Procedural Fairness as a Moderator

Moderating effects on main relationships. As defined earlier, CEO procedural fairness refers to the extent to which a CEO takes into account the concerns of all team members while making decisions (Cremer & Knippenberg, 2002). CEO procedural fairness is predicted to enhance the positive relationship between informational diversity and cognitive conflict. A high level of CEO procedural fairness is able to foster mutual trust and respect among top managers and advance their commitment to their jobs, which in turn encourages team members to actively fulfill their role requirements - participation in decision making (Colquitt et al., 2002). Therefore, when a high level of CEO procedural fairness is present, members in a TMT with diverse knowledge bases and experiences are more likely to voice opinions from their own unique perspectives in order to fulfill their responsibility of making strategic decisions (Colquitt et al., 2002). As a result, the effects of TMT informational diversity on cognitive conflict will be further enhanced. However, when CEO procedural fairness is low, TMT members are likely to perceive distrust, disregard, and even threats from the CEO and other core members. In such a situation, top managers would rather not raise their own unique perspectives derived from their informational backgrounds, because of the fear of what might be misunderstood to be personal attacks by the CEO and other powerful members

(Finkelstein & Hambrick, 1996). Consequently, even a TMT with a high level of informational diversity may experience a very low level of or little cognitive conflict. Therefore, I infer the following:

Hypothesis 3. CEO procedural fairness enhances the positive effects of TMT informational diversity on TMT cognitive conflict.

CEO procedural fairness is predicted to negatively moderate the effects of power centralization on cognitive conflict, because it is able to encourage those top managers with a lower level of power to get involved in decision debates as actively as those with a higher level of power (Colquitt et al., 2001; Tyler & Lind, 1992). As I have argued above, in a TMT with a high level of power centralization, cognitive conflict is less likely to appear (Finkelstein & Hambrick, 1996). This is because those top managers with a relatively lower level of power feel reluctant to voice their distinct opinions since their viewpoints, even when raised, will not be given as much weight as those who are more influential and powerful (Finkelstein & Hambrick, 1996). Additionally, their distinct opinions, if perceived as threats by others (i.e., the CEO), will consign them to more disadvantageous situations (Daily & Dalton, 1994). However, when a high level of CEO procedural fairness is present, the opinions of the members with a lower level of power are also likely to be taken by the CEO into appropriate consideration for strategy formulation. In addition, the norm of trust and mutual respect among top managers associated with a high level of CEO procedural fairness will diminish the misattribution effects during decision debates, which in turn encourages those TMT members with a lower level of power to raise their viewpoints (Colquitt et al., 2001; Kernan & Hanges,

2002). As a result, team members are more likely to get involved in task-related discussion. Since a TMT with a high level of power centralization is likely to experience more cognitive conflict when a high level of CEO procedural fairness is available than otherwise, I infer the following:

Hypothesis 4a. CEO procedural fairness weakens the negative effects of power centralization on TMT cognitive conflict.

CEO procedural fairness may further strengthen the negative effects of power centralization on affective conflict. As predicted, power centralization is negatively related to affective conflict, because the latter is less likely to surface when there is little competition for privileged status among top executives that is associated with a high level of power centralization. In a TMT wherein a high level of CEO procedural fairness is present, power centralization is likely to be more negatively associated with affective conflict, because the trust norm derived from CEO procedural fairness further diminishes the possibility of political interference among top executives (Colquitt et al., 2002; Tyler & Lind, 1992).

Hypothesis 4b. CEO procedural fairness enhances the negative effects of power centralization on TMT affective conflict.

Moderating effects on the cognitive conflict-affective conflict relationship. As noted before, cognitive conflict and affective conflict are highly coupled primarily because of misattribution effects. For example, some may attribute others' critique of their opinions, or the harsh language associated with the critique, as personal attacks. As

a result, task-related debates lead to the emergence of affective conflict. Affective conflict may contribute to the development of cognitive conflict as well. Individuals who dislike some members of the team may have a greater propensity to openly dispute the ideas of those other members (Pelled et al., 1999). CEO procedural fairness is able to decouple these two types of conflict through the following two mechanisms. First, procedural fairness facilitates cooperation and opinion exchange among team members (Cremer & Knippenberg, 2002), which enhances mutual trust and understanding, and, therefore, may prevent misattribution effects. Additionally, procedural fairness has a beneficial effect on team members' attitudinal interaction (Tyler & Lind, 1992). With a fair procedure available, members and their opinions are more likely to be treated by others with respect and courtesy. As a result, cognitive conflict is less likely to lead to affective conflict. Therefore, I infer the following:

Hypothesis 5. When the level of CEO procedural fairness is higher, TMT cognitive conflict is less likely to be associated with TMT affective conflict.

The Relationship between TMT Conflict and Firm Performance

TMT cognitive conflict is predicted to have a curvilinear (inverted-U shape) relationship with firm performance. A relatively high level of cognitive conflict among top managers is able to enhance decision making quality and therefore firm outcomes by stimulating different perspectives and promoting critical examination of the decision making criteria (Amason, 1996; Bantel & Jackson, 1989; Dooley & Fryxell, 1999). However, when cognitive conflict goes toward an extreme end, firm performance may start to decline because of at least two plausible reasons. First, an extremely high level of

variety of information inputs going into the TMT decision making process challenges top managers' capability to interpret, digest, and finally integrate them into a well-accepted decision in a timely manner (Haleblian & Finkelstein, 1993; Tushman & Nadler, 1978). This will hurt firm performance particularly for the firms in high-technology industries wherein a rapid response to environmental changes is indispensable for firm survival (Eisenhardt & Bourgeois, 1988). More importantly, an extremely high level of cognitive conflict may impair TMT members' affective acceptance of strategic decisions, and therefore the effectiveness of strategic implementation (Amason, 1996; Jehn et al., 1997; Jehn et al., 1999). Eventually, firm performance declines. I infer the following:

Hypothesis 6a. TMT cognitive conflict has a curvilinear (inverted-U shape) relationship with firm performance.

Consistent with the literature, affective conflict is predicted to be negatively related to firm performance. Because affective conflict disturbs effective information exchange among top managers, it therefore slows down the TMT decision making process, reduces the quality of decisions, and limits the affective acceptance of strategic decisions and the effectiveness of strategic implementation (Amason, 1996; Amason & Schweiger, 1997). Therefore, I infer the following:

Hypothesis 6b. TMT affective conflict is negatively related to firm performance.

CHAPTER 4: RESEARCH METHODS

Overview

Two studies were conducted to test the stated hypotheses: an experimental study of 77 project teams with senior business-major undergraduates at a US-based university, and an in-depth field study of 61 TMTs of US-based high-technology firms. I conducted these two studies to enhance the validity of my research. Specifically, internal validity of an experimental design was achieved in the lab study and external validity is improved with a field study. It has been suggested that research profits from the use of a number of research methodologies, each of which may compensate for the weakness of the others (Audia, Locke, & Smith, 2000; Schwenk, 1984). In this case, the experimental study of student-project teams permitted a degree of control of the causal variables that maximize internal validity to an extent that was difficult to achieve in “noisy” real world contexts (Brewer, 2000). The study of high-technology firms, however, provided the naturalism in field procedures, albeit at the potential cost of some internal validity.

Study1: Experimental study - Game Simulation

Game Introduction

A computer-based simulation, the Cellular Industry Business Game (Audia et al., 2000), was employed to conduct the experimental investigation of TMT conflict. This game simulated the evolution process of the cellular industry wherein *Celcom 21* was running against 20 preprogrammed competitors in up to 5 regional markets in competition for market share. Participants played the roles of the top managers of Celcom 21 to make strategic decisions to accomplish their company goal.

The game lasted 8 rounds, each simulating 1 year of competition. During each round of simulation, participants were required to make strategic decisions concerning the following 6 areas of activities: Raising Capital, Advertising, Sales Forces, R&D Investment, Buying Licenses, and Radio Wave Capacity. Within each area, participants were allowed to take various strategic actions. For example, in the sales forces area, they could (1) specify the number of employees as direct sales force as well as the number of dealers, (2) indicate the salary of the direct sales forces and the commission for the dealers as well, and (3) allocate both types of sales forces across markets. A complex set of formulas linking strategic actions to performance consequences are preprogrammed.

Performance feedbacks were provided by the experimenter after each round of operation. In addition, at the end of each round of operation, participants could get access to five different types of information, including (1) general industry information from the Cellular industry association, (2) information concerning the industrial technologies and competitors, (3) information on customers, (4) information from industrial executives who are supportive of the TMT's strategic decisions in the past, and (5) information from industrial executives who have questioned the TMT's strategic decisions in the past.

Design and Participants

A total of 308 senior undergraduate students -150 males and 158 females- from a university located in the eastern coast of the United States who were taking a core strategic course-Strategic Management: Globalization and Competition were selected to participate in this study. Extra class credits for all participants and monetary reward for

game winners were offered to motivate students to participate in the game and to take it as seriously as in a real business world (see Appendix A for details).

The strategic course was designed to educate graduating business students with the most recently-developed knowledge, theories and models in the field of strategic management and to help them well prepared for the management challenges in their forthcoming careers. Throughout the whole course, over 10 strategic decision making related real business cases were studied to improve students' analytical skills and their understandings of strategic decision making. Since the lab study was conducted two weeks ahead of the conclusion of the entire semester, it was reasonable to expect that the participants had had a good understanding of the executive roles by the time point they participated in the game simulation.

Students were grouped into four categories by their majors: General Management or International Management (70), Information Systems or Engineering (63), Finance or Accounting (95), and Marketing (80). I assigned them into 77 teams with four students in each by randomly picking one from each of the four categories. The students in each team played the role of a Chief Executive Officer (CEO), a Chief Technology Officer (CTO), a Chief Finance Officer (CFO), and a Chief Marketing Officer (CMO), respectively. I tried to match the participants' majors with the roles they were to play. For example, a student with a general management or international management major was assigned as a CEO, and a student with finance or accounting major was assigned as a CFO. However, since the number of participants in the four categories was not equal to each other, I assigned finance or accounting-major participants to play the role of CEO, and finance, accounting, or marketing-major participants to play the role of CTO, after

the subjects in the general management or international management category and information systems or engineering category were used up. As a result, there were 14 teams that had at least one role-major mismatch among the four members. An independent samples t-test for the equality of means was used to compare those 14 teams with the other 63 teams. The results showed no significant difference in terms of the level of conflict and market share.

To prepare participants for their roles, before the game started, each member was given a one-page memo (see Appendix A) that described the background information of the Cellular industry, the strategic goal of Cellcom21 in the next 8 years, and the procedures that the participants needed to follow to play the game. The game coordinator explained the memo and demonstrated one round of game operation to the participants as well. Then, each team started to practice two rounds of game operation to get familiar with the designated areas of activities. After the game practice session was finished and right before the game formally started, participants were given another one-page instruction sheet that described the teamwork policy, recommended strategic actions, the decision making procedure, and the team power structure (see Appendix B). While the participants were told that the game was going to last 10 rounds, the experimenter interrupted it right after the 8th round was finished to prevent endgame effects.

Participants completed a survey during the game process. The first part of the survey that asked about participants' background information was filled out before the game started. The rest of the survey with scaled items for conflict measures and manipulation check was filled out right after the entire game ended.

Treatment

This study employed a $2 \times 2 \times 2$ design with two levels of informational diversity (high informational diversity and low informational diversity), two levels of power centralization (high power centralization and low power centralization), and two levels of CEO procedural fairness (high fairness and low fairness).

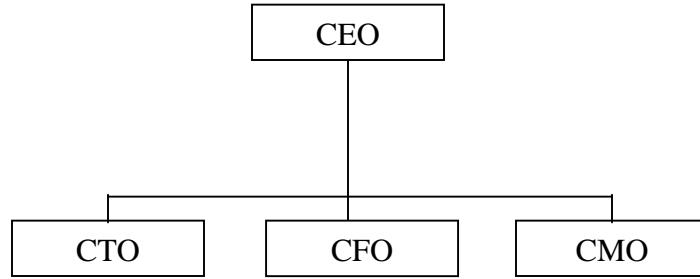
Informational Diversity

For a high level of informational diversity, each of the four members in a team was provided with an alternative strategy on the instruction sheet that highlights his/her functional expertise. Each alternative strategy consisted of suggested strategic actions on three areas of activities among the following: *raising capital, advertising, sales forces, R&D investment, buying licenses, and radio wave capacity* (see Appendix B for alternative strategies). The instruction sheet also said that the suggested strategic actions had been proven effective, and therefore he/she should persuade his/her team to pursue those strategic actions, otherwise, the performance of his/her team might suffer.

For a low level of informational diversity, the content of all the four alternative strategies was provided to all team members (see Appendix C). Other than that, the instructions were the same as those for a high level of information diversity.

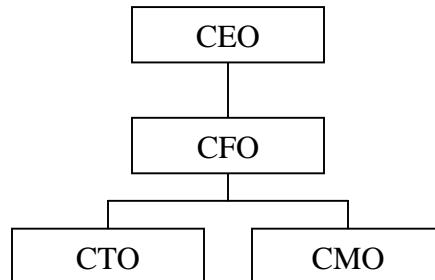
Power Centralization

Two different scenarios indicating two different levels of power centralization were provided to all team members in a team on the one-page instruction sheet. For a high level of power centralization, the scenario said, “The decision making power structure of your TMT is shown in the figure below:



In terms of the decision making structure, the CEO is authorized with the power to finalize the strategic decisions in your team. All the other members are of equal status and power, but all are also far below the CEO in decision making power.”

For a low level of power centralization, the scenario was as follows: “The decision making power structure of your TMT is shown in the figure below:



The CEO is authorized to finalize strategic decisions in your team. The next most powerful individual in the team in terms of decision making influence is the CFO. The CTO and CMO are of equal status and power, but both are also below the CFO in decision making power.”

To further strengthen the power centralization manipulation, in addition to the scenarios, title cards with different sizes were used to highlight the level of power for each member and the specific role each member played. The cards sit right in front of each team member, visible to the entire team. The size of the cards varied according to

the actual level of power a team member had been assigned in the scenario. For example, in the case of a high level of power centralization, the title card for the CEO was the biggest among all in terms of size, the CFO's was a little smaller than the CEO's, and those for the other two members were a little smaller than the CFO's, but equal to each other. In the case of a low level of power, the card for the CEO was significantly bigger than those for other members which were equal to each other. Finally, the size of the cards for the CEO, CTO, and CMO was the same cross teams with different power structures.

CEO Procedural fairness

To manipulate CEO procedural fairness, two different scenarios that described how one should fulfill the responsibility of the CEO in finalizing strategic decisions were described on the one-page instruction sheet and provided to the CEO players. For a high level of fairness, the scenario was as follows: "As the CEO, you are responsible for finalizing your team's strategic decisions. In a TMT (top management team), individuals from different functional backgrounds may approach the same strategic issue with different perspectives. For instance, as to how to allocate limited financial resources to enhance a company's financial performance, a Chief Marketing Officer (CMO) is more likely to highlight the importance of such marketing activities as advertising and would suggest investing more in marketing activities, while a Chief Technology Officer (CTO) may emphasize the criticality of R&D and therefore suggest more investment into the R&D area. While top executives' opinions are likely to be different and even contradictory, the best decisions occur when everyone has a chance to express their position and the team works to integrate the various perspectives of different team

members. Therefore, you are strongly encouraged to (1) provide all team members equal opportunities for contributing to strategic decisions, (2) make sure that all team members' concerns are given appropriate consideration, (3) provide all team members with equal opportunities to support, challenge and refute your viewpoints, (4) clarify decisions when requested by any team members, and (5) listen to every member's concerns before making decisions. In fact, the other TMT members will be evaluating your performance as the CEO in doing these five things."

For a low level of fairness, the scenario said, "As the CEO, you are responsible for finalizing your team's strategic decisions. In a TMT (top management team), individuals from different functional backgrounds may approach the same strategic issue with different perspectives. For instance, as to how to allocate limited financial resources to increase a high-technology company's financial performance, a Chief Marketing Officer (CMO) is more likely to highlight the importance of marketing activities as advertising and would suggest to invest more in marketing activities, but a Chief Technology Officer (CTO) may emphasize the criticality of R&D and therefore would suggest more investment in the R&D area. Due to their specific backgrounds and limited access to other information, their opinions are likely to be biased. Your job as the CEO is to make the best decision possible. Therefore, as the CEO, when it comes to making strategic decisions, you may very well want just to follow your own judgment or rely on one or two team members more than the others. You should NOT concern yourself with addressing all team members' concerns, providing all team members with opportunities to support, challenge, and refute your viewpoints, clarifying decisions when requested by any team members, or even with listening to every member's concerns before making

decisions. Your responsibility is to make the best decisions possible and that is what you will be judged by. In fact, the other TMT members will be evaluating your performance as the CEO in making effective decisions and making this a higher priority than being fair or just.”

Measures

Manipulation checks

As listed in Table 4, five-point Likert-type items ranging from 1, “strongly disagree”, to 5, “strongly agree”, were used to check the effectiveness of the manipulation. Five items were used to check the manipulation validity of informational diversity [$\alpha=0.80$; $ICC(1)=0.22$; $ICC(2)=0.53$]. One example item is, “Information that each member brings to the decision making process is very different.” Three items were used to check the manipulation validity of power centralization [$\alpha=0.75$; $ICC(1)=0.10$; $ICC(2)=0.32$]. One example item is, “In our team, the CFO is a little less powerful than the CEO, but more powerful than the CTO and CMO.” As to CEO procedural fairness [$\alpha=0.90$; $ICC(1)=0.10$; $ICC(2)=0.31$], six items were used, and one example item is, “Our CEO allows each team member to have a real say in how to make decisions over the six areas of activities.” ANOVA analysis revealed that the manipulations for informational diversity [$F(1, 76)=21.40^{**}$], power centralization [$F(1, 76)=2.63^*$], and CEO procedural fairness [$F(1, 76)=4.34^*$] were successful. Manipulation check data were provided by all team members through the surveys.

Table 4: Manipulation Checks

Informational Diversity
<ol style="list-style-type: none"> 1. Information that each member brings to the decision making process is very different 2. Members tend to provide very different information even about the same area of activities 3. Different members focus on different areas of activities instead of all, in making strategic decisions 4. Members approach the decisions over the six areas of activities from different perspectives 5. Different member brings different types of information to the discussion table
Power Centralization
<ol style="list-style-type: none"> 1. Except the CEO, all the other members have a similarly low level of power in making decisions 2. The CFO is a little less powerful than the CEO, but more powerful than the CTO and CMO (reverse coded) 3. Our CEO is significantly more powerful than all the other members
CEO Procedural Fairness
<ol style="list-style-type: none"> 1. Our CEO allows each team member to have a real say in how to make decisions over the six areas of activities 2. Our CEO provides all team members equal opportunities for contributing to the final decisions 3. Our CEO makes sure that all team members' concerns are given appropriate consideration 4. Our CEO clarifies decisions and provides additional information when requested by any team members 5. Our CEO provides all team members with equal opportunities to support, challenge and refute his/her viewpoints 6. Our CEO listens to every team member' concerns before making decisions

Dependent variables

Conflict. Consistent with the literature (Amason, 1996; Jehn, 1995), conflict was measured by five-point Likert-type items ranging from 1, “strongly disagree”, to 5, “strongly agree”, respectively (see Table 5). I slightly revised the 6 items adopted from the conflict literature to match them with the game simulation context. Confirmatory factor analysis, as showed in Table 6, further identified three items for TMT cognitive conflict [$\alpha=0.84$; ICC(1)=0.20; ICC(2)=0.50)], and another three for TMT affective conflict [$\alpha=0.80$; ICC(1)=0.14; ICC(2)=0.39)]. Example items for cognitive conflict include, “In our team, there are often disagreements about the content of the decision the team has to work through,” and, “In our team, people often have conflicting opinions

about the decisions the team is working on.” Example items for affective conflict are, “In our team, team members may get angry at each other,” and, “In our team, people tend to take the arguments in the team personally.” Conflict data were provided by all team members through the surveys.

Table 5: Five-point Likert-type Items Used to Measure Conflict

Cognitive Conflict
1. In our team, there are often disagreements about what decisions to make regarding the same areas of activities
2. In our team, there are often disagreements about what areas of activities the team should concentrate on
3. In our team, people often have conflicting opinions about the content of the decisions the team is working on
Affective Conflict
1. In our team, team members may get angry at each other
2. There is little emotional conflict between team members while making task decisions (reverse coded)
3. In our team, team members tend to take the arguments in the team personally

Table 6: Factor Analysis of Conflict Variables
Using Principal Components Analysis with Varimax Rotation

Variable	Factor 1	Factor 2
Affective conflict 1		0.61862
Affective conflict 2		0.69123
Affective conflict 3		0.60678
Cognitive conflict 1	0.85091	
Cognitive conflict 2	0.87908	
Cognitive conflict 3	0.82913	

Firm performance. Firm performance was measured by market share (%). The data concerning market share was provided by the game at the end of the simulation. Market share is the preprogrammed goal for the cellular business game. A complicated set of formula that relates the six areas of strategic activities with market share has been preprogrammed into the game (Audia et al., 2000). In addition, market share was highly correlated to firm financial performance ($r=0.75$).

Independent Variables

Informational diversity. The experimental treatment for informational diversity as explained before consisted of two levels: one high, and another one, low. These two levels of informational diversity were coded as “1 = a low level of informational diversity”, and, “2 = a high level of informational diversity”.

Power centralization. The experimental treatment for power centralization consisted of two levels: one high, and another one, low. These two levels of power centralization were coded as, “1 = a low level of power centralization”, and, “2 = a high level of power centralization”.

Moderator

CEO procedural fairness. The experimental treatment for CEO procedural fairness as explained before consisted of two levels: one high, and another one, low. These two levels of procedural fairness were coded as “1 = a low level of CEO procedural fairness”, and, “2 = a high level of CEO procedural fairness”.

Study 2: Field Study

Sample and Research Procedures

The target sample for the field study was TMTs in high-technology firms located in two geographic regions – the Baltimore-Washington, D.C. area, and the Philadelphia. This field study was conducted as part of a larger research funded by the National Science Foundation and involved four Ph.D. students and two faculty members at the University of Maryland and one faculty member at Stanford University.

The sample firms were identified based on two criteria. First, because I was collecting data through structured interviews with CEOs, all firms had to be headquartered locally or within driving distance. Second, I was interested in TMT conflict in high-technology industries; therefore, I sampled on a set of high-technology firms. Following Milkovich (1987), I defined high-technology firms as companies that are in industries characterized by an emphasis on innovation, products with short life-cycles, workforces comprised of a large percentage of scientists and engineers, and a need to re-invest a large percentage of revenues in R&D.

A list of 358 high-technology companies meeting these two criteria was identified through Hoovers' Online service. This online service provides company profiles, including such information as the core business of the firm, the names of top managers, and the contact address. Of these 358 firms, 32 companies were excluded because they had either been acquired or the CEO was not located in the geographical area.

I followed a multi-step approach to obtain access to data from each organization. First, I sent a package to the CEO outlining the study and including an introduction letter to solicit participation (see Appendix D), and an endorsement letter from the Dean of the

R.H. Smith School of Business at the University of Maryland (See Appendix E). Second, approximately one week after the package was sent out, I telephoned each CEO to schedule an on-site interview, during which I gained his/her support for the research, obtained a list of other members of the TMT, and collected data for firm performance, specifically, new product innovation (see Appendix F&G). Finally, I distributed surveys to all of the TMT members, including the CEO.

Out of 327 companies, 92 CEO agreed to be interviewed, a participation rate of 28.1%. Only 61 companies out of 92 submitted at least 1 TMT survey along with the CEO survey, while all CEOs interviewed agreed to complete the survey. The response rate was 66% and the average number of top managers completing the survey from these firms was 3.44, including the CEO. An independent samples t-test for the equality of means was used to compare the 61 completed companies and the 31 incomplete companies. The results showed no significant difference in terms of the number of employees, net sales, total assets, or size of the TMTs.

Research Instruments

CEO Interview

The main purpose of the CEO interview was to obtain participation and collect firm performance data - new product innovation - in this study. The CEO interview was also important for identifying other TMT members, including the CEO, to survey. 92 interviews were performed.

Surveys

Both the CEO and other TMT members identified by the CEO were asked to complete a survey, which included background items, such as tenure, education background, and functional background (see Appendix H), to measure informational diversity and scaled items to measure conflict. In addition, the TMT survey included the scaled items to capture CEO procedural fairness and TMT power centralization. As mentioned earlier, out of 92 interviews that were performed, 61 firms (66%) participated in the study.

Measures

Dependent Variables

Firm performance. Firm performance was measured by new product innovation. The data were provided by the CEOs during the structured interview. Consistent with the literature (e.g., Damanpour, 1991; Smith et al., 2005), I measured product innovation by counting the number of new products introduced by that particular firm in the most recent year (e.g., Damanpour, 1991; Smith et al., 2005). Construct validity for this measurement was further confirmed by a high correlation coefficient between the number of new product introductions and the number of scientists working in the R&D department ($r=0.38$, $p<0.01$)

I used product innovation as the outcome variable for the field study based on the following two reasons. First, innovation is the natural outcome for high-technology firms (Damanbour, 1991). High-technology firms are embedded in industries characterized by an emphasis on innovation, products with short life-cycles, workforces comprised of a large percentage of scientists and engineers, and a need to re-invest a large percentage of

revenues in R&D (Milkovich, 1987). Continuous product innovation is the primary way for high-tech firms to maintain their competitive advantage and even survival (Waldman & Jensen, 2003).

Second, a decision making process characterized by a large variety of opinions and conflicting viewpoints is likely to end up with creative ideas and decisions, which can be transferred into innovation. For instance, De Dreu and West's (2001) study on a set of cross-functional teams revealed that team dissent was positively related to team innovation. Lovelace et al. (2001) also found that cognitive conflict was able to enhance the innovativeness for cross-functional new product teams. Considering the context differences between general work teams and TMTs as argued earlier, the relationship between TMT conflict and firm innovation deserves an empirical examination.

Conflict. Like in the lab study, conflict was measured by five-point Likert-type items ranging from 1, “strongly disagree”, to 5, “strongly agree”, respectively. To enhance the scale reliability, seven instead of six items adopted from the literature were used to measure conflict in this field study (see Table 7). Confirmatory factor analysis, as showed in Table 8, further identified three items for cognitive conflict [$\alpha=0.82$; ICC(1)=0.14; ICC(2)=0.40], and another four for affective conflict [$\alpha=0.67$; ICC(1)=0.17; ICC(2)=0.46]. One example item for cognitive conflict is, “In our team, there are often disagreements about the content of the decision the team has to work through.” One example item for affective conflict is, “In our team, team members may get angry at each other.” Conflict data were provided by the CEO and TMT members through the surveys.

Table 7: Five-point Likert-type Items Used to Measure Conflict

Cognitive Conflict	
1.	There is often a lot of disagreement about the content of the decision the team has to work through
2.	There are often disagreements about the decisions involving the task the team is working on
3.	People often have conflicting opinions about the decisions the team is working on
Affective Conflict	
1.	Members very often get angry at each other
2.	There is little emotional conflict between team members while making task decisions (reverse coded)
3.	People tend to take the arguments in the team personally
4.	Arguments between team members are highly task-related, not personally motivated (reverse coded)

Table 8: Factor Analysis of Conflict Variables
Using Principal Components Analysis with Varimax Rotation

Variable	Factor 1	Factor 2
Affective conflict 1		0.52099
Affective conflict 2		0.67851
Affective conflict 3		0.54685
Affective conflict 4		0.82294
cognitive conflict 1	0.80942	
cognitive conflict 2	0.81734	
cognitive conflict 3	0.83987	

Independent Variables

TMT informational diversity. As defined earlier, informational diversity refers to the diverse knowledge base and experiences of team members that they draw upon in making decisions (Hambrick & Mason, 1984; Jehn et al., 1999). Tenure diversity, educational diversity, and functional background diversity are the three demographic variables that have been well recognized as information-relevant (Finkelstein & Hambrick, 1996; Smith et al., 1994), and have been used as the proxy to capture team informational diversity in the literature (Jehn et al., 1999). In line with the literature, I measured TMT informational diversity with the mean of the standardized scores of TMT

company tenure diversity, TMT educational diversity, and TMT functional background diversity. Below is the specific measure for those three variables.

Tenure refers to the length of time a top manager has been in his/her current position (by year). A coefficient of tenure variation across TMT members in each team was used to measure TMT tenure diversity (Harrison & Klein, forthcoming; Smith et al., 1994).

Educational background was measured by the time length of post-high school education (by year). A coefficient of education variation across TMT members in each team was used to measure TMT educational diversity (Harrison & Klein, forthcoming; Smith et al., 1994).

Each top manager's dominant functional background is defined as the area in which the manager has the most experiences. Drawn on the literature (Michel & Hambrick, 1992), TMT members' functional backgrounds were grouped into six main categories: general management, operations, R&D, marketing & sales, finance & accounting, and other. TMT members were asked to identify the functional category that most closely represented their background in the survey. Functional diversity was measured in terms of Blau's (1977) diversity index: $(1 - \Sigma i^2)$, where "i" is the proportion of the group in the " i^{th} " category. A higher score in this index indicates a greater level of TMT functional diversity. The data of informational diversity were provided by the CEO and other TMT members through the surveys.

Power centralization. As noted, power centralization refers to the extent to which the levels of influences over strategic decisions within a TMT are centered on the CEO or a few core executives instead of evenly distributed among all the TMT members

(Finkelstein, 1992). Power is centralized, if some top executives are much more involved in strategic decision making process than others (Bunderson, 2002). Drawing upon the power literature (Bunderson, 2002; Finkelstein, 1992; Ocasio, 1994; Shen & Cannella, 2002), I asked the top managers (excluding the CEO) in the survey to grade other members' influences over strategic decision making (see Table 9 for the questionnaire). One specific member's influence was measured by the mean of the scores given by all other members. A high score means a high level of influence that a specific member has over strategic decision making. The coefficient of influence variation across all TMT members within a team was used to measure power centralization. A high score means a high level of TMT power centralization.

Table 9: Questionnaire for Power

The following section asks about the influence of top management team members, *including yourself*, on your organization's strategic decision-making. Please *write down* each member's name, and *circle* the number indicating how much influence this person has into the decision making process for strategic decisions that affect this organization.

1 = extremely weak influence 2 = weak influence 3 = moderate influence 4 = strong influence 5 = extremely strong influence

	Extremely Weak Influence	Extremely Strong Influence			
Member's name:	1	2	3	4	5
Member's name:	1	2	3	4	5
Member's name:	1	2	3	4	5
Member's name:	1	2	3	4	5
Member's name:	1	2	3	4	5

Moderator

CEO procedural fairness. Five five-point Likert –type items (see Table 10) ranging from 1, “strongly disagree”, to 5, “strongly agree”, were used to measure CEO

procedural fairness [$\alpha=0.90$; ICC(1)=0.32; ICC(2)=0.53]. I adapted the items from those Cremer and Knippenberg (2002) employed to capture leader procedural fairness. Example items include, “Our CEO allows each team member to have a real say in how the team carries out its work,” and, “Our CEO provides equal opportunity for contributing to important decisions”

Table 10: Five-point Likert-type Items Used to Measure CEO Procedural Fairness

CEO Procedural Fairness
1. Our CEO allows each team member to have a real say in how the team carries out its work
2. Our CEO makes sure that all team members' concerns are given appropriate consideration
3. Our CEO provides equal opportunity for contributing to important decisions
4. Our CEO provides team members with opportunities to support, challenge and refute his/her viewpoints
5. Our CEO listens to team members' concerns before making decisions

Control Variables

Team size, age diversity, and gender diversity have been observed as being related to team conflict (Amason & Sapienza, 1997; Jehn et al., 1999). Therefore, I controlled for these variables. Team size was measured by the number of team members (including the CEO) identified by the CEO during the interview as being involved in strategic decision making process (Collins & Clark, 2003). The coefficient of age variation across all team members in a TMT was used to measure age diversity. Gender diversity was measured in terms of Blau's (1977) diversity index: $(1 - \sum i^2)$, where “i” is the proportion of team members in the “i”th category. There are two categories: one male, and another one, female. A higher score in this index indicates a greater level of gender diversity. The data for the control variables were collected through the surveys.

R&D investment was also controlled when measuring the effects of conflict on firm product innovation, because as an important input to organizational innovation process, it may impact the innovation outcomes of a firm (Waldman & Jensen, 2003).

CHAPTER 5: RESULTS

Study 1: Experimental Study - Game Simulation

Analytical Procedures

Hierarchical regression and two-way ANOVA analysis were used to test the hypotheses.

Results

The means, standard deviations, and correlations of all the variables in this study were reported in Table 11. A hierarchical multiple regression analysis in which conflict was the dependent variable was used to test Hypothesis 1 to hypothesis 2b. As shown in Table 12 ($\beta = 0.24$, $p < 0.05$), Hypothesis 1 that predicted that TMT informational diversity is positively related to TMT cognitive conflict was supported. Hypothesis 2a predicted that power centralization is negatively related to TMT cognitive conflict. Table 12 ($\beta = -0.20$, $p < 0.10$) showed partial support for this hypothesis. Hypothesis 2b predicted that power centralization is negatively related to TMT affective conflict. As indicated in Table 12, such a relationship is non-significant. Therefore, Hypothesis 2b was not supported.

Table 11: Correlation Matrix

Variables	Mean	s.d.	1	2	3	4	5
1. Informational diversity	0.45	0.50					
2. Power centralization	0.49	0.50	-0.09				
3. CEO procedural fairness	0.51	0.50	0.07	0.11			
4. Cognitive conflict	11.85	2.34	0.27*	-0.29*	-0.09		
5. Affective conflict	5.29	1.17	0.08	-0.09	-0.50**	0.28*	
6. Market share	12.23	7.67	-0.06	0.02	0.03	-0.20+	-0.29*

Note: N=77; + = $P < 0.1$; * = $P < 0.05$; ** = $P < 0.01$

Scale constructs were measured by the sum of the score of each item

Table 12: Results of Hierarchical Regression Analysis for the Effects of Conflict Antecedents on Conflict

Independent Variables	Cognitive Conflict	Affective Conflict
Power centralization	-0.20+	-0.08
Informational diversity	0.24*	0.08
R ²	0.11*	0.01
F	4.36*	0.49

Note:+ = P<0.1; * = P<0.05; ** = P<0.01

A two-way ANOVA was used to test Hypothesis 3, 4a and 4b. Hypothesis 3 predicted that CEO procedural fairness enhances the positive effects of TMT informational diversity on TMT cognitive conflict. The significant interaction effect [F (1, 73) = 7.93, p<0.01] and Figure 2 that portrayed such effect revealed support for Hypothesis 3. Specifically, TMT informational diversity was more likely to result in a higher level of cognitive conflict, when the level of CEO procedural fairness was high. In contrast, with a lower level of CEO procedural fairness, TMT informational diversity was less positively related to cognitive conflict. Hypothesis 4a predicated that CEO procedural fairness weakens the negative effects of power centralization on TMT cognitive conflict. This hypothesis was not supported, since two-way ANOVA analysis showed no significant interaction effects. Hypothesis 4b predicted that CEO procedural fairness enhances the negative effects of power centralization on TMT affective conflict. Since no significant direct effects of power centralization on affective conflict was found, Hypothesis 4b did not stand.

To test Hypothesis 5, which predicted that when a high level of CEO procedural fairness is present, TMT cognitive conflict is less positively associated with TMT affective conflict, a hierarchical moderated multiple regression analysis was conducted. Model 2 of Table 13 ($\beta = 0.28$, $p<0.05$) indicated that cognitive conflict was positively

related to affective conflict. Furthermore, model 4 of Table 13 ($\beta = -0.29$, $p < 0.05$) and Figure 3 both showed significant negative moderating effects of CEO procedural fairness on the conflict relationship, therefore supporting Hypothesis 5.

Figure 2: The Moderating Effects of CEO Fairness on the Relationship between Informational Diversity and Cognitive Conflict in the Lab Study

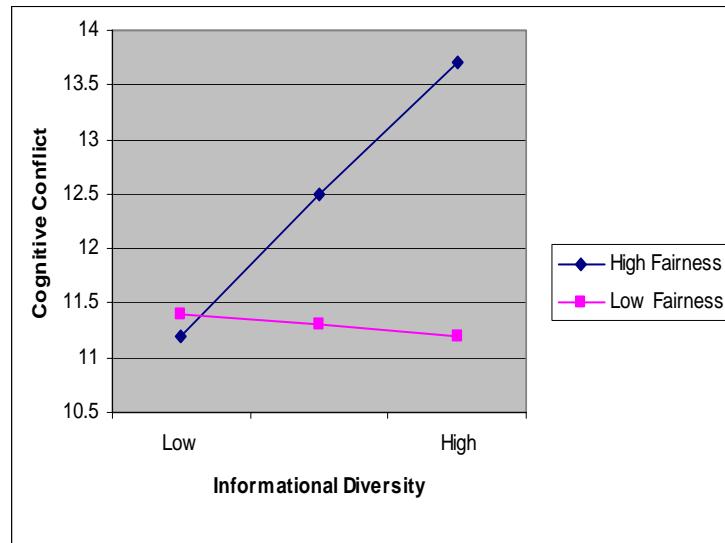


Figure 3: The Moderating Effects of CEO Fairness on the Relationship between Cognitive Conflict and Affective Conflict in the Lab Study

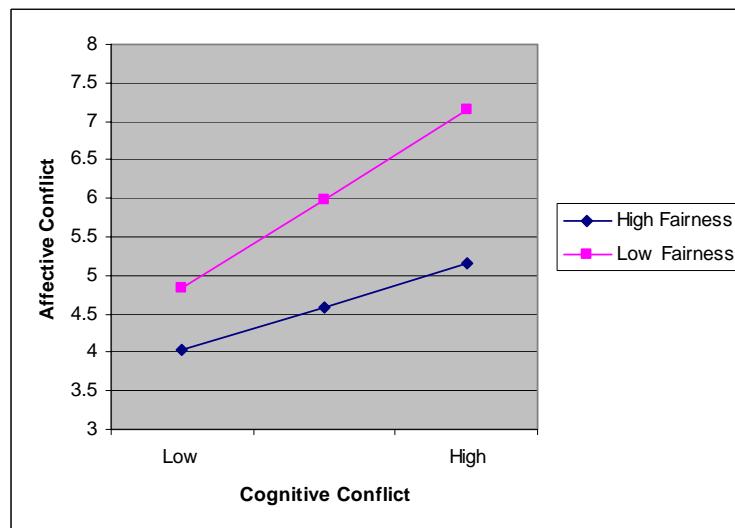


Table 13: Results of Hierarchical Regression Analysis for the Relationship between Cognitive Conflict and Affective Conflict

Independent Variables	Model 1	Model 2	Model 3	Model 4
Step1: Control variables				
Power centralization	-0.08	0.00	-0.01	0.01
Informational diversity	0.08	0.00	0.05	0.05
<i>R</i> ²	0.01			
<i>F</i>	0.49			
Step2: Main effects				
Cognitive Conflict		0.28*	0.22*	0.42**
<i>R</i> ²		0.08		
<i>R</i> ² change		0.07*		
<i>F</i>		2.10*		
<i>F</i> change		5.26*		
Step3: Moderator				
CEO procedural fairness			-0.48**	-0.48**
<i>R</i> ²			0.31	
<i>R</i> ² change			0.27**	
<i>F</i>			7.96**	
<i>F</i> change			23.54**	
Step4: Interaction				
CEO fairness X Cognitive conflict				-0.29*
<i>R</i> ²				0.35
<i>R</i> ² change				0.04*
<i>F</i>				7.62**
<i>F</i> change				4.69*

Note:+ = P<0.1; * = P<0.05; ** = P<0.01

Hypothesis 6a and 6b were tested with hierarchical multiple regression models.

Hypothesis 6a predicted that TMT cognitive conflict is curvilinearly (inverted U shape) related to firm performance. As indicated in model 2 of Table 14, neither cognitive conflict nor cognitive conflict squared was significantly related to market share that was used to measure firm performance in this study. Therefore, Hypothesis 6a was not supported. Affective conflict ($\beta = -0.25$, $p < 0.05$), however, was significantly negatively associated with market share, therefore supporting Hypothesis 6b.

Table 14: Results of Hierarchical Regression Analysis for the Effects of Conflict on Market Share

Independent Variables	Model 1	Model 2
Step 1: Control Variables		
Power centralization	0.06	0.03
Informational diversity	0.02	-0.05
<i>R</i> ²	<i>0.00</i>	
<i>F</i>	<i>0.14</i>	
Step 2: Main Effects		
Cognitive conflict		-0.08
Cognitive conflict Squared		-0.11
Affective conflict		-0.25*
<i>R</i> ²	<i>0.11</i>	
<i>R</i> ^{2 change}		<i>0.11+</i>
<i>F</i>		<i>3.52</i>
<i>F change</i>		<i>2.60+</i>

Note:+ = P<0.1; * = P<0.05; ** = P<0.01

Study 2: Field Study

Analytical Procedures

Hierarchical regression models were used to test all the hypotheses.

Results

The means, standard deviations, and correlations of all the variables in the field study were reported in Table 15. I used hierarchical moderated multiple regression models in which conflict was the dependent variable to test Hypothesis 1 to Hypothesis 4b. As shown in Table 16 and Table 17, control variables including team size, age diversity, and gender diversity were entered in the first step. Informational diversity and power centralization were entered in the second step to test their main effects on conflict. I entered the moderator variable, CEO procedural fairness, in the third step and the interaction terms in the fourth step to test the moderating hypotheses. I then plotted each interaction to examine the form of the moderated relationships.

Table 15: Correlation Matrix

Variables	Mean	s.d.	1	2	3	4	5	6	7	8	9
1. R&D investment	14.32	13.05									
2. Team size	3.44	1.15	-0.06								
3. Age diversity	0.14	0.08	-0.29*	0.14							
4. Gender diversity	0.98	0.13	0.02	0.13	-0.11						
5. Power centralization	0.85	0.07	0.08	-0.06	-0.03	0.15					
6. Informational diversity	-0.08	1.71	-0.01	-0.11	0.00	0.08	-0.11				
7. CEO fairness	19.81	7.20	0.17	-0.08	0.13	0.09	0.24+	0.1			
8. Cognitive conflict	8.79	1.71	0.01	0.09	-0.01	0.02	-0.37**	0.37**	-0.22+		
9. Affective conflict	10.36	1.92	0.06	0.15	0.22+	-0.08	-0.32**	0.47**	0.04	0.68**	
10. Innovation (ln)	1.78	1.22	0.06	-0.03	0.19	0.02	-0.08	-0.02	0.06	-0.09	-0.16

Note: N=61; + = P<0.1; * = P<0.05; ** = P<0.01

Scale constructs were measured by the sum of the score of each item

Table 16: Results of Hierarchical Regression Analysis for the Effects of Conflict Antecedents on Cognitive Conflict

Independent Variables	Model 1	Model 2	Model 3	Model 4
Step1: Control variables				
Team size	0.02	0.05	0.04	0.09
Age diversity	-0.01	-0.02	-0.01	-0.01
Gender diversity	0.03	0.05	0.06	0.07
R^2	0.00			
F	0.05			
Step2: Main effects				
Power centralization		-0.31**	-0.26*	-0.20
Informational diversity		0.34**	0.36**	0.33*
R^2	0.23			
R^2 change	0.23**			
F	3.23*			
F change	7.99**			
Step3: Moderator				
CEO procedural fairness			-0.18	-0.2
R^2	0.26			
R^2 change	0.03			
F	3.05*			
F change	1.91			
Step4: Interactions				
CEO fairness X Informational diversity				0.08
CEO fairness X Power centralization				0.23+
R^2	0.31			
R^2 change	0.05			
F	2.79*			
F change	1.76			

Note:+ = P<0.1; * = P<0.05; ** = P<0.01

Table 17: Results of Hierarchical Regression Analysis for the Effects of Conflict Antecedents on Affective Conflict

Independent Variables	Model 1	Model 2	Model 3	Model 4
Step1: Control variables				
Team size	0.11	0.17	0.18	0.20
Age diversity	0.20	0.19	0.17	0.17
Gender diversity	-0.07	-0.09	-0.09	-0.09
<i>R</i> ²	0.06			
<i>F</i>	1.24			
Step2: Main effects				
Power centralization		-0.22+	-2.44*	-0.21+
Informational diversity		0.47**	0.46**	0.45**
<i>R</i> ²	0.36			
<i>R</i> ^{2 change}	0.29**			
<i>F</i>	5.84**			
<i>F change</i>	12.01**			
Step3: Moderator				
CEO procedural fairness			0.09	0.00
<i>R</i> ²	0.36			
<i>R</i> ^{2 change}	0.01			
<i>F</i>	4.92*			
<i>F change</i>	0.54			
Step4: Interactions				
CEO fairness X Informational diversity				-0.13
CEO fairness X Power centralization				-0.07
<i>R</i> ²	0.38			
<i>R</i> ^{2 change}	0.02			
<i>F</i>	3.79*			
<i>F change</i>	0.61			

Note:+ = P<0.1; * = P<0.05; ** = P<0.01

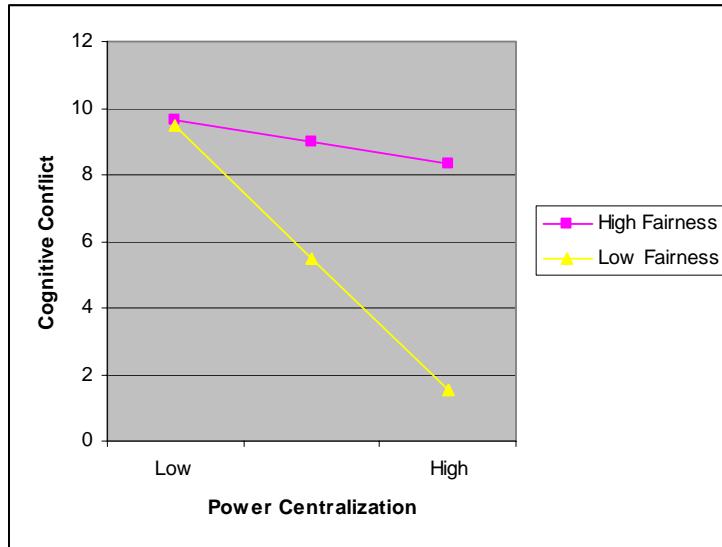
Hypothesis 1 predicted that TMT informational diversity is positively related to TMT cognitive conflict. As indicated in model 2 ($\beta = 0.34$, $p < 0.01$) of Table 16, after taking into account the control variables, informational diversity was positively related to cognitive conflict, thereby supporting hypothesis 1. Surprisingly, against my earlier argument, it was indicated in model 2 ($\beta = -0.47$, $p < 0.01$) of Table 17 that informational diversity was negatively related to TMT affective conflict.

Hypothesis 2a and 2b predicted that power centralization is negatively related to TMT cognitive conflict and affective conflict, respectively. As indicated in model 2 ($\beta = -0.31$, $p < 0.01$) of Table 16, there was support for hypothesis 2a. The negative relationship between power centralization and affective conflict, as shown in model 2 ($\beta = -0.22$, $p < 0.10$) of Table 17, however, was only marginally significant. Hypothesis 2b, therefore, was partially supported.

Hypothesis 3 predicated that CEO procedural fairness enhances the positive effects of TMT informational diversity on cognitive conflict. As indicated in model 4 of Table 16, the effects were non-significant and therefore, Hypothesis 3 was not supported. Hypothesis 4a predicted that CEO procedural fairness weakens the negative effects of power centralization on TMT cognitive conflict. As shown in model 4 ($\beta = 0.23$, $p < 0.10$) of Table 16, there was partial support for this hypothesis. The interaction effect was further portrayed in Figure 4. Specifically, when the CEO provided a higher level of procedural fairness, power centralization was less negatively related to cognitive conflict. In contrast, for TMTs whose CEOs did not provide procedural fairness, a greater level of power centralization was highly negatively related to cognitive conflict. Hypothesis 4b, which predicted that CEO procedural fairness enhances the negative effects of power

centralization on TMT affective conflict, was not supported, since the effects, as shown in model 4 of Table 17, were non-significant.

Figure 4: The Moderating Effects of CEO Fairness on the Relationship between Power Centralization and Cognitive Conflict in the Field Study



Like Hypothesis 3, 4a and 4b, Hypothesis 5 was tested with a hierarchical moderated multiple regression analysis in which TMT cognitive conflict is the independent variable, CEO procedural fairness, the moderator, and affective conflict, the dependent variable. As indicated in model 4 of Table 18, there was no support for Hypothesis 5 that predicated that when a high level of CEO procedural fairness is present, TMT cognitive conflict is less likely to be associated with TMT affective conflict.

To test Hypothesis 6a and 6b, a two-step hierarchical multiple regression model wherein product innovation was the dependent variable was conducted. As indicated in model 2 of Table 19, Hypothesis 6a that predicted that TMT cognitive conflict has a curvilinear (inverted-U shape) relationship with firm performance was not supported.

Hypothesis 6b that predicted TMT affective conflict is negatively related to firm performance, however, was partially supported ($\beta = -0.37$, $p < 0.10$).

Table 18: Results of Hierarchical Regression Analysis for the Relationship between Cognitive Conflict and Affective Conflict

Independent Variables	Model 1	Model 2	Model 3	Model 4
Step1: Control variables				
Team size	0.17	0.14	0.15	0.15
Age diversity	0.19	0.20	0.18+	0.18+
Gender diversity	-0.09	-0.11	-0.12	-0.12
Power centralization	-0.22+	-0.06	-0.1	-0.10
Informational diversity	0.47**	0.30**	0.27*	0.27*
R^2	0.36			
F	5.84**			
Step2: Main effects				
Cognitive conflict		0.51**	0.55**	0.55**
R^2		0.56		
R^2 change		0.20**		
F		10.81**		
F change		23.33**		
Step3: Moderator				
CEO procedural fairness			0.18+	0.18+
R^2			0.58	
R^2 change			0.03+	
F			10.21**	
F change			3.48+	
Step4: Interactions				
CEO fairness X Cognitive conflict				0.00
R^2				0.58
R^2 change				0.00
F				8.76**
F change				0.00

Note:+ = $P < 0.1$; * = $P < 0.05$; ** = $P < 0.01$

Table 19: Results of Hierarchical Regression Analysis for the Effects of Conflict on Firm Innovation

Independent Variables	Model 1	Model 2
Step1: Control variables		
R&D investment	0.12	0.22
Team size	-0.06	-0.02
Age diversity	0.23	0.32*
Gender diversity	0.06	0.03
Power centralization	-0.10	-0.18
Informational diversity	-0.04	0.13
<i>R</i> ²	<i>0.06</i>	
<i>F</i>	<i>0.54</i>	
Step2: Main effects		
Cognitive conflict		0.06
Cognitive conflict squared		-0.13
Affective conflict		-0.37+
<i>R</i> ²		<i>0.16</i>
<i>R</i> ^{2 change}		<i>0.10+</i>
<i>F</i>		<i>1.02</i>
<i>F change</i>		<i>1.91+</i>

Note:+ = P<0.1; * = P<0.05; ** = P<0.01

Integrated Analysis of Study 1 and Study 2

In line with the expected benefits of conducting two complimentary studies, one field and one lab, the results from the two studies in this dissertation were either consistent or complimentary to each other, revealing support for the research model of this dissertation. In the following, I compared and integrated the findings in both studies with a focus on the antecedents to conflict, moderating effects of CEO procedural fairness, and conflict outcomes, respectively. Figure 5 shows the hypothesized model; Figure 6 and Figure 7 show models that highlighted significant hypothesized relationships, and Table 20 provides a summary of the research findings from both studies.

Antecedents to Conflict

As indicated in the hypothesized model (See Figure 5), three relationships (H1, H2a, and H2b) were hypothesized to examine the effects of informational diversity and power centralization on cognitive conflict and affective conflict. Hypothesis 1 predicted a positive relationship between informational diversity and cognitive conflict; Hypothesis 2a and 2b, however, predicted a negative relationship between power centralization and cognitive conflict and between power centralization and affective conflict respectively. As summarized in Table 20, Hypothesis 1 and Hypothesis 2a gained support from both the field and the lab study. Hypothesis 2b gained partial support from the field study but no support from the lab study. Unexpectedly, a strong positive relationship between informational diversity and affective conflict was found in the field study, but not in the lab study.

Figure 5: Hypothesized Model

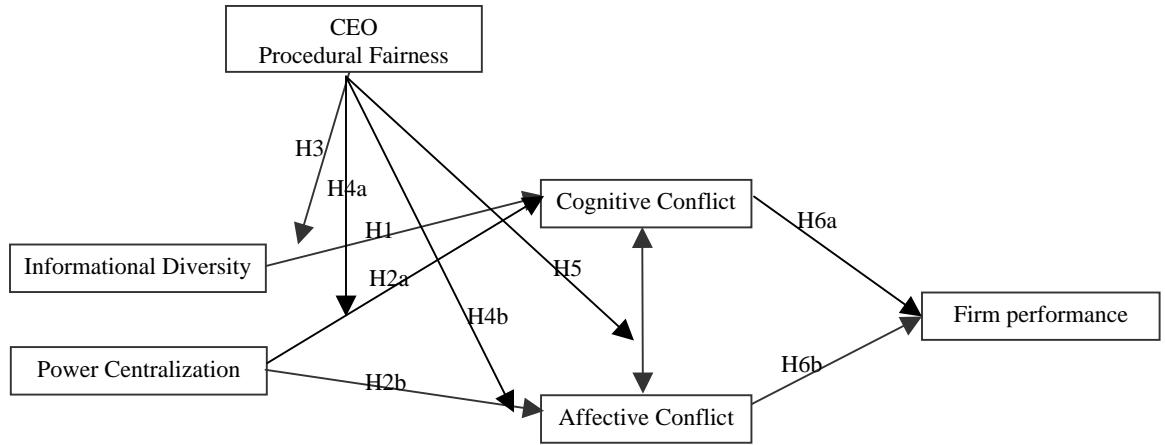


Figure 6: Significant Hypothesized Relationships in the Lab Study*

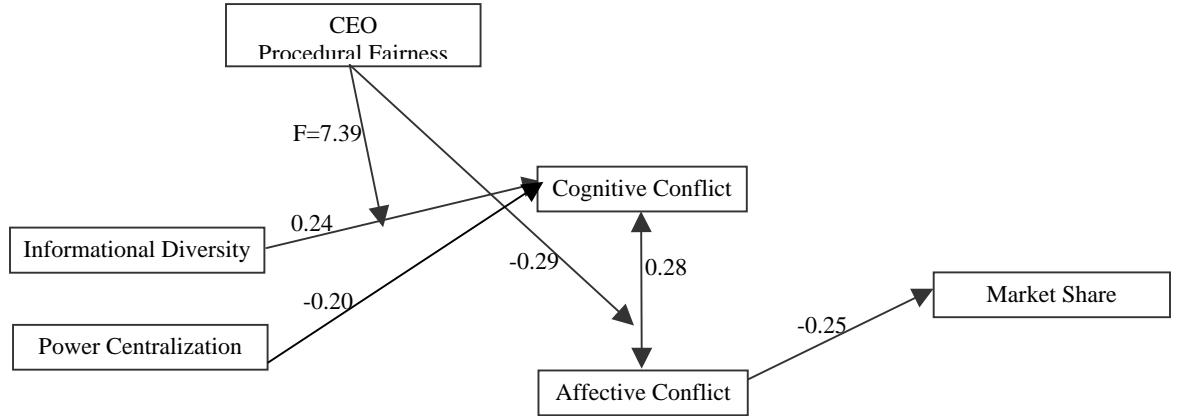
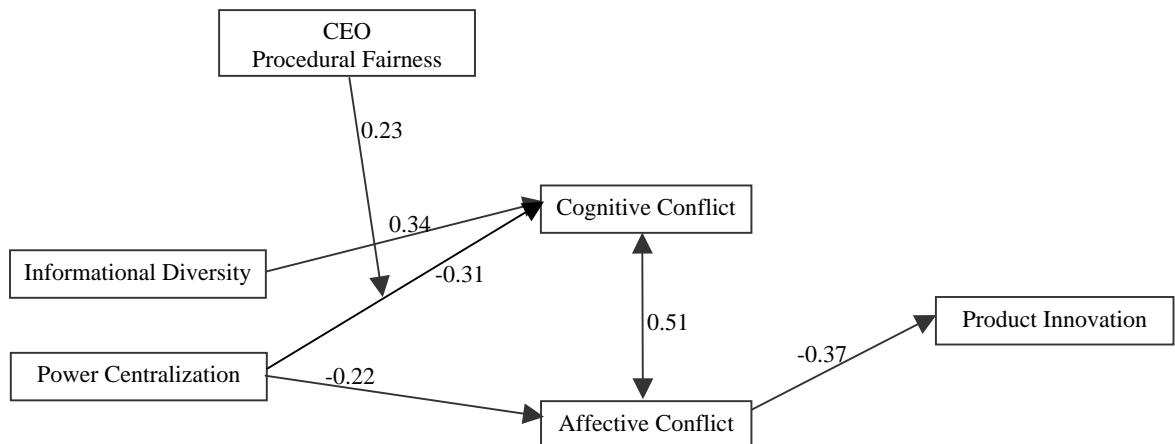


Figure 7: Significant Hypothesized Relationship in the Field Study



* Note: Standardized beta or F score for only those hypothesized relationships that were significant from the regression analyses/ANOVA was reported

Table 20: Finding Summary

Hypothesis	Field Study	Lab Study
H1: Informational diversity is positively related to TMT cognitive conflict	Support	Support
H2a: Power centralization is negatively related to TMT cognitive conflict	Support	Partial Support
H2b: Power centralization is negatively related to TMT affective conflict	Support	No Support
H3: CEO procedural fairness strengthens the relationship of H1	No Support	Support
H4a: CEO procedural fairness weakens the relationship of H2a	Partial Support	No Support
H4b: CEO procedural fairness strengthens the relationship of H2b	No Support	No Support
H5: CEO procedural fairness decouples cognitive conflict from affective conflict	No Support	Support
H6a: TMT cognitive conflict is curvilinearly related to firm performance	No Support	No Support
H6b: TMT affective conflict is negatively related to firm performance	Support	Support

CEO Procedural Fairness as a Moderator

Four relationships (H3, H4a, H4b, and H5) were hypothesized to test the moderating effects of CEO procedural fairness. Hypothesis 3 predicted that CEO procedural fairness enhances the positive effects of informational diversity on cognitive conflict. This relationship was not supported in the field study, but supported in the lab study. Hypothesis 4a predicted that CEO procedural fairness weakens the negative effects of power centralization on cognitive conflict. Partial support was found in the field study, but received no support in the lab study at all. Hypothesis 4b, which predicted that CEO procedural fairness strengthens the negative effects of power centralization on affective conflict, was not supported in either study.

Hypothesis 5 predicted a negative moderating effect of CEO procedural fairness on the positive relationship between both types of conflict. While both studies found a positive relationship between cognitive and affective conflict (See Figure 6&7), only the lab study showed support for the moderating effects of CEO procedural fairness.

Outcomes of Conflict

Two hypotheses (H6a and H6b) were used to test the effects of TMT conflict on firm outcomes. Hypothesis 6a predicted an inverted U shaped curvilinear relationship between conflict and firm outcomes. Neither significant direct nor curvilinear effects of cognitive conflict were found in either study. Hypothesis 6b predicted a negative direct relationship of TMT affective conflict on firm performance. It gained full support in the lab study where market share is the outcome variable and partial support in the field study where product innovation was used to measure firm performance.

CHAPTER 6: DISCUSSION

The purpose of this dissertation was to address three research questions: (1) What are the antecedent conditions that contribute to the development of conflict within TMTs? (2) how can TMTs develop constructive conflict profiles – those that simultaneously have relatively high levels of cognitive conflict but low levels of or little affective conflict? and (3) how does TMT conflict relate to firm performance? Two complementary studies were conducted to enhance both the internal validity and the generalizability of this research: an experimental study of 77 project teams with senior business-major undergraduates at a US-based university, and an in-depth field study of 61 TMTs of US-based high-technology firms. The consistent results from both studies revealed that: (1) TMT informational diversity was positively related to TMT cognitive conflict, however, TMT power centralization was negatively related to TMT cognitive conflict; (2) a TMT with a higher level of CEO procedural fairness was more likely to report a constructive conflict profile; and (3) TMT affective conflict was detrimental to firm performance. In this chapter, I will discuss the contributions of these findings to the literature, research methodology, and managerial practice, and limitation and future research.

Contributions to the Literature

In the following, I will discuss the findings with a focus on the antecedents to conflict, moderating effects of CEO procedural fairness, and conflict outcomes, respectively.

Antecedents to conflict

As indicated in Table 20, hypothesis 1, which predicted a positive relationship between TMT informational diversity and TMT cognitive conflict, was supported in both the field and the lab studies. This finding suggests that the more diverse a TMT is with regards to the top executives' expertise and experiences, the more likely conflicting opinions are raised in the TMT decision making process. Consistent with the results of Jehn et al.'s (1999) work, this finding indicates that the notion that team informational diversity contributes to the development of team cognitive conflict is applicable to organizational upper echelons as well. This finding also provides empirical support to TMT theorists who have suggested that CEOs who wish to create an environment conducive to encouraging constructive debate that can support effective decision making should strive to create a diverse top executive team (Eisenhardt et al., 1997b).

While I argued earlier in the dissertation that informational diversity was unlikely to lead to affective conflict because it did not provide any salient anchor variable on which social categorization effects can take place, the field study revealed significant negative effects. This caused me to reflect on the theory and reexamine the operationalization of informational diversity in the field study.

Categorization effects are the primary mechanism through which a team develops affective conflict (Pelled, 1996a, 1996b). Categorization theory argues that people have a subconscious tendency to sort each other into social categories based upon salient demographic attributes such as age, race, tenure etc. (Tajfel, 1972). Since the information about the environments is abundant, categorization help simplify and make the external environments more predictable and controllable (Pelled et al., 1999; Tajfel, 1972). Once categorization occurs, people strive to develop a positive social identity by showing

favoritism to the members of their own social categories and resentment and discriminations to those in other categories (Tajfel, 1972). As team diversity increases, members from different social categories tend to have more interactions with each other and are likely to encounter with each other's negative stereotypes and self-serving biases (Pelled, 1996a). As a result, affective conflict becomes more pronounced.

Constrained by the difficulty of collecting the data of top executives' knowledge base and experiences directly, I followed the literature to use the mean of team tenure diversity, educational diversity and functional background diversity as the proxy of informational diversity (Jehn et al., 1999). Since tenure, education and functional background are important reference variables often used by top executives to identify and categorize each other (Finkelstein & Hambrick, 1996), they are likely to become the sources for the development of TMT affective conflict.

Hypothesis 2a and hypothesis 2b predicted a negative association of TMT power centralization with TMT cognitive conflict and TMT affective conflict, respectively. Both hypothesis 2a and hypothesis 2b gained support in the field study and hypothesis 2a was partially supported in the lab study. These findings suggest that conflict is less likely to emerge in a TMT where power is disproportionately concentrated on the "core" TMT members compared to in a TMT where power is relatively evenly distributed among all top executives.

There have been two contradictory views in the corporate politics literature regarding how power distributions affect the interaction among top executives. Some scholars argued that when power is centralized with one or a few "core" members, less powerful members are likely to make alliances to seek stronger control for their own

interests during decision making process, and that the emergence of alliances would crystallize as endless fight among different interest parties (e.g., Eisenhardt and Bourgeois, 1988). Others have instead argued that an imbalanced power structure, in other words, a TMT with a high level of power centralization, is less likely to lead to the emergence of conflict. This is because less powerful parties feel reluctant to raise conflicting viewpoints to those of the “core” members since they are afraid that their distinct opinions, if voiced, might be interpreted by the core members as deliberate subversions or personal attacks (Ocasio, 1994; Pfeffer, 1981; Shen & Cannella, 2002). The findings in both the field and the lab study in this research provide strong empirical evidence in support of the second view.

Unexpectedly, no relationship was found between power centralization and affective conflict in the lab study. A plausible explanation may lie in one limitation of the lab study design. That is, while the lab study employed monetary rewards as an incentive to promote participants’ engagement in the task, in post-experimental interviews, some participants indicated that they cared more about being perceived as cooperative and helpful than winning the game and the money by fighting hard to advocate that their opinions be adopted by the team. As evidenced, compared to the mean level of cognitive conflict, the mean level of affective conflict was a lot lower (mean of affective conflict = 5.29; mean of cognitive conflict = 11.85). Future research on conflict in controlled experimental settings may need to employ alternative methods to create variance on affective conflict.

In summary, the above findings regarding the antecedents to conflict suggest that cognitive conflict is likely to emerge in TMTs where top executives have diverse

expertise and experiences, and are highly empowered. These findings contribute to the literature in three ways. First, they contribute to conflict research. Unlike existing conflict research that has been primarily centered on surface-level, static demographic diversity variables such as age diversity and gender diversity (Harrison, Price, Gavin, & Florey, 2002) as the conflict predictors, this research went beyond demographic diversity and attempted to address deeper-level, more dynamic antecedents variables to conflict, including informational diversity and power centralization (Priem et al., 1999). The findings suggest that beyond demographic diversity, informational diversity and power centralization are important predictors to team conflict.

Second, the findings make contributions by beginning to integrate the organization behavior teams literature with the TMT literature. Specifically, this research advanced the examination of a team level construct, conflict, into the upper echelons of organizations. This is important because the task environments and nature of executive teams differ substantially from those of work teams or small groups and therefore the results regarding the same relationships in these two different contexts could be different (Cohen & Bailey, 1997). Indeed, the finding regarding the relationship between informational diversity and cognitive conflict in this work is consistent with that of existing conflict research with a focus on work teams and small groups (e.g., Jehn et al., 1999). This suggests that while TMTs differ from work teams substantially with regards to task environments and composition, it is important and useful for TMT and teams research to draw upon each other for theory development in their own specific field.

Finally, the findings make contributions to TMT decision making research. The associations between TMT characteristics and TMT process variables have been largely

ignored and remained unknown in the literature, which has been a source of ambiguity regarding how TMTs relate to firm performance as considered in the TMT decision making literature (Finkelstein & Hambrick, 1996; Knight et al., 1999; Smith et al., 1994). The findings regarding the relationships of informational diversity and power centralization, TMT characteristics variables, and TMT conflict, a TMT decision making process variable, provide significant insights to addressing the following important research questions: what affects TMT decision making? and how do TMTs affect firm performance?

Moderating effects of CEO procedural fairness

Hypothesis 3, which predicted that CEO procedural fairness would further enhanced the positive effects of TMT informational diversity on TMT cognitive conflict, was supported only in the lab study. This finding perhaps suggests that informational diversity may be more likely to lead to cognitive conflict when the level of CEO procedural fairness is higher (see Figure 2). Figure 2 also indicates an interesting contrast. It suggests that at a high level of informational diversity, TMTs with high CEO procedural fairness experience a higher level of cognitive conflict than those with low CEO procedural fairness. However, when the level of informational diversity is low, TMTs with low CEO procedural fairness report a higher level of cognitive conflict.

These finding supports the notion proposed earlier in this dissertation that top executives' different expertise and experiences are not necessarily reflected on their viewpoints and therefore lead to heterogeneous opinion inputs during the decision making process, unless they have been encouraged to do so. As indicated in Figure 2, the presence or absence of informational diversity has much less pronounced effects on

cognitive conflict, when TMTs experience a low level of CEO procedural fairness.

However, when the level of CEO procedural fairness is high, the effects of informational diversity on cognitive conflict become much stronger.

As a strong believer of the above theory, I attributed the failure of hypothesis 3 in the field study to its limited internal validity (Brewer, 2000). Likely, there were some uncontrolled variables in the field context such as organizational culture, CEO leadership style, CEO conflict management strategy, etc., which may have interfered with the interaction of CEO procedural fairness and informational diversity. For instance, even if the CEO did not aggressively promote procedural fairness within the TMT, if the organization had an open culture which encouraged executives to actively involve in the TMT decision making process (Amason & Sapienza, 1997), the effects of CEO procedural fairness on the relationship between informational diversity and cognitive conflict are likely to have been mitigated. Future study may need to control for organizational culture and other CEO leadership variables when examining the effects of CEO procedural fairness in a field context. To advance our understandings of TMT conflict emergence process and TMT conflict management, it may be also useful to address the moderating effects of organizational culture and other CEO leadership variables on the relationships between informational diversity and cognitive conflict.

Hypothesis 4a, which predicted that CEO procedural fairness would weaken the negative effects of TMT power centralization on TMT cognitive conflict, was partially supported in the field study. It perhaps suggests that power centralization is less negatively related to cognitive conflict when the level of CEO procedural fairness is higher (see Figure 4). Figure 4 also indicates that TMTs at a high level of power

centralization experience a higher level of cognitive conflict when their CEOs are more procedurally fair. However, when the level of power centralization is low, CEO procedural fairness has little or even no effects on cognitive conflict.

These findings supports the notion of motivation and politics theorists that when power is concentrated on the CEO or a few core members, those executives with a relatively lower level of power may feel reluctant to voice their distinct opinions because of the fear of being interpreted by the “core” members as deliberate subversion unless they perceive a high level of procedural fairness (Colquitt et al., 2001; Kernan & Hanges, 2002). As indicated in Figure 4, when the level of CEO procedural fairness is low, power centralization has much stronger negative effects on cognitive conflict. However, when TMTs experience a high level of CEO procedural fairness, the effects of power centralization become much less pronounced.

Unexpectedly, this hypothesis was not supported in the lab study. One plausible reason is that the manipulation of CEO procedural fairness may have actually interfered with that of power centralization ($r=0.11$). For instance, participants who were manipulated to be procedurally fair and powerful at the same time might eventually end up being either extremely nice but indecisive or being autocratic since they did not have experiences to well place themselves in such a sophisticated management position. Indeed, post-game semi-structured interviews with participants revealed their confusion on the complicated manipulations. This observation suggests that future research with students as the subjects need to offer effective pre-experiment training to make sure that they understand the experiments well and are able to effectively act in line with the manipulations.

Hypothesis 4b predicted that CEO procedural fairness would further strengthen the negative effects of TMT power centralization on TMT affective conflict. This hypothesis was not supported in either study. This has caused me to reconsider the logic behind the hypothesis. My original argument was that the norm of trust and respect in a TMT derived from a high level of CEO procedural fairness would further diminish the level of interpersonal clashes among top executives, if there was any, caused by a uneven power distribution. An alternative prediction is that instead of interacting with power centralization, CEO procedural fairness may affect the emergence of affective conflict directly ($r=0.50$ in the lab study; $r=0.04$ in the field study). Affective conflict derives from the disruption of mutual trust and respect among top executives, and can occur when intense debates over the content of strategic decisions are misunderstood as personal attacks (Simons & Peterson, 2000). CEO procedural fairness is able to help rebuild such trust and respect among members (Colquitt et al., 2001), and therefore constrain the emergence of affective conflict. To test this notion, I conducted a hierarchical regression with informational diversity, power centralization, and CEO procedural fairness as independent variables predicting affective conflict. The results showed a significant direct negative effect of CEO procedural fairness on affective conflict in the lab study ($\beta = -0.27$, $p<0.05$).

Hypothesis 5 predicted that CEO procedural fairness would decouple the association of cognitive conflict and affective conflict. This hypothesis gained support in the lab study, suggesting that cognitive conflict is less positively related to affective conflict when the level of CEO procedural fairness is higher (see Figure 3). These findings confirmed the notion in the conflict literature that when there is a low level of or

little trust and respect among team members, cognitive conflict is likely to be coupled with affective conflict because the harsh language and aggressive arguments associated with a high level of cognitive conflict are likely to be interpreted by team members as personal attack or deliberate subversion, or people who dislike each other may deliberately dispute each other's opinions, thus providing a basis for interpersonal incompatibility (Simons & Peterson, 2000). The effective way to decouple these two types of conflict is to rebuild mutual trust and attitudinal harmony among team members, which can be fostered by a high level of CEO procedural fairness (Colquitt et al., 2002).

Surprisingly, this hypothesis failed in the field study. I attribute the failure to uncontrolled CEO leadership variables. Besides CEO procedural fairness, other aspects of CEO leadership such as the CEO's conflict management strategy could also interact with the cognitive conflict-affective conflict relationship, and therefore should have been controlled for. Conflict management strategy refers to the techniques implemented by team members to control or solve conflict (DeChurch & Marks, 2001). A CEO may handle conflict with a strategy of avoidance, accommodation, competition, collaboration, or compromise (Rahim, 1992). Perhaps, CEOs with similar level of procedural fairness may take on different conflict management strategy in interacting with the conflict emergence process. This may lead to the failure of the interaction of CEO procedural fairness on the relationship between cognitive conflict and affective conflict. Future research needs to examine how CEO conflict management strategy and other CEO leadership variables may moderate the association of cognitive conflict and affective conflict.

Overall, the above findings make at least two contributions. First, they contribute to conflict research by answering one of the research questions: How can a TMT establish a constructive conflict profile-a relatively high level of cognitive conflict but a very low level of or little affective conflict? Although more research is needed, the findings suggest that a high level of CEO procedural fairness is likely to further enhance the positive effects of informational diversity and weaken the negative effects of power centralization on cognitive conflict, at the same time, decouple the association between cognitive conflict and affective conflict, and consequently result in a constructive TMT conflict profile.

These findings make contributions to TMT research as well. The focus of traditional TMT research has been placed on TMT characteristics instead of individual difference. As a result, the unique role that CEOs may play in moderating the interaction among TMT members has been largely ignored (Finkelstein & Hambrick, 1996). These findings highlight the importance of taking the unique role of CEO leadership into consideration in addressing TMT decision making process.

Conflict outcomes

Hypothesis 6a predicted that TMT cognitive conflict was curvilinearly (Inverted U shape) related to firm performance. This hypothesis was not supported. Moreover, inconsistent with the literature (e.g., Amason, 1996; Jehn et al., 1999), no linear, positive relationship of cognitive conflict and firm performance was found in either study. One plausible reason for this failure in the field study is that I used the number of new products introduced within the last year before the time point when I collected conflict data to measure innovation. The inconsistent measurement timing for the independent

and dependent variables may account for the failure of this hypothesis in the field study. As to the lab study, the reason may lie in the short gaming period design: 15 minutes for one round of game may not give players enough time to transfer the conflicting opinions into high quality decisions.

The failure of hypothesis 6a in both studies also caused me to reflect on the theory underlying that prediction. While the hypothesis was not supported, I strongly believe that there should be an optimal level of cognitive conflict for a specific TMT in order to enjoy all the benefits associated with a constructive debate without destroying team cohesiveness. The mixed findings in the conflict literature regarding the cognitive conflict-team performance relationship actually provide an indirect support to the above viewpoint (see De dreu & Weingart, 2003 for a review). A more fine-grained longitudinal study that is able to observe the conflict evolution process needs to be conducted to retest hypothesis 6a.

Hypothesis 6b, which predicted a negative effect of TMT affective conflict on firm performance was supported in the lab study and partially supported in the field study. This finding confirms the notion in the conflict literature that affective conflict is detrimental to team outcomes because it disturbs effective communication and cooperation, consumes resources and energy, and hurts team cohesiveness (Janssen et al., 1999; Jehn, 1994, 1995; Pelled et al., 1999). Specifically, it suggests that in the context of TMTs, affective conflict leads to poor quality strategic decisions, which in turn constrains a firm's financial competitiveness and innovation capability. Such a finding also provides evidence to the pre-assumed theory that the research model of this dissertation has been

drawn upon. That is, a very low level of or little affective conflict is preferable for TMT decision making.

Contributions to Methodology

The design of this dissertation makes three methodological contributions. First, the two-study design enables this research enjoy both internal and external validity. It first examined the research model with an experiment that enjoys a high level of internal validity and then generalized the examination in a set of high-tech industries. The consistent findings in both studies, although not entirely overlapping, provide unique support for the research model.

Second, the design evidences that a well-designed lab study can also be used for TMT research. Traditional TMT research relies on either archival sources or surveys to collect data (Finkelstein & Hambrick, 1996). These data collection methods constrain researchers' ability to observe TMT decision making process, consequently leaving TMT process research a "black box" in the TMT literature (Laurence, 1997). Lab studies, however, offer researchers the possibility and flexibility to simulate, observe and control the TMT decision making process.

Finally, I used different methods to measure informational diversity and power centralization in the two studies. The overall consistent findings suggest that it is effective and valid to use the average of TMT tenure diversity, TMT educational diversity and TMT functional diversity as the proxy of TMT informational diversity, and to use scenarios with different power structure to manipulate power centralization. This observation provides important methodological guideline for future TMT research.

Contributions to Managerial Practice

This research has certain practical implications. First, it identified informational diversity and power centralization as important predictors to TMT conflict. CEOs who would like to finalize strategic decisions based on a large variety of inputs may need to intentionally recruit top executives with diverse expertise and experiences. In addition, to promote top executives' active involvement in the decision making process, a relatively balanced power structure needs to be enforced. In other words, the CEO needs to empower other top executives so as to inspire a healthy discussion of strategic decisions.

Second, this research provides CEOs a solution to managing TMT conflict. The common problem most CEOs and organizational leaders have encountered is that healthy fight over strategic decisions can quickly turn destructive (Eisenhardt et al., 1997b). For instance, a different opinion meant as a substantial remark can be interpreted as personal attack. Anxiety and frustration over difficult choices that intertwine with personality may evolve into interpersonal tension and disliking. Such misattribution effects, as noted earlier, may derive from the lack of mutual trust among top executives, which is not unusual across the TMTs of American-based companies (Eisenhardt et al., 1997b). A procedurally fair CEO, however, is able to foster the generation of a team norm of trust (Colquitt et al., 2002), and therefore to decouple TMT cognitive conflict from TMT affective conflict. This research highlights that CEOs need to be fair and be perceived fair by other members during decision making process in order to encourage top executives to fight for the optimal strategic decisions without destroying their ability to work together.

Finally, it provides a solution to establishing a constructive TMT conflict profile. This research found that TMTs with a high level of informational diversity and a low level of power centralization were more likely to develop a high level of cognitive conflict but a low level of or little affective conflict when the level of CEO procedural fairness was high. This suggests that to better enjoy the benefits of a constructive conflict profile, the CEOs needs to establish a team with diverse expertise and backgrounds, empower other top executives and are fair and perceived fair during decision making process simultaneously.

Limitations and Future Research

Like most studies, this dissertation is not without limitations. There are at least three limitations as follows. First, this research examined TMT conflict with its focus on the most recognized types, cognitive conflict and affective conflict, without addressing other types of conflict identified in the literature, such as process conflict (Jehn, 1997). The reason I specifically focused on cognitive and affective conflict is that these two types of conflict have been often observed as highly intertwined in TMTs and that a solution to decouple them has been urgently called upon (Eisenhardt et al., 1997b). This, however, does not exclude the necessity to address process conflict in future research.

Process conflict refers to the disagreements among team members regarding how to accomplish the tasks, such as resource and responsibility allocation (Jehn, 1997). It is not unusual that top executives fight hard for favorable resource allocation for their own departments and that there are often conflicting duty allocation among TMT members (Finkelstein & Hambrick, 1996). Process conflict opens an interesting avenue to examine

how conflict over resource and responsibility allocation may affect TMT decision making and firm performance.

Second, this study specifically focused on one aspect of CEO leadership, CEO procedural fairness, as the solution to establishing a constructive TMT conflict profile. On the one hand, this finding may only explain part of the story of how CEO leadership may affect the conflict emergence process. On the other hand, it opens an interesting research avenue for both conflict scholars and TMT researchers to address TMT conflict management. Future research needs to look into other aspects of CEO leadership, such as CEO leadership style and conflict management strategies, and to examine how they may interact with the conflict emergence process and the processes through which conflict affects firm outcomes.

Third, while the two-study research design has its strengths, both studies have their own limitations. One limitation in the lab study is that few management experiences that student participants had might actually constrain their interpretations and implementation of the manipulation messages. This in turn led to the failure of some hypotheses in the lab setting (e.g., H4a). For instance, as noted before, when the manipulations for a high level of power centralization and a high level of CEO procedural fairness were conducted simultaneously on the same participants, they might end up with behaving toward an extreme end, either being extremely nice and cooperative or being autocratic. It is suggested that future research with students as the subjects need to offer more effective pre-experiment training to make sure that they understand the experiments well and are able to effectively act in line with the manipulations. Another limitation for the lab study is that only a limited level of affective conflict was observed due to

insufficient incentive mechanism design-monetary reward. This limitation may, to some extent, account for the insignificance for some affective conflict-related hypotheses (e.g., H2b & H4b). Future conflict research needs to take more effective incentive mechanisms to promote participants as emotionally involved in the experimental setting as desired.

One main limitation for the field study lies in its cross-sectional design. This made it hard to address any causal relationships. For instance, instead of arguing that affective conflict was detrimental to firm innovation, one could propose that it was the poor innovation outcomes that led people to blame for each others, thus providing the basis for affective conflict to emerge. Moreover, a cross-sectional study may make it difficult to test a curvilinear relationship, particularly when the sample size is small. Future research need employ a more fine-grained longitudinal design to study TMT conflict. Such a study will help address the mixed findings regarding the cognitive conflict-team performance relationship in the literature as well.

Conclusion

This dissertation addressed three research topics in the conflict literature: TMT conflict antecedents, TMT conflict management, and TMT conflict outcomes. With two complimentary studies, one experiment with 77 project-teams with business-major undergraduate students and one field study of 66 TMTs of US-based high-tech firms, this dissertation found that (1) informational diversity and power centralization were important predictors to TMT conflict. Specifically, TMTs with a high level of informational diversity and a decentralized power structure were more likely to develop a high level of cognitive conflict; (2) TMTs with a procedurally fair CEO were more likely

to develop a constructive conflict profile, namely one with a relatively high level of cognitive conflict but a low level of or little affective conflict, by further enhancing the positive effects of informational diversity and decoupling the association of cognitive conflict and affective conflict simultaneously; and (3) TMT affective conflict were negatively related to firm performance.

While the findings of this dissertation may leave many questions unanswered, I believe that TMT informational diversity, power centralization and CEO leadership are important factors for future research to address TMT conflict. In particular, CEO leadership deserves more research attention in attempt to answer the following questions: how does TMT conflict emerge and develop over time? how can a TMT effectively manage conflict? and how can a TMT turn a constructive conflict profile into favorable firm outcomes?

APPENDIX A

Cellular Game Simulation Memo for All Participants

Game Purpose

In this game simulation, every four people will work closely as the top managers (CEO, CMO, CTO, and CFO) of a company in the Cellular Communication industry to compete against the computer for LARGER MARKET SHARE.

Game Background

Developed by Bell Laboratories in the 1960's, cellular phone service derives its name from small regions— called cells— into which a service area is divided. Each cell is equipped with a low-power transmitter/receiver known as a base station. Ideally, cell coverage of a service area would be total and unduplicated; in reality, however, cells frequently overlap or leave gaps due to obstructions.

It is possible to increase a cell's capacity by frequency reuse and by adding more radio waves. Frequency reuse consists of cells not adjacent to one other that can use the same frequency without interfering with each other. Cell-splitting is sometimes used to increase capacity as well. This method involves dividing a cell by adding more, less powerful base stations. There are limits to how many times a cell can be split, however; extreme cell density can result in mutual channel interference.

Cellular communications require a cellular telephone and a subscription with a cellular phone company. In addition, there are some limitations and inconveniences associated with cellular phone use. To make cellular calls, callers must be within range of the service areas. Signal quality is not as good as on standard telephones, and if a cellular phone user moves into an area that is not covered by his/her cellular service company, he/she will not be able to make or receive calls. The charge for cellular service is usually a one-time activation fee and an air charge for each minute of both incoming and outgoing calls. Some companies offer supplementary services such as paging and data transmission. Industry executives have identified two types of customers: business users (who use cellular services mostly at work) and private users (who use cellular services outside work).

Game Simulation Procedure

The whole game takes 10 rounds to finish, each round representing one year in the real business world. In each round, all the four members work together to figure out the best strategy (A combination of a set of strategic actions) to maximize the market share of their company. Available strategic actions include: Raising Capital, Advertising, Sales Forces, R&D Investment, New Market Entry, and Radio Wave Capacity. Each team needs to follow the procedures below to fulfill the entire simulation:

1. Before the game starts, each member in a team needs to fill out Part A of a survey, which involves basic participant background information.
2. Then, teams may start to make one round of game practice to get familiar with game operation. After it is finished, reset the game, and wait for the game coordinator for further instructions. Do not start the formal game simulation until the coordinator tells you to do so.

3. When the 8th round of game is finished, pause the game, and fill out Part B of the survey. Do not continue with the game until a coordinator tells you to do so.
4. After the entire game is finished, please send the files of xxxINFO.TXT, xxxINFB.TXT, and xxxRVW.TXT to the address at ljiang@rhsmith.umd.edu. The subject should be worded like this “A11 game simulation”. A11 is an assigned team number.

Incentives

Every member in those teams whose market share ranks among top 10% out of all teams will win \$50. There will be about 80 teams involved in this game. When all games are finished, the winners will be identified and informed, however, the bonus check may take a few weeks to get sent out. **Good luck!**

APPENDIX B

Cellular Game Simulation Memo for Participants

Cellular Game Simulation Memo for CEO (HD, HF, HP)

Note: These are your private instructions, please do not share this memo with anyone else. Please be sure to carefully follow the instructions that are specific to your role as a top manager in this company.

Information for Decision Making

The following strategies have been identified as being effective. Be sure to read them carefully and do your best to persuade your team to follow these strategies (Remember, do not share these strategies directly with any other member in your team, but propose them as your own ideas). Note, it may take some time for the strategies to work, but these strategies will work if you are patient and stick to using them.

Raising capital	Advertising	Sales forces	R&D investment	New market entry	Radio wave capacity
N/A	<p>Business users and private users are both important for Celcom 21 to establish its market leadership. Business users may be the major consumers in the early stage of cellular phone industry. Over time, private users may account for significant market share as well. However, if we do not advertise for the private users from the beginning, how will they choose our company later? So let us focus on both of them.</p>	<p>Dealers and direct salaries-sales forces are both very important. Dealers are motivated by commission, but harder to control; direct force may have less motivation, but easier to manage.</p> <p>Celcom 21 needs to make a balanced configuration of these two types of sales forces (50 to 50)</p>	N/A	<p><u>As long as a new market is available, Celcom 21 should buy the license to get into the market immediately, at any cost,</u> because (1) new market entry is one of the most important means to expand market share; (2) a later entry may cost significantly more than otherwise; and (3) the risk associated with first mover is very little, because Wall Street is very positive about the cellular industry.</p>	N/A

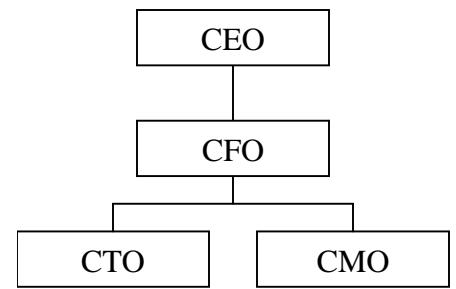
Your Role as the CEO

As the CEO, you are responsible for finalizing your team's strategic decisions. In a TMT (top management team), individuals from different functional backgrounds may approach the same strategic issue with different perspectives. For instance, as to how to allocate limited financial resource to enhance a company's financial performance, a Chief Marketing Officer (CMO) is more likely to highlight the importance of such marketing activities as advertising and would suggest investing more in marketing activities, while a Chief Technology Officer (CTO) may emphasize the criticality of R&D and therefore suggest more investment into the R&D area. While top executives' opinions are likely to be different and even contradictory, the best decisions occur when everyone has a chance to express their position and the team works to integrate the various perspectives of different team members. Therefore, you are strongly encouraged to (1) provide all team

members equal opportunities for contributing to strategic decisions, (2) make sure that all team members' concerns are given appropriate consideration, (3) provide all team members with equal opportunities to support, challenge and refute your viewpoints, (4) clarify decisions when requested by any team members, and (5) listen to every member's concerns before making decisions. In fact, the other TMT members will be evaluating your performance as the CEO in doing these five things.

Decision Making Power Structure

The decision making power structure of your TMT is showed in the figure to the left. The CEO is authorized to finalize strategic decisions in your team. The next most powerful individual on the team in terms of decision making influence is the CFO. The CTO and CMO are of equal status and power, but both are also below the CFO in decision making power.



Cellular Game Simulation Memo for CFO (HD, HF, HP)

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Information for Decision Making

The following strategies have been identified as being effective. Be sure to read them carefully and do your best to persuade your team to follow these strategies (Remember, do not share these strategies directly with any other member in your team, but propose them as your own ideas). Note, it may take some time for the strategies to work, but these strategies will work if you are patient and stick to using them.

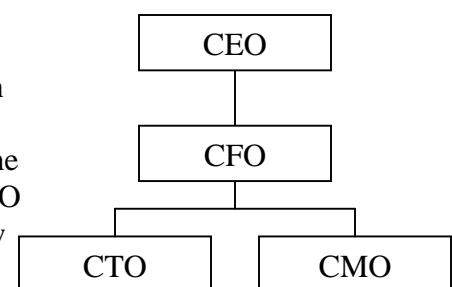
	Raising capital	Advertising	Sales forces	R&D investment	New market entry	Radio wave capacity
CFO	<p>Operating profit is one of the most critical financial sources to fuel company's strategies. While the wall street seems optimistic on the cellular industry contemporarily, we should be very careful in raising capital through external markets. No shareholders would like to support a TMT who leads to consecutive negative profit for years. <u>To raise no more than 50% of the company's credit ceiling, upon need, is probably the best financing strategy.</u></p>	<p>Given the limited financial resources, and the fact that the market growth is being fueled primarily by business users (look at the subscriber distribution), it doesn't make any sense to advertise for private uses. <u>Advertising spending should be concentrated on business users as opposed to private users as long as the percentage of private subscribers among all customers doesn't increase significantly.</u></p>	N/A	N/A	N/A	<p>As our market expands, the communication is becoming more crowded and even leads to disconnection during phone call. This has started to badly influence our market share. I agree R&D is a way to enhance the radio capacity by ourselves, however, it may take too long to meet our needs. Our competitors who buy radio wave capacity directly from the government are taking away our market share. <u>It is time to significantly buy in radio wave capacity</u></p>

Your Role as the CFO

As the Chief Financial Officer, you are primarily in charge of financial issues. However, your role as a top executive requires you to be as actively as possible involved in the entire strategic decision-making process and make contributions to the strategic decisions in all areas of activities.

Decision Making Power Structure

The decision making power structure of your TMT is showed in the figure to the left. The CEO is authorized to finalize strategic decisions in your team. The next most powerful individual on the team in terms of decision making influence is the CFO. The CTO and CMO are of equal status and power, but both are also below the CFO in decision making power.



Cellular Game Simulation Memo for CMO (HD, HF, HP)

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Information for Decision Making

The following strategies have been identified as being effective. Be sure to read them carefully and do your best to persuade your team to follow these strategies (Remember, do not share these strategies directly with any other member in your team, but propose them as your own ideas). Note, it may take some time for the strategies to work, but these strategies will work if you are patient and stick to using them.

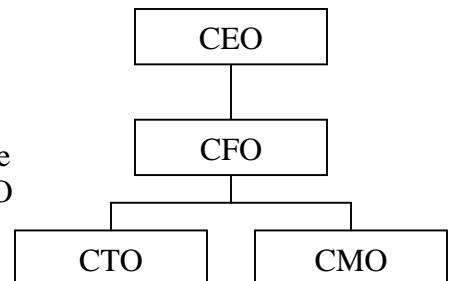
	Raising capital	Advertising	Sales forces	R&D investment	New market entry (Buying license)	Radio wave capacity
CMO	N/A	N/A	A large and strong group of dealers paid on commission will enable Celcom 21 to acquire new customers while retaining flexibility; indeed, dealers, unlike direct/salaried sales force, get paid only if they sell. Therefore, <u>I suggest to primarily invest in dealers to have more dealers and increase their commission</u>	While the introduction of new technology to market is probably important for Celcom 21's long term growth, <u>Celcom 21 should prioritize its financial resources on market expansion, such as advertising and sales forces, instead of R&D</u> because the market will not be ready for such innovative services as data transmission and switchers in the near future. Even we have to invest in R&D, I'd suggest to buy in necessary technological resources instead of doing it ourselves, because the market is changing too fast and need quicker response.	We should prioritize its business on its existing market. Only when its leadership has been established, it may move to another market. This is because 1), it is hard to manage the competition in a few markets at the same time, given the limited managerial capability and organizational resources and 2) there is uncertainty whether the growth in the new market will be as strong as in the existing ones.	N/A

Your Role as the CMO

As the Chief Marketing Officer, you are primarily in charge of marketing issues. However, your role as a top executive requires you to be as actively as possible involved in the entire strategic decision-making process and make contributions to the strategic decisions in all areas of activities.

Decision Making Power Structure

The decision making power structure of your TMT is showed in the figure to the left. The CEO is authorized to finalize strategic decisions in your team. The next most powerful individual on the team in terms of decision making influence is the CFO. The CTO and CMO are of equal status and power, but both are also below the CFO in decision making power.



Cellular Game Simulation Memo for CTO (HD, HF, HP)

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Information for Decision Making

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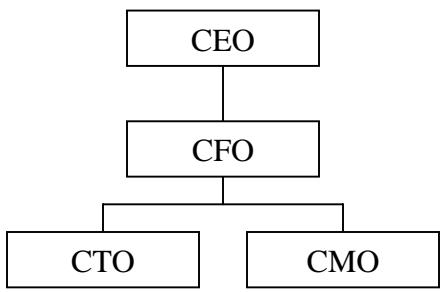
	Raising capital	Advertising	Sales forces	R&D investment	New market entry	Radio wave capacity
CTO	Celcom 21 should raise as much fund as the credit ceiling allows. For a firm competing in a dynamic environment, completely relying on its own operating profit to fuel its strategies is a mistake, because, otherwise, we will not have enough resources to catch up the technological trend and build up our leading position in the market. R&D is expensive, but critical for a high-tech firm like Celcom 21. The long-term positive market growth associated with R&D will overcome the negative effects of the short-term debt.	N/A	N/A	Data transmission, clarity of sound, radio wave capacity and switchers are the four critical technologies that will significantly influence the quality of the services of our company. Industry reports have indicated that the quality of the services highly influence customer loyalty and therefore our market share. Therefore, the company should prioritize R&D. <u>I suggest that more than 10-15% firm resources should be invested in R&D, which is an industrial standard for high-tech firms.</u>	N/A	Industry reports have indicated that the quality of the services is being badly influenced by the increasing crowded communication. Therefore it is wise to somehow increase the radio wave capacity. <u>However, I oppose to buy more radio wave capacity directly</u> because of the following reasons. First, to expand radio wave capacity is very expensive. There are not extra resources for Celcom 21 to invest in it. More importantly, R&D on radio wave capacity is a better way than directly buying radio wave capacity. In so doing we are able to develop our own core competence.

Your Role as the CTO

As the Chief Technology Officer, you are primarily in charge of technological issues. However, your role as a top executive requires you to be as actively as possible involved in the entire strategic decision-making process and make contributions to the strategic decisions in all areas of activities.

Decision Making Power Structure

The decision making power structure of your TMT is showed in the figure to the left. The CEO is authorized to finalize strategic decisions in your team. The next most powerful individual on the team in terms of decision making influence is the CFO. The CTO and CMO are of equal status and power, but both are also below the CFO in decision making power.



Cellular Game Simulation Memo for CEO (HD, HF, LP)

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Information for Decision Making

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Raising capital	Advertising	Sales forces	R&D investment	New market entry	Radio wave capacity
N/A	<p>Business users and private users are both important for Celcom 21 to establish its market leadership. Business users may be the major consumers in the early stage of cellular phone industry. Over time, private users may account for significant market share as well. However, if we do not advertise for the private users from the beginning, how will they choose our company later? So let us focus on both of them.</p>	<p>Dealers and direct salaries-sales forces are both very important. Dealers are motivated by commission, but harder to control; direct force may have less motivation, but easier to manage.</p> <p>Celcom 21 needs to make a balanced configuration of these two types of sales forces (50 to 50)</p>	N/A	<p>As long as a new market is available, Celcom 21 should buy the license to get into the market immediately, at any cost, because (1) new market entry is one of the most important means to expand market share; (2) a later entry may cost significantly more than otherwise; and (3) the risk associated with first mover is very little, because Wall Street is very positive about the cellular industry.</p>	N/A

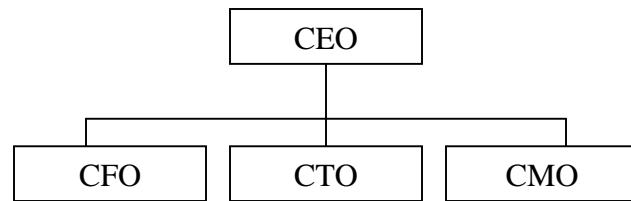
Your Role as the CEO

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concerns before making decisions. In fact, the other TMT members will be evaluating your performance as the CEO in doing these five things.

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Cellular Game Simulation Memo for CFO (HD, HF, LP)

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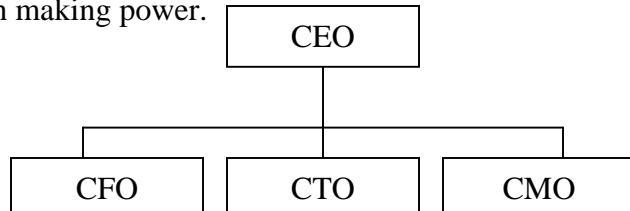
	Raising capital	Advertising	Sales forces	R&D investment	New market entry	Radio wave capacity
CFO	Operating profit is one of the most critical financial sources to fuel company's strategies. While the wall street seems optimistic on the cellular industry contemporarily, we should be very careful in raising capital through external markets. No shareholders would like to support a TMT who leads to consecutive negative profit for years. <u>To raise no more than 50% of the company's credit ceiling, upon need, is probably the best financing strategy.</u>	Given the limited financial resources, and the fact that the market growth is being fueled primarily by business users (look at the subscriber distribution), it doesn't make any sense to advertise for private uses. <u>Advertising spending should be concentrated on business users as opposed to private users as long as the percentage of private subscribers among all customers doesn't increase significantly.</u>	N/A	N/A	N/A	As our market expands, the communication is becoming more crowded and even leads to disconnection during phone call. This has started to badly influence our market share. I agree R&D is a way to enhance the radio capacity by ourselves, however, it may take too long to meet our needs. Our competitors who buy radio wave capacity directly from the government are taking away our market share. <u>It is time to significantly buy in radio wave capacity</u>

Your Role as the CFO

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Cellular Game Simulation Memo for CMO (HD, HF, LP)

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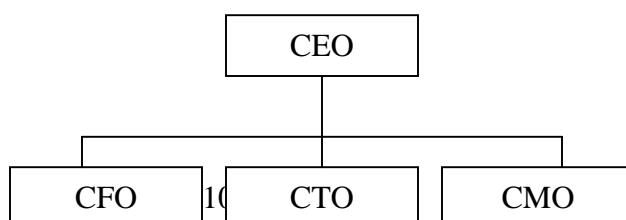
	Raising capital	Advertising	Sales forces	R&D investment	New market entry (Buying license)	Radio wave capacity
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Your Role as the CMO

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Decision Making Power Structure

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Cellular Game Simulation Memo for CTO (HD, HF, LP)

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	Raising capital	Advertising	Sales forces	R&D investment	New market entry	Radio wave capacity
CTO	Celcom 21 should raise as much fund as the credit ceiling allows. For a firm competing in a dynamic environment, completely relying on its own operating profit to fuel its strategies is a mistake, because, otherwise, we will not have enough resources to catch up the technological trend and build up our leading position in the market. R&D is expensive, but critical for a high-tech firm like Celcom 21. The long-term positive market growth associated with R&D will overcome the negative effects of the short-term debt.	N/A	N/A	Data transmission, clarity of sound, radiowave capacity and switchers are the four critical technologies that will significantly influence the quality of the services of our company. Industry reports have indicated that the quality of the services highly influence customer loyalty and therefore our market share. Therefore, the company should prioritize R&D. <u>I suggest that more than 10-15% firm resources should be invested in R&D, which is an industrial standard for high-tech firms.</u>	N/A	Industry reports have indicated that the quality of the services is being badly influenced by the increasing crowded communication. Therefore it is wise to somehow increase the radio wave capacity. <u>However, I oppose to buy more radio wave capacity directly</u> because of the following reasons. First, to expand radio wave capacity is very expensive. There are not extra resources for Celcom 21 to invest in it. More importantly, R&D on radio wave capacity is a better way than directly buying radio wave capacity. In so doing we are able to develop our own core competence.

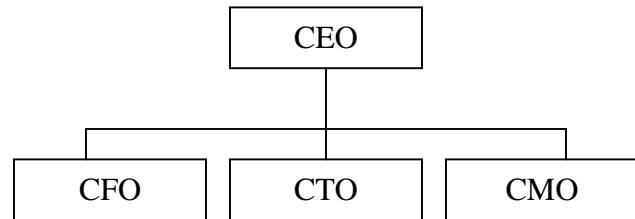
Your Role as the CTO

As the Chief Technology Officer, you are primarily in charge of technological issues. However, your role as a top executive requires you to be as actively as possible involved in the entire strategic decision-making process and make contributions to the strategic decisions in all areas of activities.

Decision Making Power Structure

The decision making power of your TMT is shown in the figure below. In terms of the decision making structure, the CEO is authorized with the power to finalize the strategic

decisions in your team. All the other members are of equal status and power, but all are also below the CEO in decision making power.



Cellular Game Simulation Memo for CEO (HD, LF, HP)

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Information for Decision Making

The following strategies have been identified as being effective. Be sure to read them carefully and do your best to persuade your team to follow these strategies (Remember, do not share these strategies directly with any other member in your team, but propose them as your own ideas). Note, it may take some time for the strategies to work, but these strategies will work if you are patient and stick to using them.

Raising capital	Advertising	Sales forces	R&D investment	New market entry	Radio wave capacity
N/A	<p>Business users and private users are both important for Celcom 21 to establish its market leadership. Business users may be the major consumers in the early stage of cellular phone industry. Over time, private users may account for significant market share as well. However, if we do not advertise for the private users from the beginning, how will they choose our company later? So let us focus on both of them.</p>	<p>Dealers and direct salaries-sales forces are both very important. Dealers are motivated by commission, but harder to control; direct force may have less motivation, but easier to manage.</p> <p>Celcom 21 needs to make a balanced configuration of these two types of sales forces (50 to 50)</p>	N/A	<p>As long as a new market is available, Celcom 21 should buy the license to get into the market immediately, at any cost, because (1) new market entry is one of the most important means to expand market share; (2) a later entry may cost significantly more than otherwise; and (3) the risk associated with first mover is very little, because Wall Street is very positive about the cellular industry.</p>	N/A

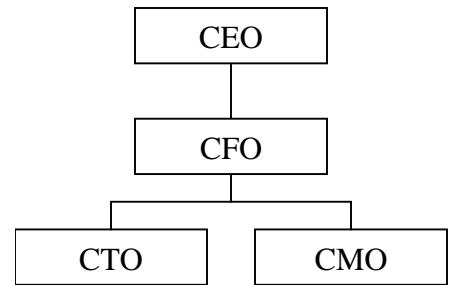
Your Role as the CEO

As the CEO, you are responsible for finalizing your team's strategic decisions. In a TMT (top management team), individuals from different functional backgrounds may approach the same strategic issue with different perspectives. For instance, as to how to allocate limited financial resource to increase a high-tech company's financial performance, a Chief Marketing Officer (CMO) is more likely to highlight the importance of marketing activities as advertising and would suggest to invest more in marketing activities, but a Chief Technology Officer (CTO) may emphasize the criticality of R&D and therefore would suggest more investment in the R&D area. Due to their specific backgrounds and limited access to other information, their opinions are likely to be biased. Your job as the CEO is to make the best decision possible. Therefore, as the CEO, when it comes to making strategic decisions, you may very well want to just follow your own judgment or rely on one or two other team members more than others. You should NOT concern yourself with addressing all team members' concerns, providing all team members with opportunities to support, challenge and refute your viewpoints, clarifying decisions when requested by any team members, or even treating all members with respect and courtesy. Your responsibility is to make the best decisions possible and that is what you will be

judged by. In fact, the other TMT members will be evaluating your performance as the CEO in making effective decisions and making this a higher priority than being fair or just.

Decision Making Power Structure

The decision making power structure of your TMT is showed in the figure to the left. The CEO is authorized to finalize strategic decisions in your team. The next most powerful individual on the team in terms of decision making influence is the CFO. The CTO and CMO are of equal status and power, but both are also below the CFO in decision making power.



Cellular Game Simulation Memo for CFO (HD, LF, HP)

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Information for Decision Making

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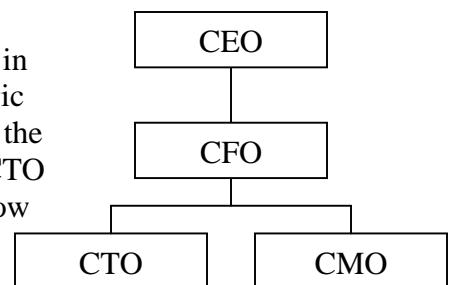
	Raising capital	Advertising	Sales forces	R&D investment	New market entry	Radio wave capacity
CFO	<p>Operating profit is one of the most critical financial sources to fuel company's strategies. While the wall street seems optimistic on the cellular industry contemporarily, we should be very careful in raising capital through external markets. No shareholders would like to support a TMT who leads to consecutive negative profit for years. <u>To raise no more than 50% of the company's credit ceiling, upon need, is probably the best financing strategy.</u></p>	<p>Given the limited financial resources, and the fact that the market growth is being fueled primarily by business users (look at the subscriber distribution), it doesn't make any sense to advertise for private uses. <u>Advertising spending should be concentrated on business users as opposed to private users as long as the percentage of private subscribers among all customers doesn't increase significantly.</u></p>	N/A	N/A	N/A	<p>As our market expands, the communication is becoming more crowded and even leads to disconnection during phone call. This has started to badly influence our market share. I agree R&D is a way to enhance the radio capacity by ourselves, however, it may take too long to meet our needs. Our competitors who buy radio wave capacity directly from the government are taking away our market share. <u>It is time to significantly buy in radio wave capacity</u></p>

Your Role as the CFO

As the Chief Financial Officer, you are primarily in charge of financial issues. However, your role as a top executive requires you to be as actively as possible involved in the entire strategic decision-making process and make contributions to the strategic decisions in all areas of activities.

Decision Making Power Structure

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Cellular Game Simulation Memo for CMO (HD, LF, HP)

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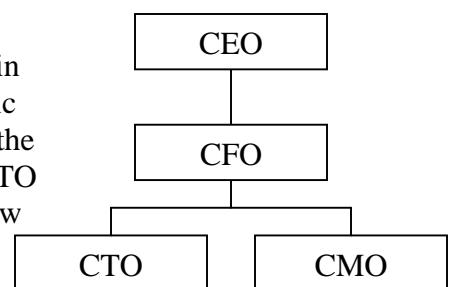
	Raising capital	Advertising	Sales forces	R&D investment	New market entry (Buying license)	Radio wave capacity
CMO	N/A	N/A	A large and strong group of dealers paid on commission will enable Celcom 21 to acquire new customers while retaining flexibility; indeed, dealers, unlike direct/salaried sales force, get paid only if they sell. Therefore, <u>I suggest to primarily invest in dealers-to have more dealers and increase their commission</u>	While the introduction of new technology to market is probably important for Celcom 21's long term growth, <u>Celcom 21 should prioritize its financial resources on market expansion, such as advertising and sales forces, instead of R&D</u> because the market will not be ready for such innovative services as data transmission and switchers in the near future. Even we have to invest in R&D, I'd suggest to buy in necessary technological resources instead of doing it ourselves, because the market is changing too fast and need quicker response.	We should prioritize its business on its existing market. Only when its leadership has been established, it may move to another market. This is because 1), it is hard to manage the competition in a few markets at the same time, given the limited managerial capability and organizational resources and 2) there is uncertainty whether the growth in the new market will be as strong as in the existing ones.	N/A

Your Role as the CMO

As the Chief Marketing Officer, you are primarily in charge of marketing issues. However, your role as a top executive requires you to be as actively as possible involved in the entire strategic decision-making process and make contributions to the strategic decisions in all areas of activities.

Decision Making Power Structure

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Cellular Game Simulation Memo for CTO (HD, LF, HP)

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Information for Decision Making

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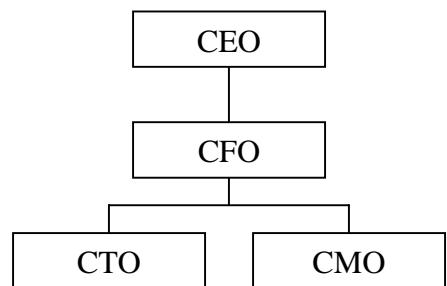
	Raising capital	Advertising	Sales forces	R&D investment	New market entry	Radio wave capacity
CTO	Celcom 21 should raise as much fund as the credit ceiling allows. For a firm competing in a dynamic environment, completely relying on its own operating profit to fuel its strategies is a mistake, because, otherwise, we will not have enough resources to catch up the technological trend and build up our leading position in the market. R&D is expensive, but critical for a high-tech firm like Celcom 21. The long-term positive market growth associated with R&D will overcome the negative effects of the short-term debt.	N/A	N/A	Data transmission, clarity of sound, radio wave capacity and switchers are the four critical technologies that will significantly influence the quality of the services of our company. Industry reports have indicated that the quality of the services highly influence customer loyalty and therefore our market share. Therefore, the company should prioritize R&D. <u>I suggest that more than 10-15% firm resources should be invested in R&D, which is an industrial standard for high-tech firms.</u>	N/A	Industry reports have indicated that the quality of the services is being badly influenced by the increasing crowded communication. Therefore it is wise to somehow increase the radio wave capacity. <u>However, I oppose to buy more radio wave capacity directly</u> because of the following reasons. First, to expand radio wave capacity is very expensive. There are not extra resources for Celcom 21 to invest in it. More importantly, R&D on radio wave capacity is a better way than directly buying radio wave capacity. In so doing we are able to develop our own core competence.

Your Role as the CTO

As the Chief Technology Officer, you are primarily in charge of technological issues. However, your role as a top executive requires you to be as actively as possible involved in the entire strategic decision-making process and make contributions to the strategic decisions in all areas of activities.

Decision Making Power Structure

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Cellular Game Simulation Memo for CEO (HD, LF, LP)

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Information for Decision Making

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Raising capital	Advertising	Sales forces	R&D investment	New market entry	Radio wave capacity
N/A	<p>Business users and private users are both important for Celcom 21 to establish its market leadership. Business users may be the major consumers in the early stage of cellular phone industry. Over time, private users may account for significant market share as well. However, if we do not advertise for the private users from the beginning, how will they choose our company later? So let us focus on both of them.</p>	<p>Dealers and direct salaries-sales forces are both very important. Dealers are motivated by commission, but harder to control; direct force may have less motivation, but easier to manage.</p> <p>Celcom 21 needs to make a balanced configuration of these two types of sales forces (50 to 50)</p>	N/A	<p>As long as a new market is available, Celcom 21 should buy the license to get into the market immediately, at any cost, because (1) new market entry is one of the most important means to expand market share; (2) a later entry may cost significantly more than otherwise; and (3) the risk associated with first mover is very little, because Wall Street is very positive about the cellular industry.</p>	N/A

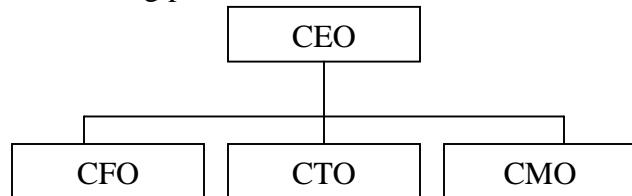
Your Role as the CEO

As the CEO, you are responsible for finalizing your team's strategic decisions. In a TMT (top management team), individuals from different functional backgrounds may approach the same strategic issue with different perspectives. For instance, as to how to allocate limited financial resource to increase a high-tech company's financial performance, a Chief Marketing Officer (CMO) is more likely to highlight the importance of marketing activities as advertising and would suggest to invest more in marketing activities, but a Chief Technology Officer (CTO) may emphasize the criticality of R&D and therefore would suggest more investment in the R&D area. Due to their specific backgrounds and limited access to other information, their opinions are likely to be biased. Your job as the CEO is to make the best decision possible. Therefore, as the CEO, when it comes to making strategic decisions, you may very well want to just follow your own judgment or rely on one or two other team members more than others. You should NOT concern yourself with addressing all team members' concerns, providing all team members with opportunities to support, challenge and refute your viewpoints, clarifying decisions when requested by any team members, or even treating all members with respect and courtesy. Your responsibility is to make the best decisions possible and that is what you will be

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Cellular Game Simulation Memo for CFO (HD, LF, LP)

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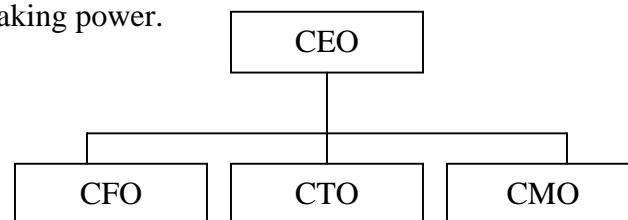
	Raising capital	Advertising	Sales forces	R&D investment	New market entry	Radio wave capacity
CFO	Operating profit is one of the most critical financial sources to fuel company's strategies. While the wall street seems optimistic on the cellular industry contemporarily, we should be very careful in raising capital through external markets. No shareholders would like to support a TMT who leads to consecutive negative profit for years. <u>To raise no more than 50% of the company's credit ceiling, upon need, is probably the best financing strategy.</u>	Given the limited financial resources, and the fact that the market growth is being fueled primarily by business users (look at the subscriber distribution), it doesn't make any sense to advertise for private uses. <u>Advertising spending should be concentrated on business users as opposed to private users as long as the percentage of private subscribers among all customers doesn't increase significantly.</u>	N/A	N/A	N/A	As our market expands, the communication is becoming more crowded and even leads to disconnection during phone call. This has started to badly influence our market share. I agree R&D is a way to enhance the radio capacity by ourselves, however, it may take too long to meet our needs. Our competitors who buy radio wave capacity directly from the government are taking away our market share. <u>It is time to significantly buy in radio wave capacity</u>

Your Role as the CFO

As the Chief Financial Officer, you are primarily in charge of financial issues. However, your role as a top executive requires you to be as actively as possible involved in the entire strategic decision-making process and make contributions to the strategic decisions in all areas of activities.

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Cellular Game Simulation Memo for CMO (HD, LF, LP)

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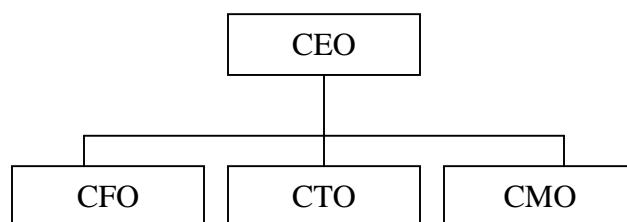
	Raising capital	Advertising	Sales forces	R&D investment	New market entry (Buying license)	Radio wave capacity
CMO	N/A	N/A	A large and strong group of dealers paid on commission will enable Celcom 21 to acquire new customers while retaining flexibility; indeed, dealers, unlike direct/salaried sales force, get paid only if they sell. Therefore, <u>I suggest to primarily invest in dealers-to have more dealers and increase their commission</u>	While the introduction of new technology to market is probably important for Celcom's long term growth, <u>Celcom 21 should prioritize its financial resources on market expansion, such as advertising and sales forces, instead of R&D</u> because the market will not be ready for such innovative services as data transmission and switchers in the near future. Even we have to invest in R&D, I'd suggest to buy in necessary technological resources instead of doing it ourselves, because the market is changing too fast and need quicker response.	We should prioritize its business on its existing market. Only when its leadership has been established, it may move to another market. This is because 1), it is hard to manage the competition in a few markets at the same time, given the limited managerial capability and organizational resources and 2) there is uncertainty whether the growth in the new market will be as strong as in the existing ones.	N/A

Your Role as the CMO

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Cellular Game Simulation Memo for CTO (HD, LF, LP)

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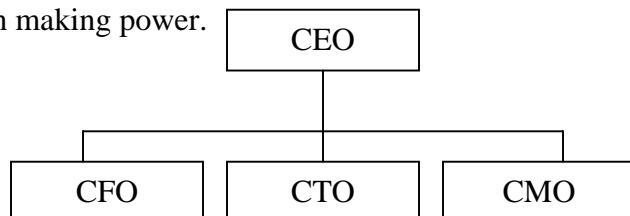
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CTO	Celcom 21 should raise as much fund as the credit ceiling allows. For a firm competing in a dynamic environment, completely relying on its own operating profit to fuel its strategies is a mistake, because, otherwise, we will not have enough resources to catch up the technological trend and build up our leading position in the market. R&D is expensive, but critical for a high-tech firm like Celcom 21. The long-term positive market growth associated with R&D will overcome the negative effects of the short-term debt.	N/A	N/A	Data transmission, clarity of sound, radio wave capacity and switchers are the four critical technologies that will significantly influence the quality of the services of our company. Industry reports have indicated that the quality of the services highly influence customer loyalty and therefore our market share. Therefore, the company should prioritize R&D. <u>I suggest that more than 10-15% firm resources should be invested in R&D, which is an industrial standard for high-tech firms.</u>	N/A	Industry reports have indicated that the quality of the services is being badly influenced by the increasing crowded communication. Therefore it is wise to somehow increase the radio wave capacity. <u>However, I oppose to buy more radio wave capacity directly</u> because of the following reasons. First, to expand radio wave capacity is very expensive. There are not extra resources for Celcom 21 to invest in it. More importantly, R&D on radio wave capacity is a better way than directly buying radio wave capacity. In so doing we are able to develop our own core competence.

Your Role as the CTO

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Cellular Game Simulation Memo for CEO (LD, HF, HP)

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Information for Decision Making

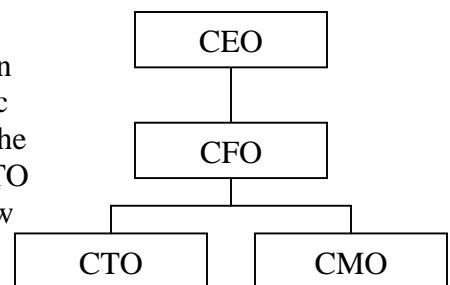
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Your Role as the CEO

As the CEO, you are responsible for finalizing your team's strategic decisions. In a TMT (top management team), individuals from different functional backgrounds may approach the same strategic issue with different perspectives. For instance, as to how to allocate limited financial resource to enhance a company's financial performance, a Chief Marketing Officer (CMO) is more likely to highlight the importance of such marketing activities as advertising and would suggest investing more in marketing activities, while a Chief Technology Officer (CTO) may emphasize the criticality of R&D and therefore suggest more investment into the R&D area. While top executives' opinions are likely to be different and even contradictory, the best decisions occur when everyone has a chance to express their position and the team works to integrate the various perspectives of different team members. Therefore, you are strongly encouraged to (1) provide all team members equal opportunities for contributing to strategic decisions, (2) make sure that all team members' concerns are given appropriate consideration, (3) provide all team members with equal opportunities to support, challenge and refute your viewpoints, (4) clarify decisions when requested by any team members, and (5) listen to every member's concerns before making decisions. In fact, the other TMT members will be evaluating your performance as the CEO in doing these five things.

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Cellular Game Simulation Memo for CFO (LD, HF, HP)

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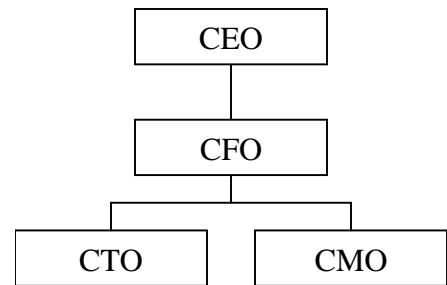
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Cellular Game Simulation Memo for CMO (LD, HF, HP)

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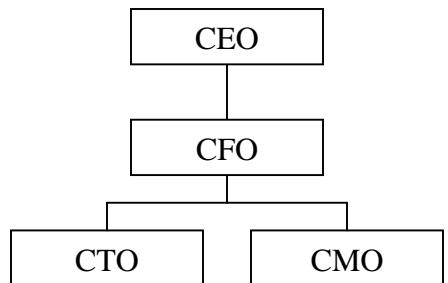
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Cellular Game Simulation Memo for CTO (LD, HF, HP)

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Information for Decision Making

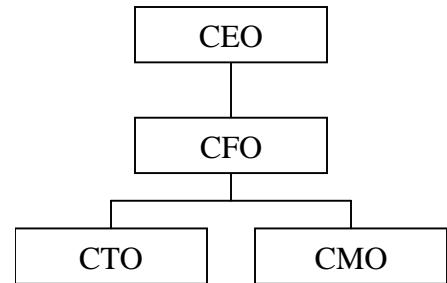
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Information for Decision Making

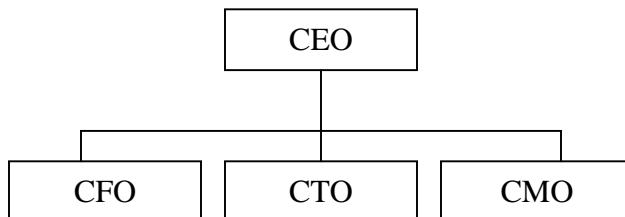
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Your Role as the CEO

As the CEO, you are responsible for finalizing your team's strategic decisions. In a TMT (top management team), individuals from different functional backgrounds may approach the same strategic issue with different perspectives. For instance, as to how to allocate limited financial resource to enhance a company's financial performance, a Chief Marketing Officer (CMO) is more likely to highlight the importance of such marketing activities as advertising and would suggest investing more in marketing activities, while a Chief Technology Officer (CTO) may emphasize the criticality of R&D and therefore suggest more investment into the R&D area. While top executives' opinions are likely to be different and even contradictory, the best decisions occur when everyone has a chance to express their position and the team works to integrate the various perspectives of different team members. Therefore, you are strongly encouraged to (1) provide all team members equal opportunities for contributing to strategic decisions, (2) make sure that all team members' concerns are given appropriate consideration, (3) provide all team members with equal opportunities to support, challenge and refute your viewpoints, (4) clarify decisions when requested by any team members, and (5) listen to every member's concerns before making decisions. In fact, the other TMT members will be evaluating your performance as the CEO in doing these five things.

Decision Making Power Structure

The decision making power of your TMT is shown in the figure below. In terms of the decision making structure, the CEO is authorized with the power to finalize the strategic decisions in your team. All the other members are of equal status and power, but all are also below the CEO in decision making power.



Cellular Game Simulation Memo for CFO (LD, HF, LP)

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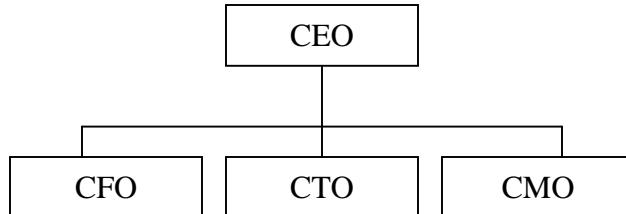
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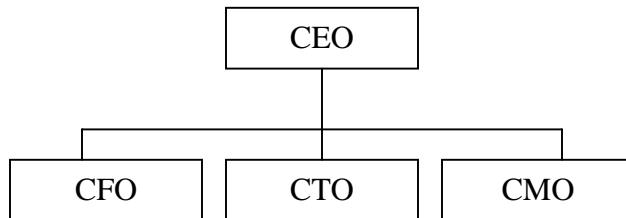
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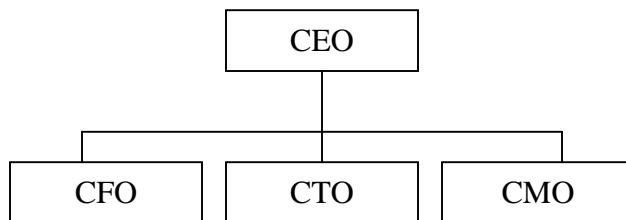
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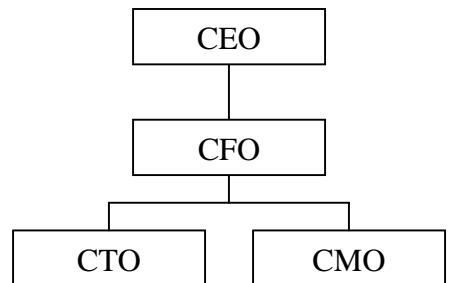
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The decision making power structure of your TMT is showed in the figure to the left. The CEO is authorized to finalize strategic decisions in your team. The next most powerful individual on the team in terms of decision making influence is the CFO. The CTO and CMO are of equal status and power, but both are also below the CFO in decision making power.



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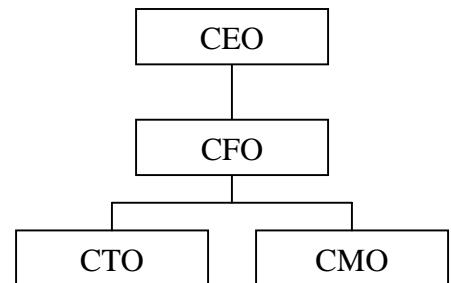
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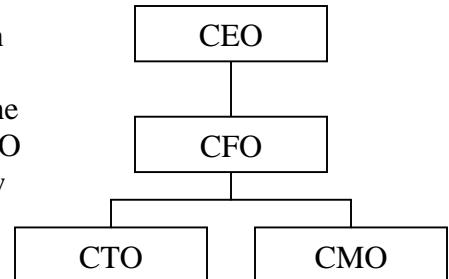
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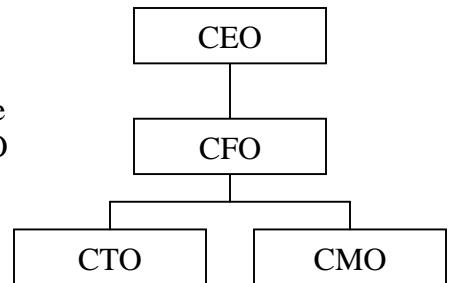
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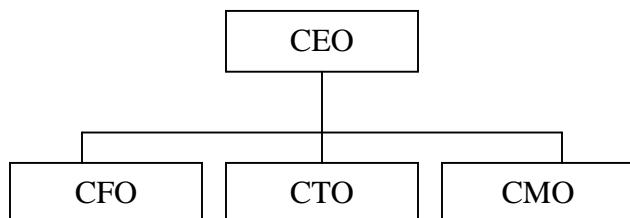
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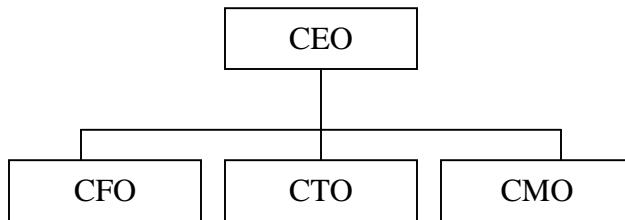
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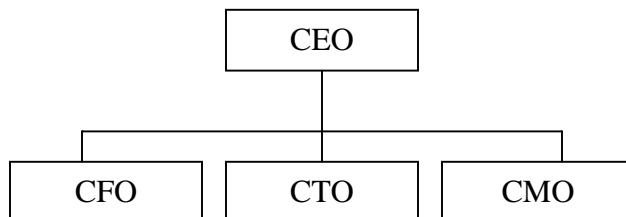
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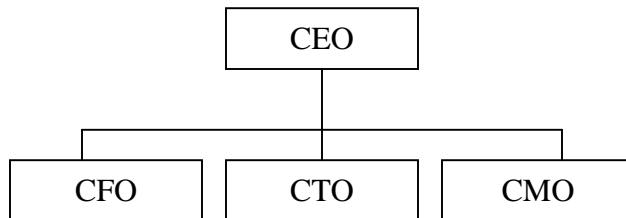
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Appendix C

Alternative Strategy

	Viewpoint 1	Viewpoint 2
Raising capital	<p>Operating profit is one of the most critical financial sources to fuel company's strategies. While the wall street seems optimistic on the cellular industry contemporarily, we should be very careful in raising capital through external markets. No shareholders would like to support a TMT who leads to consecutive negative profit for years. <u>To raise no more than 50% of the company's credit ceiling, upon need, is probably the best financing strategy.</u></p>	<p>Celcom 21 should raise as much fund as the credit ceiling allows. For a firm competing in a dynamic environment, completely relying on its own operating profit to fuel its strategies is a mistake, because, otherwise, we will not have enough resources to catch up the technological trend and build up our leading position in the market. R&D is expensive, but critical for a high-tech firm like Celcom 21. The long-term positive market growth associated with R&D will overcome the negative effects of the short-term debt.</p>
Advertising	<p>Given the limited financial resources, and the fact that the market growth is being fueled primarily by business users (look at the subscriber distribution), it doesn't make any sense to advertise for private uses. <u>Advertising spending should be concentrated on business users as opposed to private users as long as the percentage of private subscribers among all customers doesn't increase significantly.</u></p>	<p>Business users and private users are both important for Celcom 21 to establish its market leadership. Business users may be the major consumers in the early stage of cellular phone industry, Over time, private users may account for significant market share as well. However if we do not advertise for the private users from the beginning, how come they will choose our company later? So <u>let us focus on both of them.</u></p>
sales forces	<p>A large and strong group of dealers paid on commission will enable Celcom 21 to acquire new customers while retaining flexibility; indeed, dealers, unlike direct/salaried sales force, get paid only if they sell. Therefore, <u>I suggest to primarily invest in dealers- to have more dealers and increase their commission</u></p>	<p>Dealers and direct salaries-sales forces are both very important. Dealers are motivated by commission, but harder to control; direct force may have less motivation, but easier to manage. <u>Celcom 21 needs to make a balanced configuration of these two types of sales forces (50 to 50)</u></p>
R&D investment	<p>While the introduction of new technology to market is probably important for Celcom's long term growth, <u>Celcom 21 should prioritize its financial resources on market expansion, such as advertising and sales forces, instead of R&D</u> because the market will not been ready for such innovative services as data transmission and switchers in the near future. Even we have to invest in R&D, I'd suggest to buy in necessary technological resources instead of doing it ourselves, because the market is changing too fast and need quicker response.</p>	<p>Data transmission, clarity of sound, radio wave capacity and switchers are the four critical technologies that will significantly influence the quality of the services of our company. Industry reports have indicated that the quality of the services highly influence customer loyalty and therefore our market share. Therefore, the company should prioritize R&D. <u>I suggest that more than 10-15% firm resources should be invested in R&D, which is an industrial standard for high-tech firms.</u></p>
New market entry	<p><u>We should prioritize its business on its existing market.</u> Only when its leadership has been established, it may move to another market. This is because 1), it is hard to manage the competition in a few markets at the same time, given the limited managerial capability and organizational resources and 2) there is uncertainty whether the growth in the new market will be as strong as in the existing ones.</p>	<p><u>As long as a new market is available, celcom 21 should buy the license to get into the market immediately at any cost,</u> because (1) new market entry is one of the most important means to expand market share; (2) a later entry may cost significantly more than otherwise; and (3) the risk associated with first mover is very little, because the wall street is very positive about the cellular industry</p>
Radio wave capacity	<p>As our market expands, the communication is becoming more crowded and even leads to disconnection during phone call. This has started to badly influence our market share. I agree R&D is a way to enhance the radio capacity by ourselves; however, it may take too long to meet our needs. Our competitors who buy radio wave capacity directly from the government are taking away our market share. <u>It is time to significantly buy in radio wave capacity</u></p>	<p>Industry reports have indicated that the quality of the services is being badly influenced by the increasing crowded communication. Therefore it is wise to somehow increase the radio wave capacity. <u>However, I oppose to buy more radio wave capacity directly</u> because of the following reasons. First, to expand radio wave capacity is very expensive. There are not extra resources for Celcom 21 to invest in it. More importantly, R&D on radio wave capacity is a better way than directly buying radio wave capacity. In so doing we are able to develop our own core competence.</p>

APPENDIX D

Letter of Introduction

Dear Mr. CEO:

I am writing to seek your help in a project conducted by the University of Maryland's Robert H. Smith School of Business, Stanford University's School of Engineering, and funded by the National Science Foundation. I firmly believe that the issues under investigation will be of great interest to you.

The study targets a select group of high-technology companies in the Baltimore, Washington, Philadelphia, and Silicon Valley regions and will pose questions about the characteristics of the search and discovery behaviors that executives use to identify new business opportunities. As you know, in today's competitive environment, new business opportunities are the building blocks for future success. By developing a deeper understanding of this process, we hope to help companies like yours improve their adaptability and performance.

All results from the study will be strictly confidential. Only overall results will be published and no company or individual will be able to be identified. The time commitment we request is minimal and, in exchange for your participation, we will provide you with a detailed summary describing your company's position relative to other high-technology companies in our sample. This feedback could potentially be very valuable because it will allow you to benchmark your firm's characteristics and performance against that of similar organizations.

We would like to talk more with you about the aims of the project and to ascertain your interest in participating. Accordingly, one of our team will contact you by telephone in the next few days to set up an interview of approximately 45 minutes. Thank you for your time and we hope to talk to you soon.

Sincerely,

Dax Basdeo
301-314-9119

Patrick Maggitti
410-688-1274

Long Jiang
301-405-9532

Dr. Ken G. Smith
301-405-2250

Dr. Paul Tesluk
301-405-4968

APPENDIX E

Letter from Dean Howard Frank to CEOs

Dear Mr. CEO,

As you may know, the Robert H. Smith School of Business is one of the world's leading research business schools. A team of researchers here at the Robert H. Smith School of Business has initiated a study to understand the drivers of competitive advantage in high technology industries. The study will investigate the reasons why certain firms are more successful than others in the discovery of new innovations. The core area of investigation is the acquisition of knowledge within top management teams and its impact on new innovation discovery. This could be a wonderful opportunity for you to learn more about the drivers of competitive advantage in your industry and the capabilities of your organization in identifying new opportunities for gaining competitive advantage.

Having been the CEO of several technology organizations, I believe that the types of insights this research can be extremely valuable. Therefore, participating in this research effort may offer you insights into your own firm's competitive advantages and disadvantages. The research will explore key relationships between characteristics of executives problem-solving behavior and new innovation opportunities, as well as questions about how best to leverage these skills so that the *firm* benefits.

With this letter, I am asking you to participate in this study. The researchers are very aware of the constraints on your time and have worked diligently to reduce the effort required from your organization. Data collection techniques are in the form of questionnaires plus a short interview with you. These questionnaires do not take very much time to complete. In exchange for your participation, you will receive detailed summary reports that may allow you to benchmark your firm against others in your industry segment. All data will be ***strictly confidential***, only consolidated results will be published, and no individual company information will be identified.

In the next few days, a member of the research team will contact you by telephone to answer any questions that you might have, and to schedule an appointment for the on-site interview. In the meantime, if you have any questions or concerns, please contact the research team at 301-xxx-xxxx. Finally, thank you for your time and we look forward to working with you here at the Robert H. Smith School of Business.

Best Regards,

Howard Frank
Dean, Robert H. Smith School of Business
University of Maryland

APPENDIX F

CEO Interview

CEO INTERVIEW SCRIPT

(TO BE PRINTED OUT BEFORE EACH INTERVIEW)

COMPANY: _____

CODE (3-digits): _____

INTERVIEWER: _____

DATE: _____

CEO NAME: _____

CONTACT: _____

To Carry to an Interview

1. CEO interview (1)
2. Three sets of surveys:
 - a. CEO (1)
 - b. TMT (10)
 - c. KW (10)
3. Scenario inserts:
 - a. CEO (1)
 - b. TMT (10)
 - c. KW (10)
4. CEO endorsement letter (1)
5. Informed Consent form (21)
6. Return Envelope – small (21)
7. Packet Envelope with R.H. Smith Labels (21)

OVERVIEW FOR CEO

Thank you for taking time out of your busy schedule for meeting with me today. I know you are very busy so I will make this as quick as possible – no more than 45 minutes.

As we mentioned in our letter, we are conducting a study to explore the ways in which executives search for information and how their search relates to the new business opportunities they act upon. We believe that, by developing a deeper understanding of this process, we can help executives like you improve your performance by providing you with suggestions to increase both your adaptability and efficiency.

The study really is on the cutting edge of management research. Both the University of Maryland's Robert H. Smith School of Business and the Stanford University are considered top-10 in the world for this type of research. In addition, the project has been selected from among hundreds of applications, for three full years of funding by the National Science Foundation.

We are targeting a select group of high-technology companies in the Baltimore, Washington, Philadelphia, and Silicon Valley regions for participation - your company is one of those. Executives that choose to participate will be provided with a detailed summary describing your company's position relative to other high-technology companies in our sample. This feedback could potentially be very valuable because it will allow you to benchmark your firm's characteristics and performance against that of similar organizations.

On a personal level, I will truly appreciate your participation because it will provide me with data for my doctoral dissertation. Without help from individuals like you, I will be unable to complete my doctoral studies.

The time commitment for participating executives is minimal and *strictly* confidential. In addition to this interview, participation will require:

1. You to fill out a 30 minute survey, anytime within the next week.
2. Members of your top management and some other key members of your firm will also need to fill out a similar survey in the next week.

That's all that is required for participation. Again, in return, you will receive our customized feedback and the knowledge that you are helping several doctoral students finish their studies.

If you agree, we can continue with the interview.

INTERVIEW QUESTIONS

WARM-UP: Can you please describe a typical innovation in your company?

1. COMPANY SIZE: (Fill in data before interview if available)

- a. # of full-time employees in 2004: _____
- b. # of full-time employees in 2003: _____
- c. # of full-time employees in 2002: _____

2. INNOVATION: Does your firm innovate mainly: products / services / markets / internal processes?

If **Products:**

- a. **Total # of products** developed in the last year: _____, 3 years: _____.
- b. **# of completely new products** developed in the last year: _____, 3 years: _____.
- c. **Percentage of ideas/concepts** from old products that are used **in new products?**

- d. Average **cycle time** for each product from beginning to end? _____
- e. Average **dollar investment** in each innovation? _____
- f. **Dollars spent on R&D:** _____(only ask if not available)
- g. **Spending** to keep employees **up-to-date** on current industry knowledge/technology:
_____ (y/n) ; Estimated spending: \$ _____.
- h. **# of personnel assigned** to R&D: _____
- i. **# of scientists:** _____
- j. **# of patents** in the last year: _____, 3 years: _____

If **Services:**

- a. **Total # of services** developed in the last year: _____, 3 years: _____.
- b. **# of completely new services** developed in the last year: _____, 3 years: _____.
- c. **Percentage of ideas/concepts** from old service that are **used in new service?**

- d. Average **cycle time** for each new service from beginning to end? _____
- e. Average **dollar investment** in each service innovation? _____
- f. **Dollars spent** for development of new services: _____
- g. **Spending** to keep employees **up-to-date** on current industry knowledge/technology: _____ (y/n) ; Estimated spending: \$ _____.
- h. **# personnel assigned** to new service development: _____

If **Markets**:

- a. **Total number** of markets entered/developed in the last year: _____, 3 years: _____.
- b. # of completely **new** markets entered/developed in the last year: _____, 3 years: _____.
- c. Percentage of new market that involves extension of existing products and services versus completely new products or services. _____
- d. **Dollars spent** on **new market development**: _____
- e. # personnel assigned to development of new markets: _____

If **Internal Processes**:

- a. # of completely new processes developed in the last year: _____, 3 years: _____
- b. Dollars spent on internal process innovations: _____
- c. # personnel assigned to development of internal process innovations: _____

3. OPEN-ENDED QUESTIONS ON INNOVATION

- a. Could you please describe a **recent innovation**?
-

- b. When did this occur? _____

- c. How was the innovation discovered? _____

- d. How long did it take (cycle time from beginning to end)? _____

- e. How much did it cost (investment)? _____

- f. How many people were assigned to this project? _____

- g. Briefly, what was the process? _____
- h. Typically, what is the impact of the introduction of your organization's innovations on your firm's market share?

- i. How radical would you consider your firm's innovations to be in comparison to those of your competitors?

- j. Are there any professional associations or research centers with which your organization has contact that have some impact on your organization's innovation activities? _____

What % of your business falls in each of the following categories?

	Existing Products/ Services	New Products/ Services
Existing Customers		
New Customers		

4. PERFORMANCE (OPTIONAL):

- a. What is **the proper way to evaluate** your firm's performance (your objective), and why?:

- b. How does your firm compare to the industry average on this measure?

- c. Please provide the most up-to-date figures for the last calendar year; And for the year prior, for the following:

IDENTIFYING OTHER INDIVIDUALS TO BE SURVEYED

We are now done the interview questions and would like to wrap-up by asking you to help us identify the other people in your company that should receive a survey.

First, can you tell me the names of the members of your **top management group**? **Top management group members** consist of those individuals that make or are involved with decisions affecting your company's strategy. At the extreme, the team could include all employees. However, we only want to tap the **very top-level** members, perhaps the top 5 or 6 most important employees.

FILL INFO IN ON NEXT PAGE

Next, we would like the names of the individuals in the company that you would consider **key knowledge workers**.

Key knowledge workers are those individuals that are not top managers but are typically responsible for innovations that occur within the company. At the extreme, the key knowledge workers could include all employees. However, we only want to tap the **most key knowledge workers**, perhaps the top 5 or 6 most important employees – when it comes to innovation.

FILL INFO IN ON NEXT PAGE

I will return in two weeks for the completed questionnaires. If you don't mind, can you give me the name of a **contact person** (_____) who can hold the sealed envelopes containing the completed questionnaires until I return?

Wrap-Up

Once again, we truly thank you for agreeing to participate in our study. Please do not hesitate to call if you have any questions or concerns.

Before I leave, is there an **area in which I can make photocopies** of your endorsement letter and prepare the survey packets?

INTERVIEWER CHECKLIST

During CEO Interview:

- _____ Names of TMG members
- _____ Names of Knowledge Workers Employees
- _____ Name of distribution/collection person: _____ Phone: _____
- _____ CEO Signature on Endorsement memo

From Administrative Assistant:

- _____ How to distribute
_____ Photocopies of Endorsement Memo

On-site at work area:

- _____ Fill in code #'s (below) respond by date, and who to respond to on surveys.
_____ On surveys: Fill respond by date and who to respond to on surveys.
_____ Write TMT members names into CEO survey
_____ Put Endorsement memo, coded survey, and return envelope in each packet
(be sure to write respondent name on outside).

COMPANY:			
Circle One	NAME	SURVEY NUMBER	DATE for Survey Return
CEO			
TMG / KW			

APPENDIX G

Internal Memo from CEO to Other Employees

MEMORANDUM

To:

From:

Date:

Subject: Completing the Attached Survey

I have decided to participate in a study being conducted by the University of Maryland. I believe that we will benefit from helping to provide the information requested and from being able to obtain the study results which will include other high-technology companies. Our involvement requires the completion of questionnaires by selected members of our management staff, including myself. Completion of the survey will take approximately 45 minutes of your time. Responses will only be available to the research team, and results will not identify any individual or particular company.

I am asking you to complete the survey by _____ and return it to _____, sealed in the envelope provided. Please be sure to return the survey by this date because the research team will be coming back to pick them up.

Thank you for your help.

XXX

APPENDIX H

CEO and TMT Background Survey

Background Information

Regarding yourself:

1. What is your current **age**? _____ years
2. What is your **sex**? (check one) Male Female
3. What is your **race**?
 American Indian Asian or Asian American
 African American White American
 Mexican American Hispanic American
 Other: _____

Regarding your educational background:

4. Years of **post-high school education** _____.

Regarding your entire working career:

5. How long have you worked **full-time**?
_____ years
6. How many years have you worked full-time in your **current industry**? _____ years
7. In how many industries you have worked?
_____ industries

Please list these industries

8. How many years have you worked in each of the following **functional areas** during your career?
Operations/Engineering _____
Finance/Accounting _____
R&D _____
HR/Personnel _____
Marketing/Sales _____
Administration/Legal _____
Other: _____ years:

Regarding your career with your present employer:

9. What is your current **job title**?
 Chief Executive Officer

Other: _____
10. What do you consider your **functional area of expertise**?
 Operations/Engineering Finance/Accounting
 R & D HR/Personnel
 Marketing/Sales Administrative/Legal

Other: _____
11. How long have you held your **current position**?
_____ years
12. How long have you worked for your current **employer**?
_____ years
13. How many **different positions** have you had with this employer?
_____ different positions
14. What **role** did you play in the **founding** of this organization?
 I am the sole founder of this firm.
 I am a co-founder of this firm.
 I was not involved in founding this firm.

Regarding your current organization's structure:

15. Are you on the **board of directors**? No Yes
16. Do you own **stock** in this firm? No Yes
If yes, what percentage of the total shares? _____ %
17. Are you also the Chairman of the Board? No Yes

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