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UNDERSTANDING THE TEMPORAL RELATIONSHIP BETWEEN JUSTICE AND TEAM GOAL COMMITMENT IN VIRTUAL PROJECT TEAMS

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Abstract

Virtual project teams are spontaneous group configurations that endeavor to overcome spatial and temporal restrictions in bringing together distant experts to create just-in-time knowledge sharing coalitions. Due to their time-constrained nature and anonymity among members, we argue for team goal commitment as a more pertinent factor driving task performance. We then hypothesize that members' perceived distributive, interactional, and procedural justice are viable antecedents leading to the inducement of team goal commitment among virtual project team members. Empirical findings from a longitudinal field experiment reveals that: (1) distributive justice has a positive and consistent effect on members' team goal commitment across time; (2) interactional justice has a positive effect on members' team goal commitment which increases over time, and; (3) procedural justice has differential effects on members' team goal commitment across time depending on whether it deals with general working conditions or conflict resolution. Based on our analytical results, implications for both theory and practice are highlighted.

Keywords: Virtual Project Teams, Distributive Justice, Interactional Justice, Procedural Justice.

1 INTRODUCTION

Virtual project teams are groups of geographically and/or temporally dispersed individuals who are brought together via collaborative technologies (e.g., email, inter-organizational systems and groupware applications) to create “just-in-time knowledge sharing” networks that assimilate localized expertise and proficiencies without being constrained by the traditional handicap of collocation (Malhotra et al. 2001, p. 238). For this reason, virtual project teams are invaluable to organizations by: (1) offering affordable access to distant experts; (2) providing scalability in coping with interactional intensity, and; (3) according social equality during knowledge sharing (Beranek et al. 2005; Jarvenpaa & Leidner 1999). Yet, the formation of virtual project teams presents its own set of challenges. Chaar et al. (1996) admitted that social hurdles are pervasive within virtual project teams. The absence of direct physical contact in virtual project teams significantly reduces communal support, communication synchronicity, social presence and visual cues, culminating in difficulties in fostering and sustaining positive collaborative attitudes among members (Powell 2000). Indeed, the lack of media richness in virtual project teams poses a threat to project leaders’ ability to articulate goals and monitor members’ progress (Kayworth & Leidner 2000).

Prior studies have ascertained commitment as a salient driver of employee performance and satisfaction (Iverson & Buttigieg 1999). Powell (2000) reported that members’ commitment to virtual project teams positively affects task outcomes and their level of satisfaction with the collaborative experience. While we do not dispute the relevance of Powell’s (2000) emphasis on team commitment (i.e. a member’s psychological bond to other team members), contextual characteristics exclusive to virtual project teams may warrant an in-depth scrutiny of *team goal commitment* as a distinct but equally salient concept in advancing the quality of collective decisions. Conceivably, due to the short-term collaboration nature of virtual project teams and the spontaneity of their membership (Kinney & Panko 1996), members are unlikely to cultivate deep social bonds with one another. Rather, Beranek et al. (2005) claimed that members of virtual project teams tend to place greater emphasis on the achievement of broader group objectives. We hence argue for team goal commitment as a more germane construct specific to virtual project teams and endeavour to answer this research question: *What are the salient factors driving members’ team goal commitment in virtual project teams?*

This study proposes a timely and pertinent contribution to extant literature by exploring team goal commitment as an overlooked critical success factor in virtual project teams. Through the lens of the Social Exchange Theory (SET), we construct and empirically investigate a theoretical model that predicts how team goal commitment could be influenced by various justice measures. Further, we introduce time as a viable moderator that mitigates the relationship between members’ justice perceptions and their level of team goal commitment in virtual project teams.

2 BASIC CHARACTERISTICS OF VIRTUAL PROJECT TEAMS

Virtual project teams comprise members who have been selected (on the basis of knowledge expertise and/or skill proficiencies) and assembled to fulfil a specific business purpose through a series of intense digitized meetings (Kinney & Panko 1996). Often, the task involves the brainstorming and development of solutions for sophisticated business problems that cannot be resolved simply by a single straightforward decision (Kinney & Panko 1996). In the face of mounting pressure from economic globalization, it is inevitable for organizations to place a premium on such cooperative knowledge sharing networks as a driver of sustainable competitiveness in the marketplace (Malhotra et al. 2001). Like Malhotra et al. (2001), we characterized virtual project teams as follows:

- Main objective of the virtual project team is predefined to guide the recruitment of members but a substantial degree of latitude is given for the establishment of auxiliary goals as well as for the determination of the means by which to attain these goals;
- Roles may be assigned to members at the outset but are mostly decided through group consensus;
- Communication norms and the fostering of shared understanding may be introduced at the beginning but will likely evolve through ongoing computer-mediated social interactions.

3 GOAL COMMITMENT IN VIRTUAL PROJECT TEAMS

Locke et al. (1988) conceived goal commitment as depicting “one’s attachment to or determination to reach a goal, regardless of the goal’s origin” (p. 24). That is, goal commitment describes the extent to which individuals voluntarily intensify their involvement in the attainment of a goal (Locke et al. 1981). Since the complexity of the business problem precludes the formation of a well-defined pre-determined target to be achieved beforehand, virtual project teams are formalized under a broad business objective such that the “general plan and specific sub-decisions [are allowed to slowly] emerge over a series of meetings” (Kinney & Panko 1996, p. 133). In virtual project teams, conventional methods of authoritative control are usually replaced by self-induced motivations or group-negotiated consensus (Handy 1995) such that it becomes extremely easy for members to stray from the original mission. Team goal commitment therefore builds rapport among members by channelling and focusing their attention on the pressing issue at hand—what Locke et al. (1981) described as one’s “determination to try for a goal and the persistence in pursuing it over time” (p. 18; see also Locke et al. 1988). The presence of goal commitment hence translates to an individual’s unwillingness to lower or abandon an agreed-upon goal (Locke et al. 1981, 1988).

Beranek et al. (2005) maintained that members’ commitment towards group objectives is instrumental to project success in virtual project teams by aligning individuals in the pursuit of common ends. In the absence of goal commitment, it is not unusual for members to pursue partisan interests such that miscommunication and conflicts readily manifest in the form of “differing expectations and inconsistent deliverables” (Beranek et al. 2005, p. 248). This in turn promotes resource competition among members and reduces group efficacies. Salancik (1977) aptly stated that “a person who is committed to a goal will try harder to achieve it than if he is not” (p. 27). The pertinence of communicating and institutionalizing team goal commitment among members in virtual project teams is best conveyed by Beranek et al. (2005) in the following observation:

“Team leaders must establish and document both a clear project mission and a priority-level commitment with upper-management and the team participants. All of the team members should understand what constitutes project success and share the common goal of achieving that end. If goal alignment is not formally established among team members, individuals tend to pursue different priorities and virtual projects often fail...a person’s attraction to a group is connected to his/her assessment of the consequences of group participation. That, in turn, is linked to how clearly the nature of the group and its goals were delineated, how likely it is that the goal will be achieved, and how closely the characteristics of the group match the person’s needs and values.” (p. 250-251)

Team goal commitment is therefore pivotal to the success of virtual project teams as it endorses a communal vision to unite members’ efforts in the achievement of group objective. Given the capacity of goal commitment in engendering single-minded focus on goal achievement, we define team goal commitment as the *extent to which an individual member is willing to voluntarily contribute towards the accomplishment of the goal of the collective body to the best of his or her capabilities.*

4 SOCIAL EXCHANGE THEORY (SET) AND PSYCHOLOGICAL CONTRACTS: AN OVERVIEW

The SET emphasizes mutual reciprocity among participants as the underlying governance mechanism in any peer-based social community (Tiwana & Bush 2000); it involves the dynamic exchange of “diffuse, ill-defined obligations in terms of the nature, value, and timing of the benefits rendered and received by the parties” (Organ. 1990, p. 63). In contrast to pure economic transactions in which such obligations are explicitly defined and contractually quantifiable, social exchanges typically function on the principle that “people do others a favour with a general expectation of some future return but no clear expectation of exact future return” (Kankanhalli et al. 2005, p. 115). The SET offers an intuitive glimpse into the (tangible and intangible) costs and benefits borne by individuals in participating within relational networks (Gefen & Ridings 2002). According to the SET, any social interaction involves an exchange of resources that can always be structured as the interplay of power among participants through the partisan accumulation of exclusive social resources (Emerson 1981).

Social exchange relationships are fertile breeding grounds for opportunistic behaviours whereby individuals may opt to operate in ways that maximize their benefits while concurrently, minimizing their costs (Molm 1997). Individuals participating in a social exchange must therefore have “faith in the cooperative intentions of the other individuals with whom they are engaging due to the lack of a mechanism that could enforce an equal exchange” (Gefen & Ridings 2002, p. 51). This belief of symmetrical reciprocity is such a pronounced feature of social exchanges that in its absence, individuals are less likely to voluntarily partake in the exchange relationship (Kankanhalli et al. 2005). Empirically, the SET has been extensively applied to explain affiliations among employees within an organization (Gefen & Ridings 2002) as well as individuals’ willingness to participate in relational networks (Cook & Emerson 1978).

In the context of virtual project teams where there is almost zero physical interaction and limited relational bonding beyond what is attainable via computer-mediated communication media, the SET can serve as a theoretical anchor for predicting team goal commitment among members. Because virtual project teams offer limited frames of reference from which members can formulate projections of how others may behave, the extent to which a member voluntarily commits to the achievement of group objectives is dependent on whether the individual is convinced of the collective reciprocal intentions of other team members (Chatman & Flynn 2001). Such convictions among members are especially relevant for virtual project teams in that their peer-based nature inhibits the enactment and enforcement of rules and regulations governing social interactions (Tiwana & Bush 2000).

Psychological contracts are native to social exchange relationships (Morrison & Robinson 1997). A psychological contract represents a set of beliefs about what each party involved in a social exchange relationship is entitled to receive, and obligated to give, in anticipation of others’ contributions (Morrison & Robinson 1997). Empirical studies suggest that the cultivation of psychological contracts prevents social loafing and the premature exit of members from social exchange relationships (Robinson et al. 1994; Robinson & Morrison 1995; Robinson & Rousseau 1994). Psychological contracts thus form the cornerstone of virtual project teams. Since it is difficult to quantify knowledge contributions in a project setting given the exclusivity of each member’s domain of expertise (Beranek et al. 2005), success in virtual project teams is only guaranteed when psychological contracts are implicitly held by each member, giving him/her the confidence that selflessness on their part will be rewarded in kind by others in the group as and when the right opportunity arises.

5 IMPACT OF JUSTICE ON PSYCHOLOGICAL CONTRACTS WITHIN VIRTUAL PROJECT TEAMS

Tan et al. (2005) posited that the process of creating and sharing knowledge typically entails the exchange of tangible and intangible social resources among parties involved because knowledge in itself is a valuable commodity to be ‘traded’ in the modern economy. Knowledge contributions can lead individuals to perceive a loss of control within the organization (Gray 2001), but concurrently, they may serve to enhance contributors’ image or reputation among peers and colleagues (Kankanhalli et al. 2005). Because knowledge creation and sharing is the centrepiece of virtual project teams (Beranek et al. 2005), it is deducible that relationships among members assume similar forms of resource-based social interactions such as those stipulated in the SET. Unlike economic transactions however, knowledge exchanges function on the principle of delayed reciprocation whereby people do others a favour with an expectation of some future return but with no clear indication of its exact nature (Kankanhalli et al. 2005). That is, participants in knowledge sharing communities will most probably contribute to the best of their capabilities so long as they believe that others will reciprocate when the right time presents itself. Yet, Cook and Emerson (1978) contended that individuals tend to be opportunistic by manipulating others for partisan gains whenever such exploitative actions are not constrained by justice mechanisms. The existence of unenforceable psychological contracts (Morrison & Robinson 1997) among members to participate in reciprocal knowledge sharing within virtual project teams thus warrants the presence of justice measures to curb the influence of partisan interests.

Masterson et al. (2000) recommended the induction of justice measures to govern the derivation of outcomes within social exchange relationships. The concept of justice has been popularized by

scholars as a means to induce perceptions of fairness in individuals through shaping one's thoughts, feelings and actions (Tyler 2000). Investigative evidence has pegged justice as a predictor to a various positive outcomes such as organizational citizenship and group cooperation (Moorman 1991; Tyler & Bladder 2003); the very behaviors psychological contracts seek to encourage (Robinson et al. 1994; Robinson & Morrison 1995; Robinson & Rousseau 1994). Such findings have led Tyler and Blader (2003) to theorize that justice contributes to individuals' collective self—the social identity linked to group memberships—to the extent to which it dictates their willingness to cooperate with others, a proposition yet to be empirically validated and the primary impetus for this study.

Justice is a multi-dimensional construct that encompasses three conceptually distinct dimensions, namely distributive, interactional, and procedural justice (Colquitt et al. 2001; Masterson et al. 2000). Adapting these concepts to virtual project teams, we define: (1) distributive justice as the *extent to which an individual perceives outcome allocation among group members to be comparable to the amount of effort put in by each member*; (2) interactional justice as the *extent to which an individual perceives he/she has been fairly treated by other group members*, and; (3) procedural justice as the *extent to which an individual perceives that structural controls are in place to ensure democratic interactions among group members* (Colquitt et al, 2001).

5.1 Distributive Justice and Team Goal Commitment

Much of the pioneering research into distributive justice was extended from the seminal work of Adams (1965), who utilized a social exchange framework to evaluate fairness. According to Adams (1965), people are less concerned with the absolute magnitude of outcomes *per se* but are more particular about the commensuration of those outcomes relative to one's contributions (see also Colquitt et al. 2001; Schminke et al. 1997). If members of virtual project teams were led to believe that compensation is awarded relative to the level of contribution, they are more likely to adhere to psychological contracts among one another. Such a proposition is consistent with the premise of the Expectancy Theory (ET), which holds that intrinsic motivation is shaped by the extent to which an individual perceives: (1) one's effort will lead to desired performance (i.e. effort-performance expectancy); (2) the attainment of performance standards will be rewarded in kind as compensation for one's effort (performance-outcome instrumentality), and; (3) the reward is commensurable with one's expectations (outcome valences) (Lim et al. 2005). Because the positive linkage between distributive justice and commitment has been verified through numerous empirical studies (e.g., McFarlin & Sweeny 1992), we hypothesize that,

Hypothesis 1: A member's perceived distributive justice within a virtual project team is positively related to his/her team goal commitment.

5.2 Interactional Justice and Team Goal Commitment

Bies and Moag (1986) noted that individuals' judgment of fairness is also founded on the quality of interpersonal treatment received during the execution of procedures—a notion they labelled as interactional justice. Critics have however contested that interactional justice should be subsumed under the broader concept of procedural justice, arguing that interactional components, like structural elements, impact procedural justice (Cropanzano & Greenburg 1997) or that interpersonal and structural variables are complementary and thus inseparable (Tyler & Bies 1990). But as countered by Masterson et al. (2000), individuals' "attributions for the source of interactional justice perceptions tend to generalize to the person carrying out the interpersonal treatment, and that procedural justice perceptions tend to generalize to the entity to which the procedures are attributable" (p. 739). In situations characterized by high levels of interpersonal empathy, it is likely that there will be greater tolerance for individual mistakes or failures. Without such tolerance, confrontations among virtual project team members are inevitable. Interpersonal empathy is therefore a valuable commodity in virtual project teams to bridge estranged social relationships (Beranek et al. 2005). It fosters awareness and mutual understanding among virtual project team members of one another's constraints such that psychological contracts can be sustained. This is especially true when adverse circumstances beyond the control of individuals were to surface. Nonetheless, interpersonal empathy

can only be bred through respect and congeniality, which in turn warrants interactional justice. Interactional justice should have a positive influence on team goal commitment in virtual project teams by nurturing interpersonal empathy to countervail the impact of negative attributions on psychological contracts among members (Colquitt et al. 2001). Evidence from existing studies also reinforces the validity of interactional justice as a predictor of commitment among members of relational networks. Findings from Malatesta and Byrne (1997) as well as Masterson and Taylor (1996) revealed that interactional justice is suited for predicting outcomes of commitment directed at peer-to-peer or supervisor-subordinate relationship. We thus hypothesize that,

Hypothesis 2: A member's perceived interactional justice within a virtual project team is positively related to his/her team goal commitment.

5.3 Procedural Justice and Team Goal Commitment

Procedural justice, as conceived by Thibaut and Walker (1975), refers to structural elements such as process control and opportunities for voice as major deterrents against exploitation. Schroth and Shah (2000) suggested that "people look to procedures to assess their value by the group, organization, or authority using the authority" (p. 463). Fair procedures signify respect by the group or authority which imposes the procedure whereas unfair procedures imply low regard by the very same group or authority (Schroth & Shah 2000). Schroth and Shah (2000) further alleged that unfair procedures diminish one's self-esteem when an individual cannot deny responsibility for failure or accept credit for success. Lane (1988) therefore posited that procedural justice is often interpreted by the individual as an implicit evaluation of his/her worth by the collective body. Clearly, procedural justice is applicable to psychological contracts within virtual project teams where promises assume the form of knowledge contributions, which are hardly quantifiable. Not only does procedural justice offer some sort of assurance that members' individual contributions are not being neglected by the collective body (Schroth & Shah 2000), it also clarifies the ambiguities surrounding obligations in psychological contracts by enhancing the visibility of one's effort towards the achievement of group objectives. This builds confidence among members in fulfilling psychological contracts. Moreover, empirical findings illustrated that individuals' perceptions of procedural justice are positively related to their commitment as well (Malatesta & Byrne 1997; Masterson & Taylor 1996). We thus hypothesize that,

Hypothesis 3: A member's perceived procedural justice within a virtual project team is positively related to his/her team goal commitment.

5.4 Time as a Moderator of the Relationship between Justice and Team Goal Commitment

Given the spontaneous nature of virtual project teams, the capacity for members to gel and perform within a limited time frame is of utmost importance. According to Ancona et al (2001), time affects research in three ways: (1) by influencing how time is construed; (2) by determining how activities are mapped to time, and; (3) by shaping how actors relate to time. In virtual project teams, members are compelled to come together and attain a specific mission within an allocated time period (Beranek et al. 2005). Consequently, it is not only imperative for team goal commitment to develop quickly among members of virtual project teams, it is also crucial for such commitment to be sustainable across the entire duration of the project. Yet, conflicts are a predominant aspect of virtual project teams and threaten group cohesion (Tan et al. 2005). As noted by Kabanoff (1991), disagreements induce a sense of injustice and in turn, may prompt a greater desire among members of collective bodies to withdraw from further participation. This should hold true for the latter stages of virtual project teams where time pressure would have stretched members' patience, leading to the frequent occurrence of conflicts among one another (Beranek et al. 2005). We hence postulate that the saliency of justice measures on members' team goal commitment should increase as time passes,

Hypothesis 4: Time reinforces the relationships between a member's justice perceptions towards the virtual project team and his/her team goal commitment such that the more time passes, the stronger are the positive relationships of (a) distributive justice, (b) interactional justice and (c) procedural justice on team goal commitment.

6 METHODOLOGY

The aforementioned hypothesized relationships were investigated in a longitudinal field experimental setting for several reasons. First, as Cooper and Schindler (1998) noted, experimentation studies involve an intervention by the researcher that goes beyond what is required for measurement. Field experimentation techniques however enable the development of models based on data collected naturally, and hence, constitute more generalizable settings for investigating phenomena that could not easily be replicated in laboratories (Zmud et al. 1990). Furthermore, our research design offers a limited degree of experimental control, which might be useful for theory testing (Zmud et al. 1990). Considering the pervasiveness of virtual project teams, we allege that field experimentation is a much more fitting investigative strategy to derive insightful intuition into how members' justice perceptions impact their level of team goal commitment. Moreover, as time is postulated as a moderator of the relationships between justice and team goal commitment, the longitudinal design of our field experiment serves the dual purpose of testing the temporal validity of our hypothesized relationships.

The longitudinal field experiment was conducted in conjunction with a class project for an undergraduate module in a large Asian university. The module accentuates strategic applications of ICT and is a compulsory course offered to undergraduates pursuing a degree in Management Information Systems. As part of the course credit, enrolled students are expected to complete a group assignment that requires them to apply concepts and theories introduced in class to solve various business problems. Furthermore, it is mandated that this assignment be tackled in an anonymous virtual project team environment over a two-week period in order to expose students to the constraints and realities of working in contemporary corporate settings.

6.1 Scale Development

Scale items extracted from extant literature were utilized to measure the various constructs hypothesized in this study with minor adaptations. Measurements for the cognitive constructs (i.e., team goal commitment together with the three dimensions of distributive, interactional and procedural justice) were adapted with specific emphasis on items that demonstrated good psychometric properties (Nunnally & Bernstein 1994). The scale only incorporated measures exhibiting adequate reliability (i.e., Cronbach's $\alpha > .80$) and sufficient construct validity as confirmed through past empirical studies. To verify construct validity and evaluate the extent to which the elicited measurement items adequately tap on their corresponding latent variables, a round of labelled sorting was carried out with a panel of selected judges comprising 5 postgraduate students from the information systems discipline (Moore and Benbasat, 1991). Hit ratios averaged 89% and can be interpreted as a good indication of construct validity.

6.2 Justice Manipulations

For the manipulation of procedural justice, distinction was made between general working and conflict resolution guidelines in keeping with Leventhal's (1980) criteria, i.e. the prescribed general working and conflict resolution guidelines should: (a) be applied consistently across people and time; (b) be free of biases; (c) ensure that accurate information is collected and utilized in making decisions; (d) enclose mechanisms to correct flawed or inaccurate decisions; (e) conform to personal or prevailing standards of ethics or morality, and; (f) offer assurance that the opinions of parties affected by the decision have been accorded due attention. Whereas the general guidelines for working as a virtual project team govern the format of discussion, conflict resolution guidelines offer systematic instructions on the sequence of steps to be taken in managing disagreements and reconciling dissenting opinions within the community (Beranek et al. 2005). For the manipulation of interactional justice, a set of communication etiquette was advocated to encourage a congenial and deferential interactional environment (Bies & Moag 1986; Colquitt et al. 2001; Shapiro et al. 1994). Finally, for the manipulation of distributive justice, project grading was partitioned into individual and group components. Concise grading criteria were meted out to offer virtual project team members with a comprehensible synopsis of how group-level assessments will be gauged by a panel of independent judges assembled from both academic and practitioner circles (Colquitt et al. 2001). Additionally,

virtual project team members were made aware that confidential peer-evaluation forms will be distributed upon project completion to enable participants to assess each of their peers on the quality of his/her contribution towards the accomplishment of the collective mission and that responses from these peer-evaluation forms will be utilized to adjust the grades students receive for the project.

To validate our experimental treatments, the manipulated instructions together with the measurement items for the justice dimensions were combined to create an online survey instrument for pre-testing purposes. Given the predominantly Internet-savvy target audience, an electronic survey would be the most suitable option (Stanton & Rogelberg 2001). Undergraduate and graduate students, who are not registered for the module, were recruited and promised a reward of SGD \$5.00 in return for their assistance in the pre-test. In total, 20 pre-test subjects were solicited. Each respondent was instructed to go through the guidelines contrived for the various justice manipulations before responding to the measurement items. Because an online questionnaire is also planned for the actual field experiment in light of the anonymity of virtual project teams, these pre-test subjects serve a dual role in affirming the clarity of the survey instructions because there will not be any face-to-face communication between the researchers and the target audience. Our justice manipulations are substantiated based on the results of the pre-test. Feedback from the pre-test subjects was also utilized to make minor refinements to the wording of the measurement items.

6.3 Experimental Design

The lack of anonymity may be a potential confound in this study (Thatcher & Brown 2010; Robert Jr. et al. 2009). Fostering team goal commitment via justice mechanisms may mitigate delinquent behaviours among members within virtual project teams by inducing single-minded focus on group objectives despite the predominance of estranged relationships. Yet, if members were to be acquainted with one another prior to the formation of virtual project teams (Thatcher & Brown 2010), the achievement of group objectives may be relationally driven (Robert Jr. et al. 2009). Therefore, to prevent virtual project team members from initiating face-to-face contact in a collocated environment, two measures were undertaken. First, dummy Hotmail accounts were created and assigned to each subject. These Hotmail accounts were intended specifically for correspondences among members with regards to any project-related matters. The randomly generated UserIDs for the Hotmail accounts also serve as the only form of identification for members within virtual project teams and participants were cautioned that exchanges may be monitored in order to further discourage the disclosure of real identities. Second, to ensure that members will not come to recognize one another via transmissions of audio and/or visual cues, functions related to voice conversations and video conferences were disabled from the technologies in use for the experiment.

To complement the course credit as a motivational factor in driving members to derive quality solutions, the course assignment was simultaneously structured as a case study competition in which members of the top three teams with the highest grades collectively assessed by a panel of judges independent of the research stood to win cash prizes of \$30, \$20 and \$10 respectively. Due to time constraints imposed by the module, it is imperative to ensure that the experimental subjects are well-equipped for group discussions the minute the virtual project teams convene. Consequently, the experiment was organized in a manner that compels members to perform autonomous research into the business problem before convening with others. This will guarantee that whenever the virtual project teams convene, the time allocated will not be wasted on unprepared members.

Each experimental subject was given a unique UserID for accessing: (1) a detailed case competition timeline; (2) general working and conflict resolution guidelines; (3) first segment of the business case, and; (3) discussion questions for the individual report. Upon submission of a one-page individual report, the actual experiment then commenced by furnishing each subject with: (1) the IDs of his/her teammates and (2) an exclusive Hotmail account together with its corresponding password. Subjects were also given discussion questions for their first group report. Upon the submission of the five-page group report due by week 1, they were directed to an URL containing the online survey. Participation in the online survey is completely voluntary, but the completion counted toward one tutorial attendance for the module. On the next day, subjects were distributed the second segment of the business case and another set of discussion questions for the final group report. Upon submission of

the second and final five-page Group Report due by week 2, the URL for the second online survey was announced to the subjects. As was the practice with the first survey, completion of the voluntary online survey counted towards another tutorial attendance for the course. Peer-evaluation forms were then made available to the team members, and subjects were instructed to return them to the course instructor. A de-brief was conducted approximately one month later to present key findings of the experiment to participating students and to award winners with the appropriate prizes.

6.4 Data Analysis

A total of 76 students participated in the experiment. They were assigned to virtual project teams consisting of 4-5 members. All 76 subjects completed the experiment and responded to both online surveys, thereby eliminating potential biases due to either attrition or non-responses. For both surveys, repeated and homogeneous responses were removed, yielding 76 and 71 data points for week 1 and week 2, respectively. Further, to ensure consistency in comparison, only valid responses provided by the same individual for both weeks are included in data analysis. This yields a total of 71 data points for analysis across both weeks. Partial Least Squares (PLS) analysis is utilized to validate both the measurement and structural properties of our research model. Table 1 summarizes the descriptive statistics of the measures together with their factor loadings. Measurements with factorial loadings less than 0.70 for either week were dropped.

| Measurement Items | | Week 1 | | | Week 2 | | |
|--|---|--------|------|---------|--------|------|---------|
| | | Mean | S.D. | Loading | Mean | S.D. | Loading |
| <i>Procedural Justice – General Guidelines</i> | | | | | | | |
| P1G | The General Guidelines for Working as a Virtual Project Team were consistently adhered to by my team members. | 5.58 | 1.10 | 0.13 | 5.24 | 1.42 | 0.84 |
| P2G | The General Guidelines for Working as a Virtual Project Team allowed me to play a role in our team decision-making process. | 5.47 | 0.74 | 0.72 | 5.41 | 0.88 | 0.84 |
| P3G | In the past week, the General Guidelines for Working as a Virtual Project Team allow me to have fair opportunities to express my opinions to the team during the decision-making process. | 5.58 | 0.88 | 0.76 | 5.48 | 1.01 | 0.87 |
| P4G | The General Guidelines for Working as a Virtual Project Team meet most ethical and moral standards. | 5.37 | 0.95 | 0.94 | 5.32 | 1.09 | 0.93 |
| P5G | The General Guidelines for Working as a Virtual Project Team addressed my concerns about the how we carried out our team discussions. | 5.12 | 1.19 | 0.81 | 5.14 | 1.16 | 0.92 |
| P6G | The General Guidelines for Working as a Virtual Project Team are free of biases. | 5.25 | 1.23 | 0.64 | 5.20 | 1.27 | 0.86 |
| <i>Procedural Justice – Conflict Resolution Guidelines</i> | | | | | | | |
| P1C | The Guidelines for Conflict Resolution were consistently adhered to by my team members. | 5.25 | 1.03 | 0.76 | 5.20 | 1.12 | 0.88 |
| P2C | The Guidelines for Conflict Resolution allowed me to have fair opportunities to express my side of views to the team when we tried to resolve our disagreements. | 5.28 | 0.97 | 0.79 | 5.25 | 1.08 | 0.91 |
| P3C | The Guidelines for Conflict Resolution allowed me to better manage the resolution of our decisional conflicts. | 5.13 | 1.09 | 0.74 | 5.14 | 1.10 | 0.94 |
| P4C | The Guidelines for Conflict Resolution meet most ethical and moral standards. | 5.32 | 1.00 | 0.93 | 5.27 | 1.12 | 0.93 |
| P5C | The Guidelines for Conflict Resolution were able to address my concerns regarding how we resolve decisional conflicts. | 5.21 | 0.88 | 0.92 | 5.14 | 1.04 | 0.95 |
| P6C | The Guidelines for Conflict Resolution are free of biases. | 5.03 | 1.17 | 0.85 | 5.01 | 1.24 | 0.90 |
| <i>Interactional Justice</i> | | | | | | | |
| I1 | In the past week, the communications between me and my team members were conducted in a candid manner. | 5.32 | 1.18 | 0.59 | 5.31 | 1.25 | 0.71 |
| I2 | In the past week, I did not encounter any improper comments or remarks in my communications with my team members. | 5.71 | 1.23 | 0.71 | 5.70 | 1.12 | 0.85 |
| I3 | In the past week, I was treated in a congenial manner in my communications with my team members. | 5.67 | 0.97 | 0.85 | 5.71 | 0.91 | 0.82 |
| I4 | In the past week, my team members took into consideration how I feel when communicating with me. | 5.45 | 0.97 | 0.88 | 5.56 | 0.91 | 0.85 |

| | | | | | | | |
|-----------------------------|--|-------------|-------------|-------------|-------------|-------------|-------------|
| I5 | In the past week, I was treated with dignity in my communications with my team members. | 5.72 | 0.89 | 0.90 | 5.72 | 0.87 | 0.92 |
| I6 | In the past week, I was treated with respect in my communications with my team members. | 5.78 | 0.87 | 0.88 | 5.74 | 0.87 | 0.88 |
| I7 | In the past week, I was able to receive timely responses from my team members. | 5.18 | 1.28 | 0.55 | 5.29 | 1.28 | 0.71 |
| I8 | In the past week, I was able to reason with my team members in a friendly manner. | 5.67 | 0.93 | 0.80 | 5.67 | 0.96 | 0.88 |
| Distributive Justice | | | | | | | |
| D1 | I believe that the competition results for this case competition will reflect the effort that our team has put into the work. | 5.24 | 1.44 | 0.89 | 5.06 | 1.55 | 0.89 |
| D2 | I believe that the competition results for this case competition will reflect the quality of work our team has accomplished. | 5.33 | 1.34 | 0.88 | 5.13 | 1.45 | 0.93 |
| D3 | I believe that the competition results for this case competition will reflect how much I have contributed to the project. | 5.08 | 1.19 | 0.89 | 4.92 | 1.36 | 0.93 |
| D4 | I believe that the grade I am going to receive for this case competition will reflect the effort that I have put into our work. | 4.88 | 1.21 | 0.92 | 4.77 | 1.37 | 0.92 |
| D5 | I believe that the grade I am going to receive for this case competition will reflect the quality of work our team has accomplished. | 5.28 | 1.11 | 0.86 | 5.10 | 1.33 | 0.91 |
| D6 | I believe that the grade I am going to receive for this case competition will reflect how much I have contributed to the project. | 4.91 | 1.25 | 0.94 | 4.83 | 1.36 | 0.93 |
| Team Goal Commitment | | | | | | | |
| TGC1 | In the past week, I committed a major chunk of my time on achieving our team goals. | 5.22 | 1.24 | 0.75 | 5.18 | 1.28 | 0.57 |
| TGC2 | In the past week, I was very happy to spend a major chunk of my time working towards our team goals. | 4.74 | 1.41 | 0.83 | 4.72 | 1.49 | 0.66 |
| TGC3 | In the past week, I enjoyed discussing our team goals with my friends outside the team. | 4.04 | 1.34 | 0.39 | 3.89 | 1.42 | 0.32 |
| TGC4 | In the past week, I had to sacrifice other activities so that our team would be able to accomplish our team goals. | 5.24 | 1.21 | 0.41 | 5.22 | 1.25 | 0.46 |
| TGC5 | I identified strongly with our team goals. | 5.21 | 1.02 | 0.81 | 5.15 | 1.18 | 0.83 |
| TGC6 | In the past week, I was proud to show others that I was working hard towards our team goals. | 4.95 | 1.09 | 0.86 | 4.84 | 1.17 | 0.86 |
| TGC7 | The team goals really inspired me to contribute to the best of my ability during our team discussion last week. | 4.93 | 1.30 | 0.88 | 4.91 | 1.33 | 0.87 |
| TGC8 | I was committed to the goals our team chose to focus on achieving. | 5.34 | 1.14 | 0.91 | 5.30 | 1.13 | 0.83 |
| TGC9 | Whether we achieved our team goals means a lot to me. | 5.13 | 1.16 | 0.47 | 5.10 | 1.20 | 0.49 |

Table 1. Descriptive Statistics for Indicator Variables (Dropped Measures in Grey)

Analysis of internal consistencies revealed that all latent constructs exceed prescribed thresholds for standard estimates of Cronbach's alpha, composite reliability and the Average Variance Extracted (AVE), thus supporting convergent validity (see Table 2). Similarly, discriminant validity is established for all latent constructs in that the square root of the AVE for each construct was found to be greater than its correlation with any other construct (see Table 2).

| | | AVE [> 0.50] | Cronbach's α [> 0.70] | Fornell [> 0.70] | DJ | IJ | PJC | PJG | TGC |
|------------|--------------------------------------|----------------------------|-------------------------------------|--------------------------------|-------------|-------------|-------------|-------------|-------------|
| DJ | Distributive Justice | 0.84 | 0.96 | 0.97 | 0.92 | | | | |
| IJ | Interactional Justice | 0.76 | 0.94 | 0.95 | 0.45 | 0.87 | | | |
| PJC | Procedural Justice – Conflict | 0.84 | 0.96 | 0.97 | 0.70 | 0.64 | 0.91 | | |
| PJG | Procedural Justice – General | 0.81 | 0.92 | 0.94 | 0.66 | 0.71 | 0.79 | 0.90 | |
| TGC | Team Goal Commitment | 0.69 | 0.89 | 0.92 | 0.64 | 0.54 | 0.56 | 0.52 | 0.83 |

Table 2. Inter-Construct Correlation Matrix for Weeks 1 & 2 [Sample N = 142]

Analysis of the structural model was performed on the combined sample of 142 data points with time coded as a categorical variable. Results from the analysis of the structural model, including path coefficients and their statistical significance, are illustrated in Figure 1.

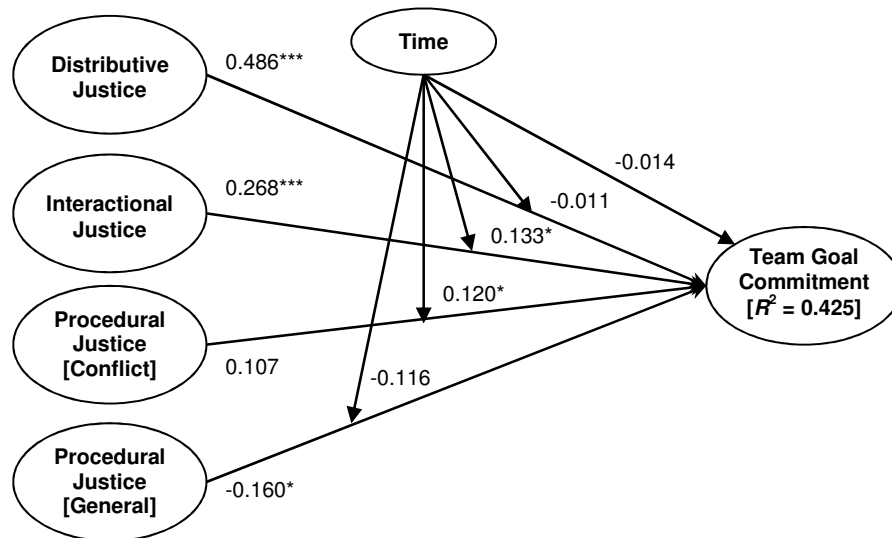


Figure 1. Statistical Results of Structural Model Analysis

As can be seen from Figure 1, *distributive justice* ($\beta = 0.486, p < 0.001$) and *interactional justice* ($\beta = 0.268, p < 0.001$) have positive and significant impacts on *team goal commitment*, thus corroborating hypotheses 1 and 2. While *procedural justice (general working)* exert significantly negative influence on *team goal commitment* ($\beta = -0.160, p < 0.05$), *procedural justice (conflict resolution)* has no effect on *team goal commitment* ($\beta = 0.107, p > 0.05$). Hypothesis 3 is not substantiated. Although *time*, as a moderator, does not affect *team goal commitment* as anticipated ($\beta = -0.014, p > 0.05$), its interactions with *interactional justice* ($\beta = 0.133, p < 0.05$) and *procedural justice (conflict resolution)* ($\beta = 0.120, p < 0.05$) produce moderating terms that exert statistically significant and positive effects on *team goal commitment*. Conversely, *time* neither moderates the relationship between *distributive justice* and *team goal commitment* ($\beta = -0.011, p > 0.05$) nor does it mitigate the relationship between *procedural justice (general working)* and *team goal commitment* ($\beta = -0.116, p > 0.05$). Whereas hypothesis 4a is unsupported, hypothesis 4b is corroborated and hypothesis 4c appears to be partially supported.

To yield additional insights into the differential impacts of various justice measures on team goal commitment, separate analyses of the structural model were performed for both weeks. Results from these analyses of the structural model are depicted in Figure 2.

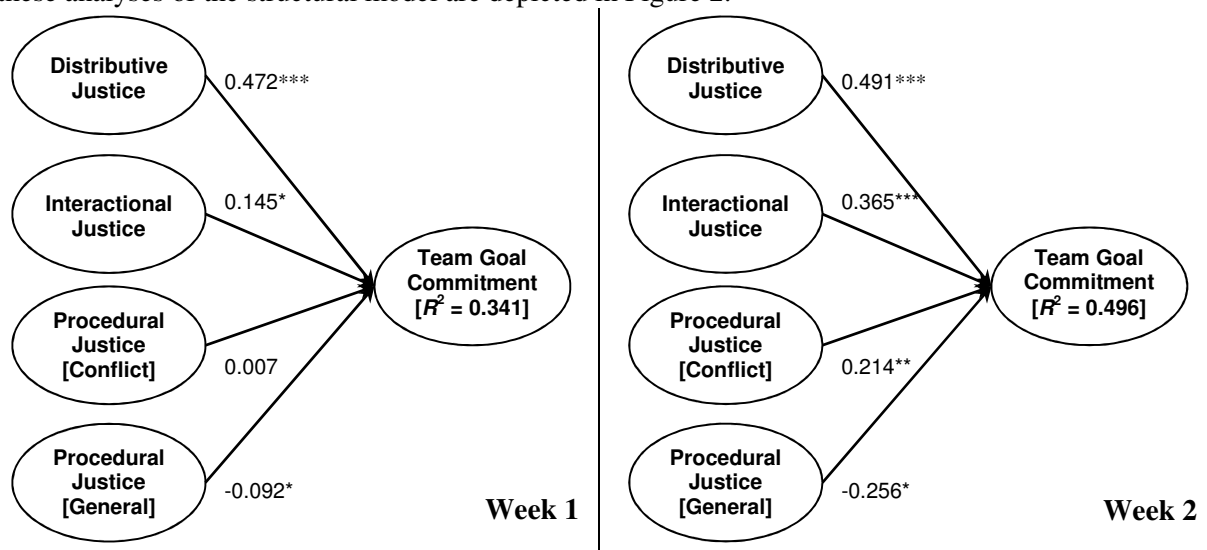


Figure 2. Comparison of Statistical Results from Temporal Analysis of Structural Model

As can be seen from Figure 2, the significantly negative effect of *procedural justice (general working)* on *team goal commitment* remains consistent across time. The same can be said for the positive impacts of *interactional justice* and *distributive justice* on *team goal commitment*. On the other hand, while *procedural justice (conflict resolution)* does not affect *team goal commitment* for week 1 ($\beta = 0.007, p > 0.05$), our analysis registered a significantly positive relationship between *procedural commitment (conflict resolution)* and *team goal commitment* for week 2 ($\beta = 0.214, p < 0.01$) when the deadline of the project is imminent. Further, to certify whether the change in path coefficients for each hypothesized relationships is salient across time, we compute the statistical significance of the difference in path values for each relationship via the formula below:

$$t = \frac{PC_1 - PC_2}{\sqrt{se_1^2 + se_2^2}} \quad (1)$$

where PC_i = path coefficient in structural model under comparison, se_i = standard error of path coefficient PC_i and t = t -statistic with $n - 1$ degrees of freedom. Table 3 summarizes the results from our comparison.

| Relational Path | PC_1 | se_1 | PC_2 | se_2 | t |
|---|--------|--------|--------|--------|---------|
| Distributive Justice → Team Goal Commitment | 0.472 | 0.0509 | 0.491 | 0.0530 | -0.26 |
| Interactional Justice → Team Goal Commitment | 0.142 | 0.0584 | 0.365 | 0.0590 | -2.69** |
| Procedural Justice (Conflict Resolution) → Team Goal Commitment | 0.007 | 0.0376 | 0.214 | 0.0796 | -2.35* |
| Procedural Justice (General Working) → Team Goal Commitment | -0.092 | 0.0574 | -0.256 | 0.1141 | 1.28 |

Table 3. Statistical Comparison of Path Coefficients

Comparatively, it can be inferred from Table 3 that our conclusions from the preceding section are indeed valid. That is, whereas the saliency of *distributive justice* and *procedural justice (general working)* does not increase over time, *interactional justice* and *procedural justice (conflict resolution)* becomes increasingly important as time passes.

7 DISCUSSION

With the advancement of computer-mediated communication technologies, virtual project teams have emerged to become a pre-eminent and integral component of contemporary organizations (Beranek et al. 2005). But despite the well-celebrated benefits of virtual project teams in transcending spatial and temporal boundaries to assimilate localized expertise in tackling unstructured business problems, its over-reliance on ICT-enabled communications significantly reduces the richness of the interactional cues available for interpretation by correspondents. This in turn may exacerbate many of the classical nuisances plaguing relational networks such as cultural insensitivity (Kayworth & Leidner 2000), interpersonal conflicts (Tan et al. 2005) and social loafing (Jarvenpaa & Leidner 1999).

Responding to the socio-technical challenges faced by virtual project teams, this study puts forward the notion of team goal commitment as the governance mechanism behind what is otherwise a loosely coupled and temporary coalition (Kinney & Panko 1996). Arguing for team goal commitment among members as a determinant of successful virtual project teams, we set out to elicit salient antecedents driving members' team goal commitment. We then explore the temporal validity of these antecedents in influencing team goal commitment within virtual project teams. Given that "research on time is still in the initial period of experimentation, and a dominant paradigm has yet to be developed" (Ancona et al, 2001, p. 512), we believe that this study is a step in the right direction towards understanding how team goal commitment in virtual project teams evolves over time in response to various justice mechanisms. Findings from our empirical investigation raise several issues of interest.

7.1 Effect of Distributive Justice

Distributive justice is a strong predictor of team goal commitment across time. While our empirical investigation uncovers a statistically significant relationship between distributive justice and team

goal commitment for both weeks (see Figure 2), the saliency of this relationship does not intensify over time as evidenced by the insignificant interaction relationship with time (see Figure 1). This study therefore testifies to the criticality of distributive justice in fostering team goal commitment among member within virtual project teams. To a certain extent, our findings coincide with pre-existing empirical evidence advocating a positive relationship between distributive justice and commitment (e.g., McFarlin and Sweeney, 1992). Interestingly enough, while McFarlin and Sweeney (1992) acknowledged the impact of distributive justice on team goal commitment, they maintained that distributive justice is inferior to procedural justice in predicting collective outcomes whereas the reverse is true for personal ones. Naturally, this begs the question as to why we witness a statistically significant relationship between distributive justice and team goal commitment but not for procedural justice. Perhaps the rationale for this observation lies in the delineation of the compensatory reward (i.e. project grade) into personal and group components such that the presence of distributive justice will guarantee an equitable outcome distribution, which not only reflects the quality of collaboration for the virtual project team, but also resonates with one's individual contribution (Lim et al. 2005; Morrison and Robinson 1997). Also, as virtual project teams are task-oriented and hence outcome-driven (Beranek et al. 2005), the emphasis by members on the equity of the payoff structure may be especially salient in shaping their team goal commitment. Whereas procedural justice dissuades virtual project team members from engaging in exploitative actions by imposing external restraints, distributive justice builds confidence in psychological contracts by securing commensurable compensation for every participant.

7.2 Effect of Interactional Justice

As deducible from Figure 1, the relationship between interactional justice and team goal commitment increases in strength over time. This deduction is also corroborated by the statistically significant difference in path coefficients for the relationship between interactional justice and team goal commitment (see Table 3). Finding a positive relationship between interactional justice and team goal commitment is not a surprising discovery given the abundance of prior studies, which substantiated the impact of interactional justice on team goal commitment (e.g., Malatesta & Byrne 1997; Masterson & Taylor 1996). What is fascinating from our research is the observation that the effect of interactional justice on team goal commitment becomes increasingly salient over time, i.e. members tend to attach greater importance to the need for congeniality and respect as the assignment draws nearer to its designated deadline.

Lim and Tan (2005) hinted at a logical explanation for this phenomenon in positing that individuals possess an intrinsic character of conflict avoidance to the extent to which participants collaborating on group-oriented tasks share a stronger preference for self-censorship behavior at initial phases of cooperation. Automatically, such desires for conflict avoidance nurture a cordial atmosphere for interaction, which may culminate in a much reduced role of interactional justice. But as pointed out by Lim and Tan (2005), self-censorship behavior comprises the quality of collective knowledge building, which may become more of a hindrance to the fulfillment of psychological contracts as the project deadline approaches (see also Tan et al, 2005). Conceivably, as the project submission deadline looms, members could be pressured to perform such that they are less conscientious of their reactions when interacting with others. Furthermore, the short lifespan typical of virtual project teams may not have provided members with sufficient time to attain consensus in communication protocols and etiquette (Kinney & Panko 1996). Consequently, the quality of interpersonal treatment may suffer, thereby prompting virtual project team members to seek interactional justice.

7.3 Effect of Procedural Justice

From Figures 1 and 2, we can conclude that procedural justice exerts differential impact on team goal commitment subjected to whether the justice measure is targeted at general working conditions or conflict resolutions. This is counter-intuitive in that there is substantial evidence from extant justice literature which attests to the pivotal role of procedural justice in fostering commitment within collective communities (e.g., Malatesta & Byrne 1997; Masterson & Taylor 1996; Masterson et al. 2000). Past studies have alluded to the importance of procedural justice in situations where the

phenomenon of interest centers on communal outcomes (e.g., commitment) (Colquitt et al. 2001; McFarlin & Sweeney 1992). Tyler and Blader's (2003) Group Engagement Model (GEM) echoed the exact same sentiments in postulating that procedural justice is the dominant predictor of collectivistic attitudes, values and behaviors within group settings by embedding structural elements, which cultivate a prominent social identity for the community. Yet, our study reveals that procedural justice pertaining to general working conditions may be detrimental to the cultivation of members' team goal commitment in virtual project teams whereas procedural justice dealing with conflict resolution becomes crucial only when the task deadline is fast approaching.

A plausible reason for these contradictory findings may be traced to the inherent nature of virtual project teams. Virtual project teams are just-in-time knowledge sharing networks that emphasize adaptability (Beranek et al. 2005). Indeed, virtual project teams are characterized by members working under autonomous conditions interspaced with sporadic episodes of intense group discussions, which rely heavily on ICT for communication and coordination (see Qureshi & Zigurs 2001; Jarvenpaa & Leidner 1999). The institutionalization of structural controls may thus impose a layer of rigidity that undermines the flexibility of virtual project teams (Davern and Kamis 2010). This may account for the significantly negative relationship between procedural justice for general working and team goal commitment. For instance, in the context of this study, students attend courses beyond just this particular module such that instilling procedure controls on general working conditions (e.g., weekly meeting) may actually erode the ability of virtual project teams to accommodate individual members' timetables in accomplishing group assignments. Conversely, as in the case of interactional justice, the manifestation of interpersonal conflicts may accelerate in the later stages of virtual project teams due to issues of time pressure (Beranek et al. 2005). Procedural justice addressing conflict resolution would hence become increasingly valuable under such scenarios.

7.4 Implications for Practice

This study represents a foremost endeavor to direct managerial attention to the importance of team goal commitment in virtual project teams. While numerous studies have embraced the need to build positive affect among virtual team members in order to cultivate a sense of social congeniality conducive to knowledge sharing (Jarvenpaa & Leidner 1999; Powell 2000; Qureshi & Zigurs 2001), our findings suggest that the short-term, mission-based nature of virtual project teams may render the engendering of team goal commitment a more viable option for managers.

Our study further explicates the three dimensions of distributive, interactional and procedural justice as antecedents to the cultivation of team goal commitment among members within virtual project team settings. Though procedural justice on conflict resolution may benefit the engenderment of team goal commitment, managers should exercise caution in imposing too much structural restrictions that 'cramp the style' of members in virtual project teams because such restrictions may undermine participants' adaptive ability to overcome obstacles in their own ways. Additionally, our empirical evidence indicates that the effect of interactional justice becomes increasingly salient as time passes, which may work against the short lifespan typical of virtual project teams (Kinney & Panko 1996). Since distributive justice appears to be exceedingly prominent in task-oriented virtual project teams (Beranek et al, 2005), it might be optimal to focus organizational resources in ensuring the equity of outcome allocation as the primary driver for team goal commitment and to simply allow the initial interactional congeniality inherent among members to carry the project through (Tan et al, 2005).

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