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The impact of value diversity on information system development projects

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Abstract

Diversity of personal values among participants in an information system project is typically considered to create harmful team conflict, as do other forms of personal diversity. However, recent research establishes that information and knowledge diversity among project team members contribute to project success, leading one to question accepted thought regarding diversity of values. We model the impact of value diversity on project performance through theoretical layers of diversity, conflict, and teamwork quality. An empirical test supports hypotheses that value diversity adds to both beneficial and detrimental conflict. Project managers should compose teams with diverse project values but must control for potential detrimental effects.

Keywords: Value diversity; Conflict; Project teams; Software development projects; Project management

1. Introduction

Successful completion of development projects is an important issue in the information systems (IS) domain as only 32% of IS projects are considered successful (Standish Group, 2009). Among the recognized factors in achieving desired outcomes to IS projects is composing the best team (Liang et al., 2007). However, one must not look only to the competencies of the team members, but how well they work together to achieve desired goals. Diversity has come to be considered a prime factor affecting conflict, communication, and coordination behaviors that can impact the success of an IS development project (Liang et al., 2010). Diversity is a complex set of attributes that include perception, traits, knowledge, principles, and personal behavior. Social interaction among diverse individuals can lead to the emergence of new insights and effective learning that elevate team performance or add to detrimental conflict that detracts from effective performance of tasks (Bell et al., 2011; Ely, 2004; Jehn et al., 1999; Van Der Vegt et al., 2005; Wang et al., 2006). The final impact of diversity on performance of tasks will vary by the different forms of diversity that uniquely impact team accomplishment (Jehn et al., 1999). Three forms of diversity are generally recognized by researchers to include demographic diversity, informational diversity, and value diversity (Jehn et al., 1999; Liang et al., 2007). Each of these diversities implies different challenges and opportunities during team composition, task completion, and final team performance (Garrison et al., 2010; Jehn et al., 1999).

Demographic diversity is based on extrinsic traits such as age, gender, and ethnicity. Demographic diversity is potentially detrimental requiring an IS development (ISD) project manager control for the effects of increased conflict that can impede achievement of project goals (Garrison et al., 2010; Trimmer et al., 2002). Informational diversity derives from differences in education and experience that have built unique knowledge bases within each individual. Informational diversity appears to promote creative solutions to problems that arise through an increased critical examination of procedures and tasks, resulting in better team performance (Liang et al., 2010; van Knippenberg et al., 2004).

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Value diversity relates to individual beliefs, perspectives, and behaviors (Tyran and Gibson, 2008). In other words, value diversity means that team members differ in what they believe are the team's goal or mission or in the principles that must be followed in the pursuit of the goals or mission (Jehn, 1997; Liang et al., 2007). For example, team members who value quality probably disagree with team members who value efficiency on resource allocation, constraining goals of the project, and critical duties (Jehn, 1997). It is generally accepted that value diversity increases conflicts that detract from the accomplishment of team tasks (Barsade et al., 2000).

ISD projects utilize teams that are diverse on a number of dimensions. Although differences among members of team are the norm, Byrne's (1971) similarity-attraction theory suggests that similarity in interaction, value, and demographics are important factors in team composition as they help to provide effective work environments. However, the unique nature of ISD projects that span multiple knowledge fields and include stakeholders across numerous organizational boundaries may not follow established patterns and naturally contain extensive diversities (Liang et al., 2010). In building teams, the organization must consider the impacts of all diversity when forming and managing ISD teams, including value diversity which is not as well understood as informational or demographic diversity and considered to be detrimental in most contexts. Will value diversity exhibit a negative impact on ISD project outcomes as suggested by studies in other fields? To address this general question, we derive and test a theory-based model to explore how value diversity affects the performance of IS development teams. More specifically, we address the following research questions: What relationships exist between value diversity and conflict among team members? Does any resulting conflict affect the teamwork quality of the project team and, thus, impact the chances of success?

This research provides a model to explain the effect of value diversity on IS team performance and an empirical study to test this model. We find that value diversity significantly increases task conflict, and task conflict positively affects the interaction of team members during task completion. ISD project leaders can leverage the different value perspectives of team members in order to achieve higher performance. However, value diversity also increases relationship conflict, which negatively affects the interaction of team members during task completion. Hence, ISD project managers should endeavor to build teams with value diversity but must be prepared to manage potential relationship conflicts among team members who have very different value perspectives.

2. Theoretical background

The chain of consequences from diversity aspects to project success will be examined through three supporting theoretical relationships: a theory of diversity that relates the presence of diversity to multiple outcomes; a theory of conflict that considers the impact on team outcomes; and a model of teamwork quality that states success in innovative projects is dependent on quality of team processes. These relationships are well established in the literature, though the layered combination is unique to this study.

2.1. Diversity

Diversity theorists describe the relationship between team diversity, certain team behaviors, and team performance (Garrison et al., 2010; Harrison and Klein, 2007; van Knippenberg and Schippers, 2007). Based upon information-processing theory (Ancona and Caldwell, 1992), some researchers claim that diverse teams can have a positive impact on group performance through an increase in the innovations, information, and knowledge that diversity brings (Chung and Hossain, 2009; Earley and Mosakowski, 2000; Rink and Ellemers, 2006). On the other hand, others point out that team diversity reduces team performance (de Wit et al., 2011; Jackson et al., 2003; Mannix and Neale, 2005). This pessimistic view is based upon a social attraction perspective where people avoid communicating with those who hold views differing from their own as a means of reducing the strain produced by ensuing conflict (Williams et al., 2007). In short, informational diversity should lead to positive team outcomes by stimulating discussions and idea generation while demographic diversity could exhibit a negative effect by stifling participation or adding to harmful communication. In the ISD project literature these effects tend to hold (Liang et al., 2010).

As a third form, values are persistent beliefs that shape behaviors in individuals and groups (Jehn, 1994). Value is an important dimension in understanding attitudes and motivation. Therefore, value compatibility can enhance interpersonal relations and the degree of communication within a team (Hackman, 1990). Empirical evidence also demonstrates that values play an important role in team member relationships and team success (Wang et al., 2006). Consistent values, a lack of value diversity, maintain the mutual confidence and interaction among team members to complete tasks (Dose and Klimoski, 1999). In short, it is believed that similarity in team members' values will decrease conflicts, enhance interpersonal relations, and promote success (Jehn, 1994).

2.2. Conflict theory

Hellriegel et al. (1986) state that conflict is a subjective perception of animosity and negative emotions caused by inconsistent objectives and conceptual differences. Conflict is typically classified into two types: task conflict and relationship conflict (Jehn, 1995; Liang et al., 2010). Task conflict is job-originated disagreement among team members regarding perspectives, thoughts, or opinions on how to complete required tasks or even which tasks need to be performed (Jehn, 1995). Relationship conflict, on the other hand, is rooted in perceived incompatibilities among team members that often result in tension, animosity, and annoyance, thus impeding interpersonal communications and stalling the completion of tasks. Groups experiencing task conflict tend to make better decisions because such conflict increases communication and brings a team more information to promote group problem solving capability (Jehn and Bendersky, 2003; Liang et al., 2010; Simons et

al., 1999). Team performance is enhanced by having a variety of perspectives to draw from (Greer et al., 2008; Leslie, 2007).

In contrast, relationship conflict is a more personal factor that limits the information processing ability of the team because team members spend their time and energy focused on each other rather than on project-related problems. Deutsch (1969) claims that relationship conflict reduces friendship, communication, and understanding among team members. Prior empirical evidence consistently indicated that relationship conflict has negative consequences on team communication and harms the quality of team outputs (de Wit et al., 2011; Dijkstra et al., 2005 ; Jehn and Mannix, 2001). In summary, task conflict may be productive and functional, whereas relationship conflict is dysfunctional and strongly reflected in management thought (McShane and Von Glinow, 2010; Robbins, 2000).

2.3. Teamwork quality

The complex nature of teamwork is a multifaceted, higher-order concept that includes both task related activities (coordination) and social interaction within teams (communication) (Hoegl and Gemuenden, 2001). Concerns for the formation of the team, outside influences, and resources are excluded from the scope of teamwork quality. Nor does the model of teamwork quality consider specific antecedents given the plethora of organizational, environmental, and personal traits that can impact the interaction quality of a team (Dietrich et al., 2010). In general, a high level of teamwork quality leads to a high level of team performance (Hoegl and Parboteeah, 2006; Hoegl et al., 2004).

The communication factor of teamwork quality is the most elemental, providing a means for the exchange of ideas and information among team members (Adenfelt, 2010; Pinto and Pinto, 1990). Communication distributes productive information to all members of the team, which reduces the level of uncertainty (Turner and Müller, 2005). Efficient and accurate collaboration among team members require direct communication as the exchange of information via mediators consumes time and is subject to error (Kuruppuarachchi, 2009). A lack of open communication hinders the integration of knowledge and experience (Baiden and Price, 2011; Gladstein, 1984). Further, it is desirable that participation be universal among team members (Hackman, 1987). An inability to bring in perspectives from all relevant disciplines and draw on the talents of all team members is limiting (Seers et al., 1995). Interaction quality between different stakeholders is found to be important in ISD projects (Christiaanse and Venkatraman, 2002; Jiang et al., 2006; Wang et al., 2005).

2.4. Research model

The purpose of this study is to examine the impact of value diversity on ISD team performance. Diversity theorists have proposed links to successful outcomes as well as intermediate factors, but provide little guidance as to the exact path taken. Conflict theory has similar considerations of success and intermediate factors but provide incomplete guidance for a model structure involving project teams. The teamwork quality model, however, is more specific as to several immediate predecessors of project success. With that in mind, we propose the model shown in Fig. 1. In particular, value diversity may impact conflict, teamwork quality, and eventual project success. However, the structure of the subsequent relationships is not specified. This is then further refined by the relationships stressed by conflict theory that says teamwork factors and success are impacted by the two major types of conflict, but again without any structural claims. The third layer is the teamwork quality model that directly links certain factors, including communication and balance of input, to project success. Collectively, the three theories not only mesh the variables together, but precisely define the complete structure not accomplished by any of the three alone or in pairs.

2.5. Hypotheses

Similarities in the values of team members may lead to a lower degree of relationship conflict, higher group identification, and more social integration (Chou et al., 2008; Lim and Klein, 2006). Team members with similar work values are more willing to obey the norms of teamwork, reconcile differences, and reduce any tensions during interpersonal interactions (Homan et al., 2010; Nemeth and Staw, 1989). In contrast, when team members have different values, friction results and increases the extent of relationship conflict among team members (Liang et al., 2007). Further, diverse values add to conflicts about how conduct tasks and in the perception of team goals (Liang et al., 2007; Peltokorpi, 2006). Based upon diversity theory and the empirical studies, we propose that value diversity among ISD team members will increase both task conflict and relationship conflict, or formally:

H1a. The level of value diversity on ISD project teams will be positively associated with the level of task conflict.

H1b. The level of value diversity on ISD project teams will be positively associated with the level of relationship conflict.

Information system development is a social-technical process which requires intensive communication among stakeholders (Jones and Harrison, 1996; Mackin, 1994). Team members need to collect and exchange information to understand the external environment, to clarify current conditions, and to generate solutions in order to reach a consensus on objectives and means (Dietrich et al., 2010; Hoegl and Gemuenden, 2001). Empirical evidence shows that task conflicts are positively associated with adopting intensive communication mechanisms for sharing the expertise and information among team members (Jehn and Mannix, 2001; Pinto and Pinto, 1990). For example, Eisenhardt (1989) points out that communication is an effective solution for team conflict and helps other members to solve the task problems on hands. We, therefore, propose the following hypothesis:

H2a. The level of task conflict will be positively associated with the level of communication among ISD project team members.

Baiden and Price (2011) suggest that an important characteristic of a high quality team is when every team member

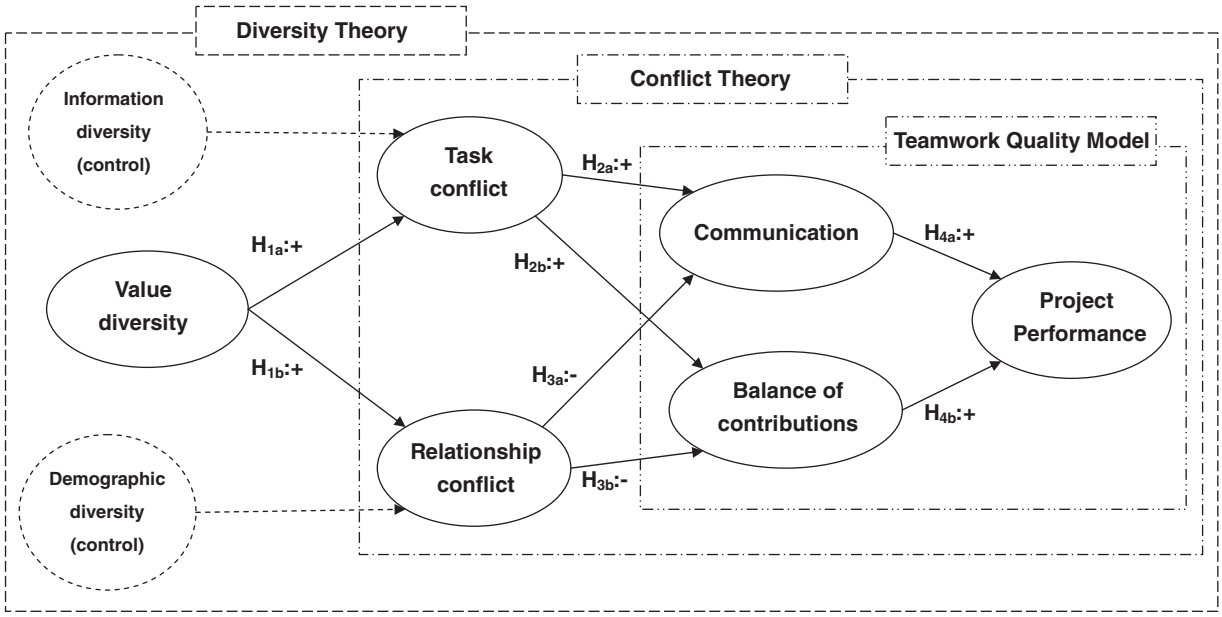

Fig. 1. Proposed research model.

can contribute all task-relevant knowledge and experiences to make the team tasks be completed efficiently and effectively. It is an important success factor for teams with innovative tasks because they often consist of members whose expertise is in different domain areas and can bring out innovative thoughts to promote balanced opportunities for sharing thoughts on problem identification and solution (Baron, 1991; Putnam, 1994). That is, task conflict gives the team members opportunity to contribute their unique knowledge and experience (Eisenhardt and Schoonhoven, 1990; Jehn and Mannix, 2001). Therefore, greater balance of contribution among team members should be achieved when task conflicts are present (Amason, 1996; Dietrich et al., 2010; Jehn, 1997). Thus, based on conflict theory and empirical evidence we propose the following:

H2b. The level of task conflict will be positively associated with the level of balanced contributions by ISD project team members.

Unlike task conflicts which provide opportunities for team members to contribute their task-relevant expertise, relationship conflicts are associated with negative effects on the harmonious interaction of team members (Staw et al., 1981). Empirical evidence in the literature shows that relational conflicts are accompanied by negative emotions and behaviors that lead to negative impacts on overall communication and knowledge contribution (Liang et al., 2010; Roseman et al., 1994; Shah and Jehn, 1993). These lead us to expect that relationship conflict is detrimental to communication and a balanced input from team members. Based on empirical evidence and conflict theories:

H3a. The level of relationship conflict will be negatively associated with the level of communication among ISD project team members.

H3b. The level of relationship conflict will be negatively associated with the level of balanced contributions among ISD project team members.

Communication mechanisms and balance of contributions from team members are essential to the successful design and implementation of innovative projects (Adenfelt, 2010; Hoegl and Gemuenden, 2001; Seers, 1989). Other studies, point out that a high quality of teamwork is positively associated with team performance (Dayan and Di Benedetto, 2008, 2009). Since these relationships are well-established in the literature and represented in the teamwork quality model, we propose:

H4a. The level of communication among ISD project team members will be positively associated with the level of project performance.

H4b. The level of balanced contributions in an ISD project team will be positively associated with the level of project performance.

Because prior studies show an influence of informational diversity and demographic diversity, both of these appear as control variables in the model. Informational diversity refers to the variation in knowledge bases and perspectives that members bring to the ISD project team. Such differences are likely to arise as a function of differences among team members in the firm, educational major, level of education, and tenure (Jehn and Bezrukova, 2004). Demographic diversity is based on characteristics of difference measureable by common demographic variables – gender and age. An entropy-based index (Ancona and Caldwell, 1992) provides an aggregate measure of informational and demographic diversity.

3. Research methods

The research model was tested with survey data collected from members of the Project Management Institute's (PMI)

special interest group on Information Systems in Taiwan. Taiwan has a high penetration of project professionals, which is deemed more important in the development of IT than national culture because of variation in tasks during the development process (Bredillet et al., 2010; Carayannis and Sagi, 2001). Each project was represented by a project manager and one team member to provide the perspective of two, separate key informants. Analysis of the model and data follow standards of structural modeling employing PLS techniques and software.

3.1. Sampling

Target respondents of this study include managers and members of information systems development projects. The PMI list provided access to project managers who were first contacted by phone to inquire whether they had recently completed a project while serving as a project manager. Further, chosen subjects expressed a willingness to complete a survey and identify one team member to complete an identical survey. Confidentiality of all responses for both subjects was assured. Only tracking information to later match paired responses served as any identifier. No mechanism was in place to track individual responses to completed surveys.

Survey packages included two cover letters and two questionnaires over limited demographics, team composition variables, team process variables, and project performance. The packages were sent to 65 identified project leaders willing to participate. The project managers distributed the second questionnaire to one key project team member. The survey yielded a total of 62 complete and valid response pairs for analysis. The total response rate is 95%. Demographic information is in Table 1.

3.2. Measurement

All variables were measured with multi-item constructs adopted from previous team research and shown in Table 2. The only modifications were to adjust to the ISD project context where necessary. All items are measured on a Likert-type scale, with anchors ranging from 1 (strongly disagree) to 5 (strongly agree). Project performance is considered to be the degree to which the project team completes the ISD project efficiently and effectively (Henderson and Lee, 1992). The measure consists of 5 items over meeting budget, schedule, goals and user requirements and is based on the scale of Jones and Harrison (1996). These items have been used in numerous recent studies appearing in the project management literature (Hsu et al., 2011; Liu et al., 2011; Wang et al., 2011). Further, performance scores are based on the average scores of both the project manager and a project team member.

Value diversity is composed of the unique individual perspectives of team members on the goals and mission of the project tasks. The 6 items are adopted from Jehn (1994). 7 items

Table 1
Demographic information of respondents (n=124).

	Categories	#	%	Variables	Categories	#	%
Gender	Male	112	90	Department	Marketing	7	6
	Female	12	10		R&D	10	8
Current position	Technical Professional	57	46		MIS	71	57
	General Staff	37	30		Engineering	30	24
	Manager	25	20		Finance	6	5
	Others	5	4				
				Education (degree)	Graduate	86	70
Role in the team					Bachelors	20	16
	Team leader	62	50		Associates	16	13
	Team member	62	50		Other	2	2

Table 2
Factor loadings and item-total correlation.

Constructs	Loadings	ITC
Value diversity (CR = 0.91)		
The values of all team members were similar	0.83*	0.70
The team as a whole had similar work values	0.75*	0.55
The team as whole had similar goals	0.76*	0.56
Team members had strongly held beliefs about what is important within the team	0.80*	0.78
Team members had similar goals	0.80*	0.80
All members agreed on what is important to the team.	0.78*	0.78
Task conflict (CR = 0.86)		
Team member often disagree about opinions regarding the project content	0.87*	0.39
Team members have different ideas about project content and project goal	0.90*	0.70
Team members have different viewpoints about project content and project goal	0.91*	0.70
Relationship conflict (CR = 0.91)		
There is much personality conflict evident in your team.	0.80*	0.65
There is much tension among members of your team.	0.74*	0.56
Team members envious and counter each other.	0.80*	0.70
Some team members don't like each other.	0.80*	0.70
Communication (CR = 0.87)		
There was frequent communication within the team.	0.76*	0.63
The team members communicated often in spontaneous meetings, phone conversations, etc.	0.77*	0.70
The team members were happy with the timeliness in which they received information from other team members.	0.74*	0.65
The team members were happy with the precision of the information received from other team members.	0.77*	0.66
The team members were happy with the usefulness of the information received from other team members.	0.87*	0.68
Balance member of contributions (CR = 0.89)		
The team recognized the specific potentials (strengths and weaknesses) of individual team members.	0.70*	0.43
The team members were contributing to the achievement of the team's goals in accordance with their specific potential.	0.92*	0.80
Imbalance of member contributions caused conflicts in our team.	0.91*	0.79
Project performance (CR = 0.84)		
Projected goals were met.	0.94*	0.56
The expected amount (scope) of work was completed.	0.93*	0.70
The schedule was adhered to.	0.97*	0.41
Task operations were carried out efficiently.	0.88*	0.44
The members maintain the high morale during the project process.	0.91*	0.57

adopted from Jehn (1995) were used to measure perceived relationship and task conflict. Communication and Balance of Member Contributions are two facets of teamwork quality developed by Hoegl and Gemuenden (2001). The 8 items capture the interaction behaviors of the team.

A content examination of the questionnaire was conducted by three experts in IS development to assess logical consistency, ease of understanding, sequence of items, and clarity of accompanying instructions. Overall, they stated that the questionnaire was clear and easy to complete. A number of small suggestions were made about the wording of several items and the overall structure of the questionnaire. These suggestions were discussed among the researchers resulting in minor changes made to the instrument. Subsequently, a pilot study with 20 part-time Master's degree students was conducted. The purpose of this pilot study was to gain additional comments on the questionnaire content, structure, and instructions. Minor clarifications were proposed and incorporated into the survey instrument.

4. Results

PLS Graph 3.0 was used to evaluate the measurement and structural models. Using ordinary least squares as its estimation technique, PLS performs an iterative set of factor analyses and applies a bootstrap approach to estimate the significance of the paths. The validation of the measurement model includes item reliability, convergent validity, and discriminant validity tests. Factor loadings, shown in Table 2, should be higher than 0.7 to demonstrate high reliability. All loadings reflect this condition.

Convergent validity can be examined by the item-total correlation (ITC) and composite reliability both shown in Table 2. The average variance extracted by the constructs (AVE) shown in Table 3 also shows convergent validity (Fornell and Larcker, 1981; Kerlinger, 1986). To demonstrate convergent validity, ITC should not be lower than 0.3 (Field, 2005) and composite reliability should be higher than 0.7 (Nunnally, 1978). Moreover, if the square root of the AVE is less than 0.71, it means that the variance captured by the construct is less than the measurement effect and the validity of the construct is questionable (Fornell and Larcker, 1981). To have required discriminant validity, the correlation between constructs (Table 3) should be lower than 0.80 and the square root of AVE should be higher than inter-construct correlation coefficients (Bagozzi et al., 1991; Fornell and Larcker, 1981). As can be seen in Tables 2 and 3, all of these conditions are met.

The research questions of this study require team level analysis. All questions were posed at the team level and two key informants provide more than one perception. To be certain that there is uniformity between the two key informants from each project team both similarity measures for each pair and paired t-tests for each variable serve as measures of consistency (Table 4). The agreement index (R_{wg}) suggested by James et al. (1984) is used as a similarity indicator. A value greater than .7 for each variable is considered adequate to aggregate the data by project team (Klein and Kozlowski, 2000). Only one violation of this restriction occurred in the entire data set. Further, paired t-tests indicated no significant differences are present in the data between the two groups for any variable. This level of agreement lends standing to the evaluation of the data using both key informant groups. Further analysis is conducted as teams by aggregating the two observations.

Fig. 2 shows the analysis results of the structural model. Table 5 summarizes the results of the hypotheses. All results are as expected except the negative relationship between relationship conflict and balance of member contribution is not significant at $p<0.05$ (though it is at $p<0.10$). Further, the control variables included in this study, information diversity and demographic diversity, were also found to be significantly associated with task conflict and relational conflicts as suggested in the literature. The model developed from the three models in other disciplines generally holds for the ISD context.

5. Discussion and conclusions

The composition diversity of ISD project teams has recently received attention in the ISD literature (Liang et al., 2010). Demographic diversity had been found to be detrimental and informational diversity beneficial. However, diversity of values had no reports in the ISD literature. Whether value diversity has the same impact or not as the other forms will make a difference in how ISD project teams are formed and controlled. This study confirms that value diversity can lead to both desirable task conflict as well as undesirable relationship conflict. Thus, a project manager must consider placing team members with diverse value perspectives on the team to contribute to task accomplishment, yet be prepared to control resulting relationship conflict that may arise.

The major contribution of this study is to combine precepts of diversity theorists, conflict theory, and teamwork quality models into a single framework for study. The framework

Table 3
Descriptive statistics of the constructs.

	Mean	SD	M3	M4	Correlations and AVE					
					VD	TC	RC	CM	BC	PP
Value diversity (VD)	2.27	0.36	0.84	−0.48	**0.79**					
Task conflict (TC)	3.42	0.46	0.87	−0.24	0.48	**0.78**				
Relationship conflict (RC)	3.32	0.49	1.17	1.59	0.42	0.69	**0.80**			
Communication (CM)	3.47	0.32	1.67	3.23	0.19	0.36	-.27	**0.71**		
Balance of contributions (BC)	3.25	0.41	1.74	2.79	0.25	0.45	0.16	0.65	**0.85**	
Project performance (PP)	3.35	0.37	0.80	−.34	0.36	0.58	0.28	0.56	0.67	**0.93**

Notes: The **bold** diagonal line of the correlation matrix is the square root of AVE; M3: Skewness; M4: Kurtosis.

Table 4
Key informant consistency.

Variable	R_{wg} range	Nbr of $R_{wg}<.7$	Paired t-score (p-value)
Value diversity	.87–1	0	0.349 (0.728)
Task conflict	.37–.98	1	−1.462 (0.149)
Relationship conflict	.87–1	0	1.594 (0.116)
Communication	.80–1	0	−0.093 (0.927)
Balance of contributions	.81–1	0	−0.353 (0.725)
Project performance	.92–1	0	−0.180 (0.858)

Table 5
Hypotheses summary.

Hypothesis	Result (at $p<.05$)
H1a:Value diversity➔Task conflict	Supported
H1b:Value diversity➔Relationship conflict	Supported
H2a:Task conflict➔Communication	Supported
H2b:Task conflict➔Balance of member contributions	Supported
H3a:Relationship conflict➔Communication	Supported
H3b:Relationship conflict➔Balance of member contributions	Not supported
H4a:Communication➔Project performance	Supported
H4b:Balance of member contributions➔Project performance	Supported

provides direction for the data collection that confirms the expectations of value diversity impacts on project success, as well as the intermediary variables of conflict and teamwork quality. Importantly, the confirmed model shows value diversity to have beneficial impact on task conflict while previous works categorized value diversity as a personal trait strictly adding to a detrimental impact on relationship conflict. Therefore, value diversity should not be considered as only having negative effect. These conclusions are based on the model derived from established theory and confirmed with a survey of 62 matched pairs of ISD project managers and ISD team members.

The result first confirms our knowledge regarding impacts of informational diversity and demographical diversity demonstrated in the existing ISD literature and the impacts of communication and balance of contribution on final project outcomes suggested in the teamwork quality literature. As a result, it provides further empirical evidence on the generalization of the prior studies to the ISD frame. Project managers should continue to compose teams with a broad variety of knowledge and experience to improve project outcomes while controlling for behavioral problems that may arise from demographic diversity.

In addition, the results provide new insight on the additional impacts of value diversity on both relational conflict and task conflict. In all, different types of diversity lead to conflicts interdependently and, as a result, informational diversity, demographic diversity, and value diversity should be considered separately by project managers when forming ISD teams. More specifically, value diversity should not be ignored when forming an ISD team as it does have a direct impact on both forms of conflict. When a project might require an innovative and novel approach, value diversity could add to the ability of a team to arrive at a successful completion to a project, providing another tool for the project manager. As each team member has different views on the goals of the project, project managers should be aware that these team members could also have different opinions about directions that should be taken. However, since relational conflict is increased the project manager must also be aware that there is an increased risk of detrimental behaviors and be prepared to identify those behaviors and react to mitigate them.

Finally, the study also incorporates communications and balance of contribution as two mediators between conflict and project outcomes. Based upon the results of this study, the balance of contribution is another positive effect of task conflicts among team members. This adds to the evidence that task conflicts may be a necessary condition for a team to generate sufficient

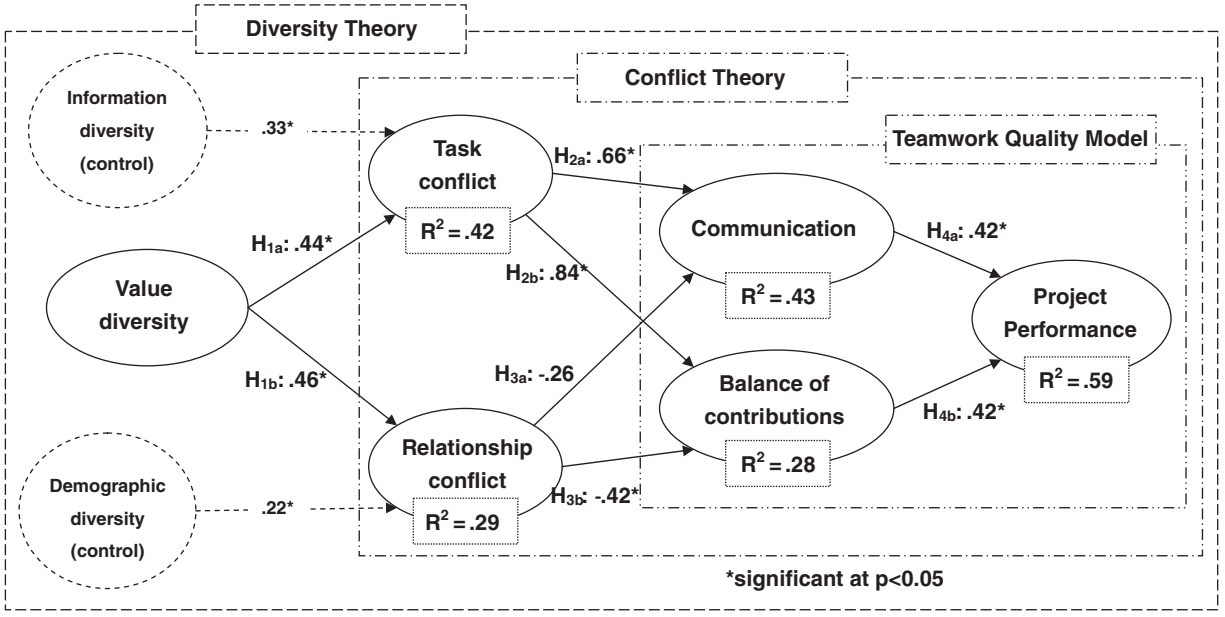

Fig. 2. Resulting structural model.

communication from all team members to increase the likelihood of a successful outcome. Teamwork quality factors serve as important indicators and may serve as measures for project managers to monitor the relationships within the team fostered by conflict. This deserves further consideration by practitioners and researchers.

The model allows future research on a number of components. Other factors of teamwork quality may be examined to determine whether they are influenced by conflict. Success variations associated more with the product rather than the project should be examined to determine metrics more directly related to organizational objectives rather than strictly project objectives. This study and existing publications tend only to consider a narrow perspective of teamwork quality and a very specific set of project success criteria. As projects are intended to further organizational goals future work must consider improvements to organizational objectives in addition to those associated with projects.

This study is not without limitations, which should be overcome in future studies. First, the data were collected from information system development project teams in Taiwan, limiting the generalizability of the findings due to cultural influences and localized business practices. Further, as the influence of virtual teams grows in IS development, cultural differences will be an even more an important issue for IS project management. Nevertheless, the confirmation of results found in prior studies increases our confidence in generalizing the results. Second, the project outcomes measured in this study focused on project performance. Other dimensions of success that impact the organization, individuals, operations, and system usage are not considered. Lastly, like any cross-sectional survey, this study is limited in attributing and substantiating affirmative causality. Future studies should collect longitudinal data to better assess causal relationships.

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