Task complexity and rapport in outsourced system development

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Abstract: Little work exists to study the impact of context on offshore development teams for information systems development (ISD) projects. This study examines the role of rapport and the impact of task complexity to influence cohesion within offshore ISD project teams and their implications for project performance and work satisfaction from a social capital and interdependence perspective. Five hundred surveys were sent to randomly selected IS team members in India from IS outsourcing vendors located in India. A total of 194 responses were used in the PLS analysis. The empirical results show that task complexity and rapport had a positive and significant effect on task cohesion while task cohesion had a positive and significant effect on project performance and work satisfaction. This study demonstrates that the interdependence between task complexity and rapport among team members that can lead to shared understanding of the problems and approaches the team adopts, which eventually leads to successful outcomes.

Keywords: rapport; task cohesion; task complexity; work satisfaction; project performance.

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1 Introduction

Tasks related to developing systems or software can be multifaceted and involves significant communication and coordination between team members and among different skill levels (Espinosa et al., 2007; Slaughter and Kirsch, 2006). Therefore, team capability and human relations can become more important than technical skills needed for software development (Pries-Heje and Commisso, 2010; Hsu et al., 2012). Research shows that an alignment between the social and technical skills is needed and that managers should not just focus on the technical skills to ensure a successful team performance for system development (Maheshwari et al., 2012). Kudaravalli et al. (2017) state another reason that software development is so challenging is due to lack of expertise coordination. The authors state that the approach to coordinate software development usually provides conflicting recommendations including the team design. The authors show how team structure, collaborative decision making, group structures and interaction can further provide limitations to the software development teams. The authors conducted a field study of 71 software development teams in a large North American organisation that provided software development for different clients.

However, as indicated by Schmidt et al. (2001), most of the studies on software development lack a cross-cultural perspective since data collected in using US data alone. The authors believe that conducting survey on various factors in culturally different settings is important to widen the view of software development. A few of the risks the authors identified were lack of required skills in project personnel, lack of people skills and poor team relationships. Another major risk, Schmidt et al. (2001) identified was that there are multiple vendors involved in the project would complicate the dependencies. Since information systems development (ISD) can be very rigorous, many companies decide to offshore software development at a low cost to employees or contractors from different countries (Srivastava and Teo, 2012). Not many research studies provide the perspective of outsourcing on software development. Bhoola (2015) identified project success factors in the Indian software industry. He first stated that there are internal problems with the organisation as well as from the client side. A main issue is that software professionals are not open about issues upfront due to the fear of client demands (Bhoola, 2015; Athreye, 2005). The offshoring of software development projects further add additional challenges to the team design, which focuses on group structure, formal procedures and hierarchy (Kudaravalli et al., 2017; Bunderson and Boumgarden, 2010). These challenges include; unclear responsibilities, unmanaged conflicts, limited relationships among team members, lack of information sharing, lack of shared goals and objectives, inability to build and maintain trust and failure to build a cross-boundary team and find collaborative solutions (Kliem, 2004). When dealing with complex software development, the specifications and functionalities can be difficult to understand as well as the costs and delivery dates to estimate for the vendor (Susarla et al., 2010). The rate of failure is higher for complex software projects since complex projects require more investments from the vendor as well as greater communication between teams and better coordination with the client (Chen et al., 2017; Clemons and Hitt, 2004). The presence of these task complexities and interdependencies can have either useful or detrimental effects on the team effectiveness (Hsu et al., 2012). According to social interdependence theory, a team can work cooperatively to accomplish shared goals or competitively to achieve a goal that only one or a few can attain (Johnson and Johnson, 2005). When team members must work together on a task, they participate in developing social interactions, engage in shared involvement and experience enhanced personal liking and harmony (Van der Vegt et al., 1998). Past literature has identified interdependence as a critical component of cohesion collaboration and expertise sharing (Ghobadi and D'Ambra, 2013; Tarricone and Luca, 2002).

Modest characteristics of how groups are designed (such as task properties, rules, resources allocation, individual and group goals) greatly influence relationships in groups and how they perform. Task properties such as complexity is commonly prevalent in ISD program teams in the form of requirements elicitation (Espinosa et al., 2007; Anton and Potts, 1998), programming (Balijepally et al., 2009), testing and verification (Hailpern and Santhanam, 2002). Task complexity is formally defined by the number of goals the team has, the number of paths that can be taken to achieve those goals and the amount of cooperation among members required to carry out the task (Kuhn and Poole, 2000). In team literature, task complexity has been identified as a moderator variable in influencing the effect of independent variables such as task and relationship oriented variables in improving dependent variables such as performance (Bradley et al., 2015; Chen et al., 2001). Task complexity mediates the effects of task familiarity and team familiarity

on performance (Espinosa et al., 2007). Further, task complexity has a very sensitive relationship with performance and that small changes in task complexity required great changes in team composition to achieve better performance (Higgs et al., 2005). The direct role of task complexity in generating the cooperative effects suggested by social interdependence theory has not been the subject of study in the onshore or outsourcing context. We believe task complexity is useful in improving task cohesion particularly in outsourced ISD teams.

In addition to the complexity and time constraints of software development teams, as one project ends, offshore vendors quickly transfer team members to another project. The dispersion of work activities in offshore software development projects is vulnerable to communication, coordination and administration problems that affect project performance which is an indicator of how efficiently the team performed its tasks (Herbsleb and Mockus, 2003; Maznevski and Chudoba, 2000; Sarker and Sahay, 2003; Gantman and Fedorowicz, 2016). Therefore, offshore software development team members may be working together for the first time on projects. In the case of offshore software development, it is important that teams also develop characteristics which can build social structures suitable for collaboration.

According to the social capital theory perspective, the entire team benefits from the behaviours that help form the different dimensions of social capital (Kostova and Roth, 2003). Given the difficulties related to executing successful offshore software development projects, a social capital theory perspective supports the investigation of embedded team development dynamics that may contribute to project performance. Rapport, which is "the quality of the relation or connection between interactants, marked by harmony, conformity, accord and affinity" [Bernieri et al., (1994), p.113] has been found to increase social capital, as well as, create collaboration between individuals in a business environment (Gremler and Gwinner, 2000). Therefore, as team members conduct various tasks on a project, the rapport between them may result in further engagement and increased teamwork (Kotlarsky and Oshri, 2005) and eventually an increase in trust between members. Social capital can be identified as an asset linked to specific positions during exchanges, which certain individuals and groups depend on (Burt, 2000). These individuals or groups trust each other and are obliged to support each other. Based on the social capital perspective, building rapport and close relationships with team members determine the types of information they are comfortable sharing with each other (Propp, 1999).

Ghobadi (2015) describes the importance of knowledge sharing in ISD projects by describing drivers that help software teams achieve effective sharing in a dynamic environment. Furthermore, ISD team members desire learning as a personal development goal. Team members value greater experience and that new team members seek out experienced team members to ask for help (Vlaar et al., 2008). Experienced members find it easier to understand requirements and bring valuable insight to a project (Vlaar et al., 2008). Therefore, ISD team members seek out knowledge to become more experienced in their role. In addition, as team members learn and grow in their role, they are given more tasks and responsibilities that enhance their career. This also leads to work satisfaction which is the personal satisfaction of team member's desire to work in teams in the future (Hoegl and Gemuenden, 2001). As team members are more satisfied with their work, they are less likely to leave the project.

Based on Johns (2006) recommendations to contextualise theory by evaluating the impact of properties of social structure in the offshore ISD project context, we examine the role of rapport and the impact of task complexity to influence cohesion within offshore ISD project teams and their implications for project performance and work satisfaction from a social capital and interdependence perspective. According to social interdependence theory, a team can work cooperatively to accomplish shared goals or competitively to achieve a goal or task that only one or a few can attain (Johnson and Johnson, 2005). Cultivating teamwork through shared tasks and improving the quality of interaction and rapport among team members (Lee-Kelley and Blackman, 2005) can serve to fortify the team and enhance opportunities for eventual project success (Jones, 2008).

With these issues in mind, this study aims to understand the relationship of task complexity and social proximity in the form of rapport and its potential impact on task cohesion and subsequently to the beneficial outcomes of learning and work related satisfaction. To this end, we develop a model of high performing ISD teams fostered by the presence of task complexity and rapport. This study provides three significant contributions to the study of project teams. First, it provides a theory-based approach to development of project management teams that is based on previous literature. Second, the study evaluates the effects of task complexity on team dynamics. Third, this study provides insights on how to improve communication between offshore software development project teams. In the following sections we first review the literature on social capital and social interdependence theory and then build hypotheses based upon the literature.

2 Theoretical background

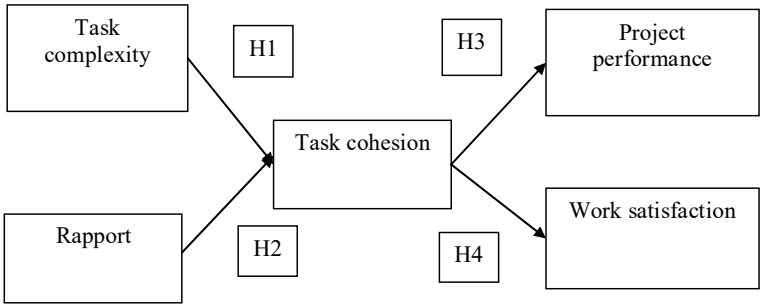
Social interdependence theory has emerged and presented a conceptual structure to understand cohesion in groups. When interdependence exists, such as in ISD project teams, group members can take action in ways that relate to the actions of others (Johnson and Johnson, 2005). The basic presumption of social interdependence theory is that the type of interdependence structured in a situation determines how individuals interact with each other, which, in turn, determines results. When approached positively, interdependence tends to result in cooperation and subsequently task cohesion (Tziner and Yoav, 1982). In the context of ISD projects, interdependence is likely to be present when each member's successful completion of individual tasks is based upon the overall team's effort/contribution (De Dreu, 2007). In this context, individual team members are likely to be motivated and committed to cooperate in order to derive support to assist in the completion of their individual tasks. Thus, task cohesion is increased by providing members with complex tasks to the extent that the group successfully accomplishes its goal by seeking cooperation to complete them (Man and Lam, 2003). In numerous studies, task cohesion significantly led to an increase in communication, coordination and performance outcomes (Campion et al., 1993).

Cabrera and Cabrera (2005) states that social capital includes shared language, mutual trust, common norms and identification with other individuals in the network. Successful teams include members who have complementary skills, shared values and are able to work in together for a common goal (Katzenback and Smith, 1993). Teams that invested time in building rapport, sharing information and agreed on shared activities were found to be successful. When teams experienced high levels of trust and friendship between members, social capital increased. This encouraged team members to engage in social exchange and cooperative interaction, which involves, e.g., relying on others, asking for help, having spontaneous conversations and unplanned meetings and sharing information, knowledge and resources (Lee et al., 2005; Rai et al., 2009). Rapport and social relationships lead to frequent knowledge exchange behaviour (Larson, 1992).

Task cohesion has been found to useful in improving a multitude of individual and group outcomes such as learning and work related satisfaction (Carron and Hausenblas, 1998; Filho et al., 2015). Individual team members feel positive about the project work when the team interacts closely and performance is satisfying. Individual team members find intrinsic and extrinsic satisfaction when the team cohesion facilitates the positive project outcomes (Tekleab et al., 2009).

From the perspective of social interdependence and social capital theories, we argue that task complexity and rapport improve task cohesion that, in turn, facilitates team members' learning and work satisfaction in the outsourcing context. Figure 1 shows the proposed research model.

Figure 1 Research model



3 Hypotheses

Compared with simple tasks, complex tasks relate to a large number of distinct actions and information cues to be processed, a high demand for coordination of various task inputs and outputs and a high likelihood of changes in the process of task execution (Wood, 1986). Task complexity in a large-scale project includes technological complexity, goal uncertainty, environmental complexity, openness of elements, dynamics of process, resource availability and information completeness (Lu et al., 2015). Complex tasks often require greater group interaction, coordination and understanding of complexity of dependency among tasks (Man and Lam, 2003). Software development can be characterised as complex tasks because of its ambiguity, difficulty and unstructured problems. The high level of task complexity in software development often

requires team members to pool the resources and expertise and demand a high level of cognitive processing of multiple team members to tackle the problems. As a result, team members increasingly perceive task interdependence among team members. According to social interdependence theory, the type of interdependence determines how group members interact (Johnson and Johnson, 2005). As team members perceive high task complexity, team members tend to interact, embrace others' thoughts, integrate different inputs to create feasible solutions and stick together to make a unique contribution.

In addition, perceived job complexity triggers the appraisal of challenges and leads team members to become motivated and persistent (Liu and Li, 2018). When team members find many challenges and roadblocks in the software development process, they interact frequently and try to understand the challenges and figure out different alternatives to solve the problems. Their sense of team identity increases. Group members become more committed to the team and the team becomes more cohesive (Welbourne and Paterson, 2017). Hence, we believe that,

H1 Task complexity will positively improve task cohesion among team members.

A group establishes a good rapport when team members understand each other's belief, feelings and values, enjoy interacting with other group members and perceive a close personal connection with others (Gremler and Gwinner, 2000). With the prevalent technology such as social networking tools, rapport building becomes easy and necessary for group building. A group with a good rapport develops a strong level of trust among team members. According to the social capital theory, project teams benefit from these social capital resources such as trust and tend to engage in frequent group interaction and show support to each other, leading to improved task cohesion (Iorio and Taylor, 2015).

A high level of group rapport also encourages team members to interact closely, share and process a large amount of information (Tomasi et al., 2015). Rapport increases team members' shared understanding of the situation and problems and approaches the team adopts. The positive perception of teamwork and appreciation of team members will enhance the team's shared commitment to the teams' tasks. Hence, it is hypothesised that

H2 Rapport will positively improve task cohesion among team members.

Past research has consistently found that group cohesion positively contributes to group performance (Castaño et al., 2013; Beal et al., 2003; Man and Lam, 2003). Task cohesion applies its effect on group performance by increasing group coordination and enhances intention to commit to the group (Mathieu et al., 2015). The software development team has a high level of task cohesion when the team members bond together and remain united to achieve the software development tasks (Bahli and Buyukkurt, 2005; Carless and De Paola, 2000). Task cohesion stimulates the team processes such as team mental model and collective efficiency and then lead to individual and group outcomes (Carron and Hausenblas, 1998; Filho et al., 2015). Team members work on tasks with a high level of cohesion engage in frequent social interactions and often find other team members' needs and provide assistance during the interactions. A team with a high level of team cohesion enhances team learning by making team members motivated, comfortable for inquiries and engage in exploration and feedback (Tekleab et al., 2016). In addition to the expected team interaction, team members may go further to provide extra-role support and assistance to others because of their high commitment. Consequently, project

performance will improve as a result of frequent interaction, mutual assistance and problem solving (Tekleab et al., 2016). Hence, our hypothesis:

H3 Task cohesion will positively improve project performance.

According to social identity theory, when task cohesion is high, group members have a sense of group identity and perceive themselves as a member of the group and often interact frequently (Hogg, 2006). They generate commitment to tasks and enjoy the fun of working together. At the same time, group members are more likely to enjoy the sense of group achievement when they solve the challenges in the task completion process (Wech et al., 1998). Individual team members feel positive about the group work when the team interacts closely and group performance is satisfying (Martin and Good, 2015). Individual team members find intrinsic and extrinsic satisfaction when task cohesion facilitates the positive project outcomes (Picazo et al., 2015).

In addition, the members of offshore software development teams have high interests in professional development. Individuals feel more satisfied when they can learn new knowledge from team collaboration (Wickramasinghe and Dolamulla, 2017). Past studies showed that individuals perform better on learning tasks if they are in high cohesion groups than in low cohesion groups (Lott and Lott, 1966). Individuals with highly liked others tend to learn better in the favourable social context (i.e., in the group) than individual learners (Lou et al., 2001). Hence,

H4 Task cohesion will positively improve work satisfaction.

The chain of relationships suggested by the literature provided the basis for our research model shown in Figure 1.

4 Methodology

A survey methodology was selected to test the above hypotheses. The instrument package included a cover letter and questionnaire and was sent to 500 randomly selected IS team members in India from IS outsourcing vendors located in India. The vendors were randomly selected from the database of National Association of Software and Service Companies (NASSCOM), which is India's premier trade body for the IT software and services industry. The cover letter indicated the purpose of the study and informed respondents that their responses would be kept confidential. Participants were requested to sign a consent form and mail the questionnaire back after completion. Our sampling process follows recent studies that collect data from one member in each team to increase the response rate and sample size. IS outsourcing companies were selected because, in the outsourcing context, a project-based organisation develops the system for clients and people who are not familiar with each other, gathered together for one project and frequently working with others in an internationally-distributed fashion. A total of 204 surveys were returned and after removing incomplete response questionnaires, a total of 194 were used in the analysis. The final response rate is about 39%. Table 1 provides a summary of the demographic information for the sample. Sample representativeness was assured by comparison to past studies. The questionnaire consisted of items all measured on a on a seven-point Likert-scale ranging from 'totally disagree' to 'totally agree'.

Because independent and dependent variables are from the same rater, common method variance might jeopardise the analysis result and additional inference. Harman's single factor test was used to test the common method variance. Our results indicated that more than one factor was extracted, with a total variance extracted of 68% and the first factor accounting for 35.7% of variance only. Thus, since no one factor represented all indicators, common method variance was not evident.

Table 1 Organisation and project characteristics

Variables	*Categories*	*#*	*%*
CMM level	1 (initial)	1	0.5
	2 (repeatable)	3	1.5
	3 (defined)	7	3.6
	4 (managed)	4	2.1
	5 (optimising)	132	68.0
	Missing	37	19.6
Team size	≤ 7	53	27.3
	8–15	68	35.1
	16–25	28	14.4
	≥ 26	23	11.9
	Missing	22	11.3
Gender	Male	149	76.8
	Female	41	21.1
	Missing	4	2.1
Avg. project duration	≤ 1 year	36	18.6
	1–2 year	55	28.4
	2–3 year	26	13.4
	3–5 year	22	11.3
	≥ 6 year	14	7.8
	Missing	41	21.1
Position	Programmer	47	24.2
	System analyst	28	14.4
	Module leader	17	8.7
	Software engineer	60	30.9
	Technical leader	27	13.9
	Others	15	7.7
In this team (months)	Min.	1	
	Max.	48	
	Average	15.2	
	SD	10.2	

4.1 Constructs and measurements

A total of two items adopted from Kuhn and Poole (2000) measured task complexity. Rapport is a team member's perception of having an enjoyable interaction with other members, characterised by a personal connection between the interactants. A total of seven items describing activities related to rapport were adopted from Gremler and Gwinner (2000). Task cohesion is the measure of a team's shared commitment to the team's task. A total of three items adopted from Carless and De Paola (2000) measured task cohesion. Project performance refers to how efficiently a team can complete the tasks. The team's efficiency is assessed in terms of adherence to schedules, e.g., starting the manufacturing and/or marketing on the target date and budgets, e.g., staying within target costs with both the project and the finished product (Hoegl and Gemuenden, 2001). A total of five items adopted from Hoegl and Gemuenden (2001) measure the perceived outcome of the development work conducted. A total of five items adopted from Hoegl and Gemuenden (2001) measure work satisfaction which is the personal satisfaction of team member's desire to work in teams in the future.

4.2 Constructs and measurements

Hypotheses were tested and verified by using partial least squares (PLS) analysis (Hair et al., 2011). PLS is selected since it is not contingent upon data having multivariate normal distributions. This is a latent structural equation modelling technique that uses a component-based approach to estimation; it contains two steps. The first examines the measurement model and the second assesses the structural model. When using PLS, researchers must pay attention to three concerns:

1 the reliability and validity of measures

2 the appropriate nature of the relationship between measures and constructs

3 path coefficient, model adequacy and the final model from the available set of alternatives (Hair et al., 2011).

PLS-Graph Version 3.01 was used to test the hypotheses. Item reliability, convergent validity and discriminant validity tests are often used to test the measurement model in PLS. Individual item reliability can be examined by observing the factor loading of each item. As shown in Table 2, all factor loadings are significant using t-statistics and are higher than the recommended 0.7 (Hair et al., 2011). The item-total correlations (ITC) are also higher than the recommended cut-off value of 0.3. Individual item reliability is assured in this study.

Convergent validity should also be examined because more than two indicators were used to measure each construct. We used composite reliability (CR) of constructs and average variance extracted (AVE) by constructs to evaluate convergent validity (Hair et al., 2011). Convergent validity is assured since CR of all constructs is higher 0.7 and the AVE values are all greater than 0.5. Lastly, as Tables 2 and 3 show the correlations between pairs of constructs are below 0.8 and the square root of AVE is higher than each corresponding correlation coefficient (Hair et al., 2011). These properties indicate that the measures of constructs are sufficiently distinct from each other and discriminant validity is assured.

Table 2 Validity and reliability

Factors	*Items*	*Factor loading*	*t-statistics**	*ITC*
Task complexity	To what degree is there more than one acceptable solution to the task? (1 = extremely boring; 7 = extremely interesting)	0.86	18.09	0.59
CR: 0.88 *AVE: 0.79*	To what degree is integrated action among group members required to complete the task? (1 = no cooperation; 7 = tight integration needed)	0.91	32.40	0.59
Task cohesion	Our team was united in trying to reach its goals for performance.	0.77	17.91	0.58
CR: 0.87	I was very happy with my team's level of commitment to the task.	0.88	46.86	0.73
AVE: 0.64	We did not have a lot of conflicting aspirations for the team's performance.	0.76	15.05	0.61
	This team gave me enough opportunities to improve my personal performance.	0.77	20.00	0.59
Rapport	I enjoy interacting with my team members.	0.78	24.03	0.69
CR: 0.94	My team members create a feeling of 'warmth' in our relationship.	0.85	42.88	0.77
AVE: 0.69	My team members relate well to me.	0.87	49.37	0.80
	I feel like there is a 'bond' between my team members and myself.	0.86	43.82	0.82
	I look forward to seeing my team members at work.	0.83	24.90	0.78
	I strongly care about my team members.	0.80	21.43	0.74
	I have a close relationship with my team members.	0.82	24.12	0.78
Project performance	The project was able to meet expected goals.	0.81	24.80	0.70
	The expected amount of work completed in the project.	0.79	20.44	0.68
CR: 0.90	High quality of work completed in the project.	0.80	28.05	0.67
AVE: 0.64	The project was completed on time.	0.82	34.10	0.71
	The project was completed within budget.	0.76	21.16	0.66
Work satisfaction	After this project, I could draw a positive balance for myself overall.	0.82	26.54	0.59
CR: 0.89	I have gained from the collaborative project.	0.88	41.10	0.77
AVE: 0.73	I would like to do this type of collaborative work again.	0.85	33.61	0.67

Notes: *All significant at $p < 0.05$.
CR is composite reliability, AVE is average variance extracted and ITC is item-total correlation.

Table 3 Basic information and correlation table

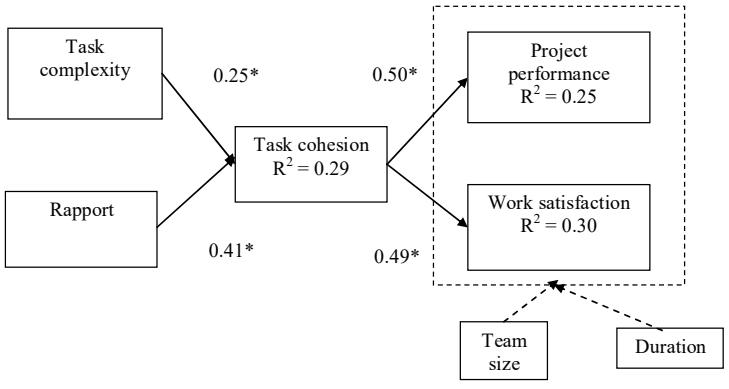
Basic information						*Correlation matrix*				
		Mean	*Std. dev.*	*M3*	*M4*	*1*	*2*	*3*	*4*	*5*
1	Rapport	5.39	0.94	–0.52	0.44	*0.83*				
2	Task cmplx.	4.96	1.12	–0.41	0.43	0.28	*0.93*			
3	Task coh.	5.21	0.96	–0.44	–0.25	0.48	0.37	*0.80*		
4	Project per.	5.37	0.99	–0.53	0.22	0.30	0.20	0.50	*0.79*	
5	Work satis.	5.25	1.03	–0.76	0.60	0.34	0.28	0.54	0.56	*0.85*

Notes: M3: skewness; M4: kurtosis.
The diagonal line of correlation matrix represents the square root of AVE.

5 Data analysis

Basic information about each variable is given in Table 3, including means, standard deviation, skewness and kurtosis. For each variable, the skewness was less than 2 and the kurtosis less than 5, indicating no significant violation of normal distribution. The mediating effect is shown in Figure 2. These indicate that task complexity and rapport had a positive and significant effect on task cohesion while task cohesion had a positive and significant effect on project performance and work satisfaction. Task complexity and rapport explained 29% of variance in task cohesion. Task cohesion explained 25% and 30% of variance in project performance and work satisfaction, respectively. In order to further explore the dataset, we examined the direct effect of the independent variables on the dependent variables; no significant effect was found for the direct effect. From these results, we can conclude that task cohesion fully mediates the effects of task complexity and rapport on project performance and work satisfaction. Three tests (the Sobel test, the Aroian test and the Goodman test) confirmed the mediation relationship (Preacher and Leonardelli, 2001). Therefore, all the hypotheses were supported. In order to prevent possible interferences from contextual factors, team size and project duration were incorporated as control variables.

Figure 2 Path analysis



Note: *p < 0.05.

6 Discussions

The purpose of our study was to examine and document the effects of task complexity and rapport in ISD projects. As predicted, they were observed to produce improvement in task cohesion among project members. This is consistent with previous research.

The results of this study show how team rapport and task complexity can influence task cohesion leading to positive project performance and work satisfaction outcomes. Based on the social interdependence theory, the way goals are structured determines how teams will interact with each other. In this study, we see that task complexity, a characteristic that can influence how a team interacts can lead to cohesion for members to work together to achieve the goal. Instead of hoarding knowledge or competition against each other, team members depend on each other to achieve mutual understanding and share knowledge to achieve a project success in software development. Rapport further adds to the cohesion of the team to complete the task at hand with successful outcomes. When there is task cohesion, not only will be the project be successful, but individual work satisfaction occurs. This study shows that individuals are satisfied with their contribution to the project. Individuals in a team are happy when the entire team is interacting and collaborating together in a positive work environment to achieve a mutual goal. This is important especially for offshore software development teams, where team members are often transferred between projects or there is high turnover within the team due to specialised resources are at a premium in certain countries (Ethiraj et al., 2005). Sometimes team members may be working together for the first time on projects. It is critical to build a team that allows for rapport within team members, which leads individuals to work together for a shared goal (task cohesion). As task complexity increases due to issues with the software development project, teams will begin to work together for the good of the team goal rather than for self-interests.

This study contributes to project management research by developing a model that applies both social capital and social interdependence theory. The model shows that the interdependence of task complexity and rapport that have not previously addressed in literature are critical components that work together for task cohesion. The testing of the model not only provides impact on the performance of the project but on the outcome to individual work satisfaction.

From a social capital perspective, this study investigates how rapport influences task cohesion. Team members need to establish rapport in order to effectively exchange information and solve problems. Team members that have rapport with one another begin to trust others and feel obligated to support each other. Based on social capital, rapport and close relationships determine the types of information team members are comfortable sharing (Propp, 1999). Based on social interdependence theory, we see how task complexity and rapport influence task cohesion. When tasks are complex and there is rapport between team members, there is an interaction and team members embrace each other's thoughts, knowledge and inputs to create a unique and feasible solution. We also see through social interdependence theory, how team members interact with each other on the task (task cohesion) impacts the different outcomes (performance and work satisfaction).

Since offshoring has been increasing used to help decrease costs for software development while maintaining the level of quality to improve productivity and reduce project completion times, this study fills a gap within the understudied context of offshore ISD teams. More importantly, it demonstrates that the interdependence between

task complexity and rapport among team members that can lead to shared understanding of the problems and approaches the team adopts, which eventually leads to successful outcomes. For management, although it can be difficult to build rapport between team members due to high turnover, it is a critical team building attribute for project success. This study shows that team members will enhance the team's shared commitment to the teams' task which not only benefits the project but influences overall personal work satisfaction.

Our results open up avenues for future research. It is important to see what other social dimensions other than rapport will work together with task complexity to increase task cohesion. In teams, specifically offshore project teams, team building is imperative as the turnover rate is higher than usual due to a premium of the skill set. A limitation of this study is the generalisability of data to other contexts. Even though the data is collected from single country, majority of the firms are multinational corporations with development centres distributed globally. This suggests limited generalisability of results and hence we recommend future research in other settings. Another limitation of this study is that data was collected from a single respondent from vendor organisations. Future studies that integrate both client and vendor inputs on project performance are strongly encouraged to further strengthen this study.

While research and media continue to report high project failure, these interpersonal aspects cannot be overlooked. This research recommends that management invest in early team building skills that develop team relationships and allow for interactions with each other in social and professional settings that would result in rapport within the team. In an outsourced ISD project, there are many complex tasks that arise and this type of complexity will only enhance group interaction and coordination. While ISD projects often have large overheads and questionable success rates, it is crucial for management to continue to look at the relational aspects of a team that will contribute to project performance.

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