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Exploring the Role of Team based Reward in the performance of Outsourced ISD projects: A Social Interdependence Perspective

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ABSTRACT

Vendor project teams can greatly facilitate the successful implementation of client ISD projects. We examined the effects of team performance based reward structure on ISD project performance. A total of 194 responses were solicited, obtained, and analyzed. The results indicated that reward based on team performance can enhance the level of task cohesion which in turn facilitates increased information utilization. Both task cohesion and information utilization improve project performance. Directions for management practice and future research are discussed.

Keywords

Project management, task cohesion, information utilization, reward for team performance.

INTRODUCTION

An information system development (ISD) project is a series of difficult decisions and complex problem solving activities. Individuals with diverse knowledge and expertise are gathered together as a team to accomplish complex tasks. During the project life cycle, team members work on their individual and collective tasks, discover problems, diagnosis the components of problems, and generate solutions to problems. The final team performance is largely determined by their collective commitment towards the team's tasks. The key for a diverse team is to develop shared commitment towards team tasks or task cohesion more effectively. Task cohesion is the basis for exchanging unique information (Zaccaro et al. 1995). It can also facilitate group membership and team decision making (Zaccaro and McCoy 1988).

Compared to permanent business units or a team with a long history where members interact with each other more completely, a temporary project team presents more difficulties in forming a cohesive unit. For example, in the context of outsourced IS development projects, where IS development teams are constituted for the duration of the project life cycle and dissolved once the project is implemented, task cohesion is difficult to form since there is only limited time for team members to interact with each other. In addition, according to the study conducted by (Schaaf et al. 2005), among IT providers in India, the turnover rate is 15-30%, while in the BPO segment the rate has risen to no less than 40% in some cases. We believe, under this condition, task cohesion among team members is limited and certain managerial interventions are required to improve task cohesiveness.

Team performance linked reward (a type of managerial intervention) is often adopted by managers across different types of teams to improve aspects of individual and overall team performance (Strokes 1995; Wageman 1995, Haines and Tagger, 2006). It enhances cooperation, cement task identity and team goals. The purpose of this study is, therefore, to explore the relationship of team performance based reward system to their potential impact on task cohesion and subsequently to project performance in the context of IS outsourced projects. Drawing upon social

interdependence theory, we propose that managerial intervention (reward) is required to build task cohesion in a temporary team. In addition, those common understandings facilitate team processes (information utilization) and lead to a better outcome (project performance). Survey data of 194 IS developers from IT service firms located in India was collected to validate the model. In the following sections, we first review the literature on task cohesion and social interdependence. We then build hypotheses based upon the literature. Research methodology and data analysis are followed by implications for researchers and practitioners.

BACKGROUND

2.1 Team Cohesion

Task cohesiveness is the measure of a team's shared commitment to its task (Hackman 1976). It has been extensively studied both as an outcome of group member characteristics and as an input to performance outcomes. Overall, evidence supports a positive relationship between task cohesion and team performance (Casey-Campbell and Martens 2009). Team goals are a key antecedent of task cohesiveness. In task-cohesive groups, members care about the success of other group members because their own goal attainment is often inextricably bound to collective achievement (Zaccaro et al. 1995). Also, task-cohesive teams set and enforce more stringent performance norms that compel high effort (Zaccaro and McCoy 1988). In numerous studies, task cohesion significantly predicted performance outcomes (O'Keefe et al. 1975; Mullen and Copper 1994). Task cohesion increases greater exchange and adoption of information (Zaccaro et al. 1995).

2.2 Social Interdependence

Social interdependence theory has evolved and provided a conceptual structure to understand cooperation in groups. Different types of social interdependence that exist among group members include resource, expertise, goal and reward interdependence. When interdependence exists, such as in program teams, group members can take action in ways that relate to the actions of others (Johnson and Johnson 1998). There are two types of social interdependence: cooperative and competitive. 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 promotive interaction; while in a negative approach interdependence tends to result in oppositional interaction; and no interdependence results in an absence of interaction. Reward interdependence refers to the level to which a subgroup believes that their rewards depend on the performance of the other subgroup (Wageman 1995). Organizations typically implement performance-related mechanisms, which explicitly link rewards to individual or group performance (Hertel et. al 2004, Perez et. al 2004). These mechanisms are often designed such that rewards of individuals or groups are linked. In the context of ISD projects, reward interdependence is likely to be present when each member's reward is based upon the overall team's performance (Pee et. al 2010). In this case, individual team members are likely to be motivated and committed to cooperate in order to maximize their overall rewards. Team based reward systems include profit sharing, goal based incentives, discretionary bonus and team skill incentives (Hoffman and Rogelberg 1998).

(Cavalier et al. 1995) identified positive interdependence as an antecedent of team cohesion. (Tjosvold 1988) determined that group interactions are developed by providing members with a common goal and rewarding them to the extent that the group successfully accomplishes its goal. Empirical research suggests that rewards dependent on team outcomes place the emphasis on a common goal and nurture cooperation and the associated interaction. (Campion et al. 1993) suggest that rewards should be linked to the group's performance in order to motivate group-oriented behavior.

From the perspective of social interdependence theory, we argue that reward based upon team performance improves task cohesion which, in turn, facilitates information utilization and both collectively improved ISD project performance. The chain of relationships suggested by the literature provided the basis for our research model; this is shown in Fig. 1.

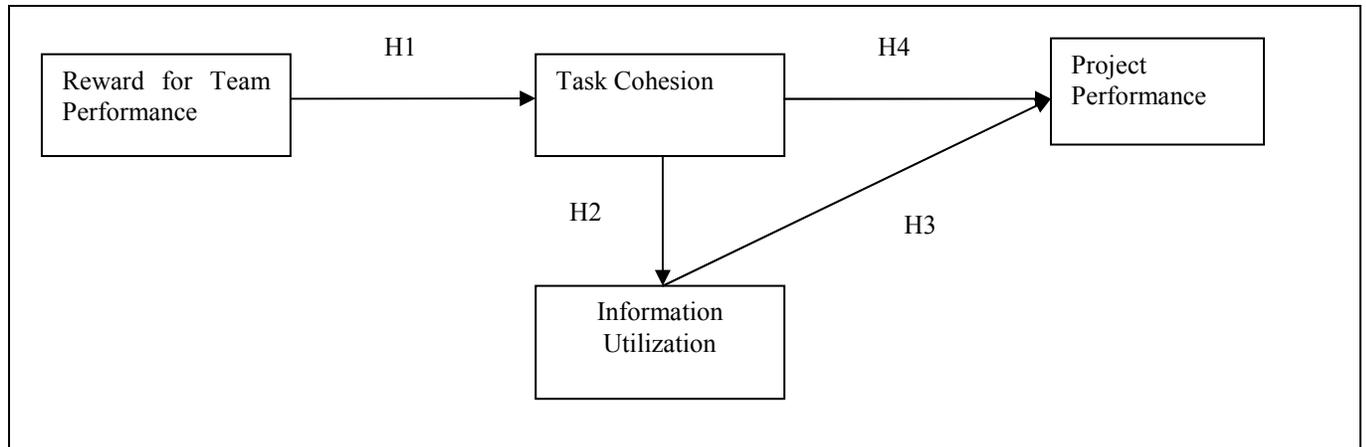


Figure 1: Research model

HYPOTHESES

In line with (Hackman 1976)'s definition of task-based cohesiveness as "shared commitment to the task", prior studies have suggested that reward manipulations are effective in raising the commitment of group members to the group task (Back 1950). External rewards provide a source of task cohesiveness (Back 1950). (Wageman 1995) identifies in her study that whenever collaborative behavior is important to excellent task performance, reward interdependence is important. Research on teams in laboratory settings and single-function teams suggests that team reward impacts team interaction (Ichniowski et al. 1997; Wageman and Baker 1997). Pinto et al. (1993) suggest that rewards based on team outcomes nurture cooperation and the associated interaction. In IS research team based reward systems are determined to improve knowledge sharing (Pee et al. 2010; leverage into sustainable competitive advantage (Perez et. al 2004) and improved team effectiveness (Hertel et al 2004). We believe that reward for team performance, impacts task cohesion since it provides individuals with the incentives to interact with one another.

Hence,

H1: Reward for team performance will positively improve task cohesion among team members.

Members of high task cohesive teams are likely to be more committed to the task, devote more effort to its accomplishment, and persist when confronted with difficult obstacles (Hackman and Morris 1975). Members of high task-cohesive teams should also engage in more effective planning, information exchanges, and communicate more frequently during the performance period than will members of low task-cohesive teams (Zaccaro et al. 1995). Drawing from these findings we expect that team members demonstrating higher commitment to their project tasks are more likely to lead to greater information exchanges and adoption of shared information and ideas. Hence this leads us to believe,

H2: Task cohesion will positively improve information utilization among team members.

According to (Hackman and Morris 1975), understanding the interaction processes that take place between team members is the key to understanding team effectiveness. Through the intra-team interactions between team members that occur when performing team activities such as planning, exchanging, and coordinating information, teams can transform requirements into deliverables that affect overall project outcomes. Empirical studies confirmed that team performance is greatly influenced by interaction processes such as coordination, communication, and information sharing (Yeatts and Hyten 1998). Drawing from these findings, we expect that team members focused on sharing, discussing, and evaluating information as a group is more likely reduce various uncertainties. By capitalizing on the interaction synergies occurring during team information processing, the team's efforts can be translated into better project performance. Hence our hypothesis:

H3: Information utilization will positively improve project performance.

Past research has confirmed the role of task cohesion in significantly predicting performance outcomes. For example, (O'Keefe et al. 1975) found cohesive scientific work groups to be more likely to adopt innovations than non-cohesive groups. Furthermore, (Keller 1986) longitudinal study found that group cohesiveness was the strongest predictor of project groups' performance, both at the initial assessment and over time. Cohesiveness has a direct influence on the degree of team satisfaction (Olaniran 1996). Studies have found that cohesive teams with relatively high performance goals are more productive than non-cohesive teams (Zaccaro and McCoy 1988). It is believed that the cohesiveness-performance relationship is primarily due to individuals' commitment to the team members as well as to the task (Mullen and Copper 1994). Hence,

H4: Task cohesion will positively improve project performance.

Variables	Categories	#	%
CMM Level	1	1	0.5
	2	3	1.5
	3	7	3.6
	4	4	2.1
	5	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	Min	1	
	Max	48	
	Average	15.2	
	SD	10.2	

Table 1: Organization and Program Characteristics

METHODOLOGY

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. 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. 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 measured on a 7-point Likert-scale ranging from 'totally disagree' to 'totally agree'.

Because independent and dependent variables are from the same rater, common method variance might jeopardize the analysis result and additional inference (Podsakoff et al. 2003). 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.

CONSTRUCTS AND MEASUREMENT

Reward for team Performance refers to the degree to which a team member is provided benefits based upon their contribution to overall team performance. A total of three items adopted from (Denison et al. 1996) measured the extent to which rewards are linked to team performance.

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.

Information Utilization refers to the use of information transformed by the team. A total of four items describing activities related to information utilization capture team information utilization behaviors (Deeter-Schmelz 2003).

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; Wang et al. 2005) measure the perceived outcome of the development work conducted.

2.1 Measurement model

In this study, PLS-Graph Version 3.01 (Chin 1994) was used to verify the measurement and test hypotheses. PLS is a latent structural equation modeling technique that uses a component-based approach to estimation that involves two steps. The first step is to examine the measurement model and the second step is to assess the structural model.

Item reliability, convergent validity, and discriminant validity test were used to test the measurement model in PLS. Individual item reliability is examined by observing the factor loading of each item. All items have loadings higher than the cutting point (0.5). Convergent validity can be examined by testing composite reliability of constructs, and variance extracted by constructs (AVE) (Fornell and Larcker 1981; Kerlinger 1986). The convergent validity is assured since, for each construct, the AVE is larger than 0.5, the composite reliability is more than 0.7. Finally, discriminant validity was assessed by testing whether the correlation between pairs of construct are below the threshold value of 0.90 (Bagozzi et al. 1991) and whether the square root of AVE is larger than correlation coefficients (Fornell and Larcker 1981; Chin 1998).

Factors	Items	Factor Loading	Composite Reliability	Variance Extracted
Reward for team performance	Team members' performance review depends upon their performance as a member of the team.	0.89	0.88	0.71
	Team members' performance review depends upon the performance as a member of the team.	0.77		
	Team member's effective work in support of teams is critical to their advancement within the organization.	0.87		
Task cohesion	Our team was united in trying to reach its goals for performance.	0.78	0.87	0.64
	I was very happy with my team's level of commitment to the task.	0.88		
	We did not have a lot of conflicting aspirations for the team's performance.	0.77		
	This team gave me enough opportunities to improve my personal performance.	0.77		
Information utilization	My team often uses ideas we have developed to improve our performance.	0.87	0.91	0.72
	My team often uses ideas developed in team discussions to solve specific problems.	0.88		
	Members of my team try to use the discussions we have about projects as a source of learning.	0.85		
	My team uses ideas developed in discussions about projects to set new team goals.	0.79		
Project performance	The project was able to meet expected goals.	0.83	0.90	0.64
	The expected amount of work completed in the project.	0.80		
	High quality of work completed in the project.	0.80		
	The project was completed on time.	0.81		
	The project was completed within budget.	0.77		

Table 2: Validity and Reliability

Basic Information					Correlation Matrix			
	Mean	Std. Dev.	M3	M4	1	2	3	4
1 REWARD	5.21	1.13	-0.82	0.73	0.84			
2 TASK COH	5.20	0.96	-0.44	-0.25	0.53	0.80		
3 INFO UTIL	5.17	0.99	-0.48	0.17	0.35	0.66	0.84	
4 PP	5.37	0.99	-0.53	0.22	0.47	0.52	0.50	0.80

M3: Skewness; M4: Kurtosis

The diagonal line of correlation matrix represents the square root of AVE

Table 3: Basic Information & Correlation Table

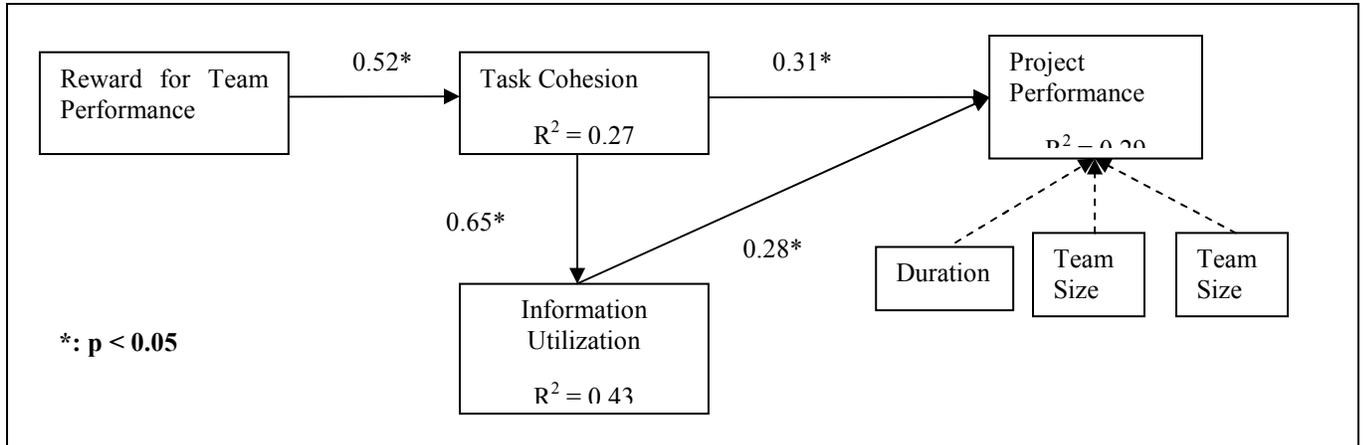


Figure 2: Path analysis

2.2 Data Analysis

In order to prevent possible interferences from contextual factors, team size and work duration were incorporated as control variables. As shown in Fig 2, all hypotheses are supported. Task cohesion fully mediated the effects of reward on information utilization and project performance.

The purpose of our study was to examine and document the effects of reward mechanism in ISD projects. As predicted, reward was observed to produce improvement in task cohesion among project members. This is consistent with previous research. Reward explained 27% of variance in task cohesion. Task cohesion explained 43% of variance in information utilization and they both collectively explained 29% of variance in project performance.

Findings from the empirical study indicate that an ISD team can improve its performance by implementing reward mechanisms linked to team performance, encouraging task cohesion; encouraging information exchange and utilization with regards to each other's tasks.

DISCUSSION

Theoretical underpinnings of this study were based upon social interdependence theory (Johnson and Johnson 1998) which postulated the development of cohesive relationships among participants as a result of reward interdependence. Further, we empirically illustrate the relationship. Reward linked for team performance, task cohesion and their impact on project performance had not been explored in the context of IS development projects. To complete common project tasks, team members must demonstrate collective commitment to successfully complete an ISD project. Project managers face important issues impacting effective information utilization, especially in the IS outsourcing context. In this study, we also explore whether team members with a shared commitment towards team tasks will more effectively exchange and utilize the information collectively held by the group. To help determine effective means of increasing team cohesion, we explore whether reward linked to team performance have a positive effect on building task cohesion.

The results of the path analysis revealed several important findings. First, reward for team performance is an important antecedent condition and explains significantly the presence of task cohesion. Second, theoretical perspectives on social interdependence were found to reasonably predict the outcome of performance based reward system. All relationships presented in this research were significant.

A couple of implications can be garnered from this research. First, reward structure linked to team performance serves as a useful tool for team leader to build a cohesive, temporary ISD team. Reward structure increases the interaction among members and intensive interaction serves as a basis for generating task cohesion. Second, task cohesion increases team performance both directly and indirectly. The direct effect has been supported by prior studies. Our results confirm previous studies by showing the direct effect of task

cohesion on project performance. The direct effect indicates that the presence of committed team members toward team tasks reduces the ambiguity of work assignment and prevents possible barriers in integrating individual tasks to the team's deliverable. The increasingly modular design of software production (Carmel and Agarwal 2006), has resulted in high levels of task partitioning in offshore, outsourced IS development processes. Task cohesion assumes greater importance in this context.

Different members of the team perform different roles, and the reward system needs to acknowledge these differences and provide suitable recognition to all members of the team. The ability to manage the team member expectations with regards to their reward structures and their relationship to overall team performance will likely lead to a positive impact on the task cohesiveness. Conversely, not being able to set or manage expectations concerning evaluation processes and reward systems may not have the desired sustainable impact on their performance. Future research can investigate different team based reward systems and determine their effectiveness in outsourced IS development contexts.

A limitation of this study is the generalizability of data to other contexts. Even though the data is collected from single country, majority of the firms are multinational corporations with development centers distributed globally. This suggests limited generalizability 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 organizations. Future studies that integrate both client and vendor inputs on team performance are strongly encouraged to further strengthen this study.

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