

Performance of IS Project Teams - A Learning Perspective

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ABSTRACT

The purpose of this paper is to study the performance of Information Systems (IS) project teams. Performance of IS project teams is defined in terms of efficiency, effectiveness, and timeliness. Drawing upon the theories of organizational learning, a model is proposed that includes culture variables of collaboration and trust.

INTRODUCTION

Extant literature shows that few studies have been done in the area Information Systems (IS) projects performance. (Robey, Smith, & Vijayasarathy, 1993) point out that IS project performance is an often neglected area of research in information systems. Organizations do not have a clear understanding of the factors that influences the performance of IS projects. The study of IS project teams are different from other project teams in terms of being more complex, having advanced methodologies and being more information intensive. The research in the area of IS project teams performance can shed light on the phenomenon of IS project failures, which are so rampant in organizations. Though, we hear stories of technical advances in tools and methodologies, the rate of IS project failures are still high.

In this study, software development is viewed as a cooperative process between team members that will gain from the collaboration efforts of the team. Taking the perspective of Organizational learning to study the team performance of IS projects. (Wastell, 1999) contends that learning is crucial to the success of IS development and many IS projects fail due to social factors in project teams. He, further states that given the continuing prevalence of IS project failures, a fresh theoretical perspective and new methodological principles are needed for IS developments.

As noted by (Aladwani, 2002), the literature in IS projects are broadly based on two mutually uncoordinated streams of research:

1. "Social perspective of IS project performance focus on issues relevant to the behaviors and attributes of team members and includes project social context as well as organizational environment within which IS projects take place." In this

perspective, technology is not seen as a determinant of project outcomes. Technology is just seen as a supporting infrastructure for project teams. (Wastell, 1999) illustrates this perspective.

2. “Technical perspective of IS project performance focus on issues relevant to the attributes and tasks of the IS projects.” The behaviors and attributes of team members are not included as important factors. (Saarinen, 1990) is an example of this stream of research.

Taking a social perspective on the study of IS project performance, I draw upon the concept of Organization learning and culture. According to (Schein, 1985), culture has been defined as the set of shared implicit assumptions that a group has and which determines how the group perceives, thinks about, and reacts to its environments. (Fiol & Lyles, 1985) define learning as “the process of improving actions through better knowledge and understanding.”

The motivation of this study is to explain the performance of IS project teams from a learning perspective. Although advanced tools and methodologies are available, how well they are implemented into a robust system also hinges on the social actions and interactions of the team members. A better understanding achieved from collaboration will significantly impact the learning process in software development.

THEORETICAL FOUNDATIONS AND HYPOTHESES

Performance of IS project teams may be influenced by the learning of new concepts or methods that are enhanced in an environment of trust and collaboration. Hypotheses are largely derived from theoretical statements made in the literature on organizational learning. (Hult, Hurley, Giunipero, & Nichols, 2000) state that organizational learning is related to two different concepts: the process of learning and the structure of the learning organization. The hypotheses are developed through the following variables.

Cooperative Learning

Cooperative learning theory (Johnson & Johnson, 1989) is selected as a form of organizational learning that focuses on the learning (i.e. knowledge creation), the sharing (i.e. knowledge dissemination), and the application of knowledge to achieve superior work outcomes. Cooperative Learning helps the team members to work together to maximize their own as well as other team members’ performance and learning.

According to co-operative learning theory, certain conditions need to be present for cooperative learning to exist – promotive interaction and group process. Promotive interaction is related to the degree to which members of a group can identify the individual strengths and weaknesses in the group and seek to help others in developing the necessary skills for the group to achieve its goals through explaining or teaching. In order to exist for promotive interaction, the members need to have adequate social skills beforehand. Social skills are important for members of an organization which can lead to ‘social knowledge’ that is inherently created by the collective actions of a group (Janz & Prasarnphanich, 2003).

Group process refers to assessment of past activities by the group. This involves reflecting on the activities that the group did well and also the ones that the group did not so well. Group can take certain measures to address the identified weaknesses.

Task Complexity

Task complexity defines the complexity of task of a project team (Campbell, 1988) classifies task complexity as: a psychological experience, an interaction between task and personal characteristics, and a function of objective task characteristics. For this study, task complexity is taken as a person-task interaction. This view accounts for the importance of both the task accomplisher and the task while determining the degree of task complexity.

Task Interdependence

Task interdependence refers to the extent to which a task requires organizational units to which a task requires organizational units in order to take part in workflow exchanges of product, information, skills, or resources, and to where actions taken in one unit affect the actions and work outcomes of other units (Mohr, 1971). When task interdependence is low, each department's or team member's contributions are additive (Andres & Zmud, 2001). As task interdependence increase, a department or team member's need to integrate its effort with others and the output of another is required as input to do their tasks. Because of task interdependence there may be a delay in time as one unit can not start its work till it gets the input from the other.

Collaboration

Collaboration may be defined as the degree to which people in a group actively help one another in their work. If an organization has a Collaborative culture, then it will increase knowledge creation through increasing cooperative work of knowledge exchange. Exchanging knowledge among different members is a prerequisite for knowledge creation. Collaborative culture fosters this type of exchange by reducing fear and increasing openness to other members. For example, (Zucker, Darby, Brewer, & Peng, 1996) confirmed the significance of collaborative culture in knowledge creation by examining the biotechnology industry. Collaboration between organizational members also tightens individual differences. It can help people develop a shared understanding about an organization's external and internal environments through supportive and reflective communication. Shared understanding among organizational members is very important for knowledge creation. Organizational members get more opportunities to collaborate when their tasks are inter-related or inter-dependent. According to the study of (Andres & Zmud, 2001) on productivity of software project teams, there was a significant interaction effect between task interdependence and coordination strategy for productivity. As the task interdependence increase there will be more likely to be cooperative learning between the members as both parties will benefit from the learning, thus increasing the productivity. However, lack of collaboration culture will affect the co-operative learning even if there is a chance due to task interdependence.

Hypothesis 1: As system development tasks become more complex, proportionally greater will be the effect of high collaboration on cooperative learning than the effect of low collaboration.

Hypothesis 2: *As system development tasks become more task interdependent, proportionally greater will be the effect of high collaboration on cooperative learning than the effect of low collaboration.*

Trust

Relationships with high level of trust results in more co-operation and learning than the ones with low level of trust (Nahapiet & Ghoshal, 1998). Trust encourages a climate that is conducive to better co-operative learning by alleviating the fear of risk. Thus it is expected that the relationship between task interdependence and co-operative learning will be influenced by the level of trust amongst team members.

Hypothesis 3: *As system development tasks become more complex, proportionally greater will be the effect of higher levels of trust on cooperative learning than the effect of low levels of trust.*

Hypothesis 4: *As system development tasks become more task interdependent, proportionally greater will be the effect of higher levels of trust on cooperative learning than the effect of low levels of trust.*

Team Performance

Team performance can be defined as the extent to which a team is able to meet the objectives of quality, time and cost (Schrader & Goepfert, 1996). For the purpose of this study, the team performance is described in terms of the variables – effectiveness, efficiency, and timeliness. The term ‘effectiveness’ has been used to describe the way individuals or groups perform their duties to meet the desired expectations. According to (Hackman, 1987), the effectiveness implies that the work output meets expectations of the reviewers such as a supervisor or customer. (Henderson & Lee, 1992) developed a stakeholder instrument that will be used in this study to measure stakeholder’s perceptions of team’s work performance along the dimensions of efficiency, effectiveness, and timeliness. Efficiency is related to the amount of work the team produces with a given amount of resource inputs. Effectiveness is the degree to which the teams’ work product, i.e. software application, meets the user’s requirements. Timeliness pertains to the team’s ability to meet the scheduled deadlines.

Team performance has been viewed as an outcome of a learning process when knowledge is generated, shared or applied. Performance implies that knowledge is applied and realized. (Davenport & Prusak, 1998) remark that knowing is not the same as doing; it is meaningless if knowledge and learning are gained but not applied to generate benefits for an organization.

Performance that stands for individual or team achievement has been used as an outcome of learning (i.e. (Edmondson, 1999). Cooperative learning theory suggest that the achievement and productivity of a group will be enhanced if members of the group have interdependent goals, feel individually responsible for the group’s performance, help each other, possess adequate social skills, and periodically evaluate the group’s performance. Drawing upon the cooperative learning theory, the work performance will be higher or enhanced when there is co-operative learning.

Hypothesis 5: *The level of co-operative learning positively influences work performance of system development teams.*

Research Model

The hypothesized research model is presented as follows:

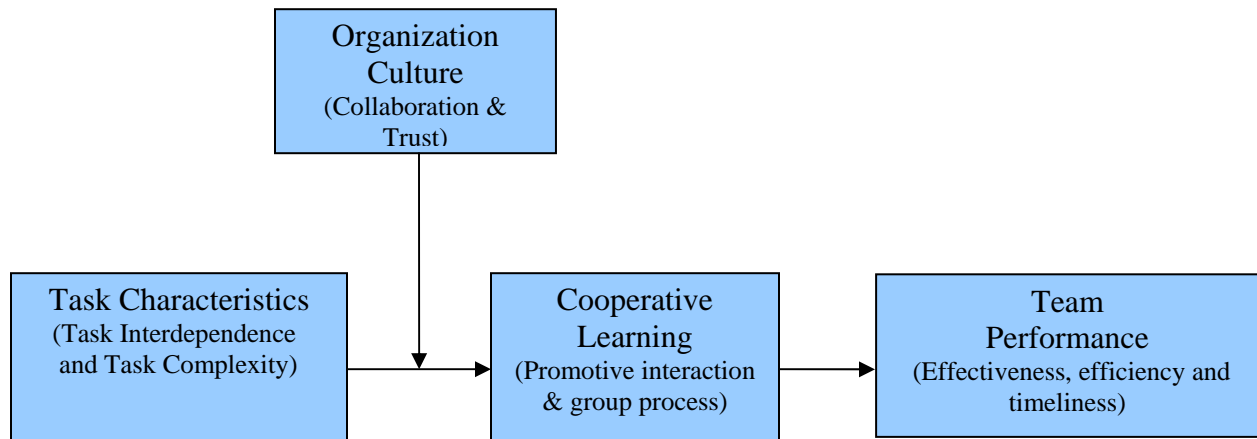


Figure 1: Research Model.

RESEARCH METHODOLOGY

Samples for this study will be collected through a field survey using questionnaires as the research instrument. Organizations that have implemented IS development projects will be used for the study. Target respondents were project team leaders and team members. The unit of this study is the team.

DISCUSSION AND CONCLUSIONS

The model examined in this paper suggests that organizational culture of collaboration and trust are important moderators. Performance of IS project teams can be enhanced by developing a culture of collaboration and building trust among the team members. Task interdependence provides a chance for cooperative work among the members; however, making tasks too interdependent may block the swift progress of the project. Within the environment of collaboration and trust, task complexity will result in more cooperation among the team members. This study will have implications from both theoretical and practical perspectives. Theoretically, a framework is proposed to study the learning in IS projects. The constructs used in the framework has grounding in established theories. Practically, the framework provides guidelines for the IS managers to prepare a condition that will assist learning in their organizations.

Future research can extend this model by adding the technical variables to build a more holistic model of IS project performance. Another area to focus will be on the processes that transfer learning from the group level to the organizational level. Performance of project teams can be studied to analyze their effect on the organizational as a whole. Such organizational impact can be studied either behaviorally or objectively in terms of stock value, market value, profits etc.

REFERENCES

- Aladwani, A. (2002). An integrated performance model of information systems projects. *Journal of Management Information Systems*, 19(1), 185-210.
- Andres, H., & Zmud, R. (2001). A contingency approach to software project coordination. *Journal of Management Information Systems*, 18(3), 41-70.
- Campbell, D. J. (1988). Task complexity - a review and analysis. *Academy of Management Review*, 13(1), 40-52.
- Davenport, T. H., & Prusak, L. (1998). *Working knowledge: How organizations manage what they know*. Boston: Harvard Business School Press.
- Edmondson, A. (1999). Psychological safety and learning behavior in work teams. *Administrative Science Quarterly*, 44(2), 350-383.
- Fiol, C. M., & Lyles, M. A. (1985). Organizational learning. *Academy of Management Review*, 10(4), 803-813.
- Hackman, J. R. (1987). The design of work teams. In J. Lorsch (Ed.), *Handbook of organizational behavior* (pp. 315-342). Upper Saddle River, NJ: Prentice Hall.
- Henderson, J. C., & Lee, S. (1992). Managing I/S design teams - a control theories perspective. *Management Science*, 38(6), 757-777.
- Hult, G., Hurley, R., Giunipero, L., & Nichols, E. (2000). Organizational learning in global purchasing: A model and test of internal users and corporate buyers. *DECISION SCIENCES*, 31(2), 293-325.
- Janz, B., & Prasarnphanich, P. (2003). Understanding the antecedents of effective knowledge management: The importance of a knowledge-centered culture. *DECISION SCIENCES*, 34(2), 351-384.
- Johnson, D. W., & Johnson, R. T. (1989). *Cooperation and competition: Theory and research*. Edina, MN: Interaction.
- Mohr, L. B. (1971). Organizational technology and organizational structure, *Administrative Science Quarterly* (Vol. 16, pp. 444): Administrative Science Quarterly.

- Nahapiet, J., & Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage, *Academy of Management Review* (Vol. 23, pp. 242): Academy of Management.
- Robey, D., Smith, L. A., & Vijayasarathy, L. R. (1993). Perceptions of conflict and success information systems development projects. *Journal of Management Information Systems*, 10(1), 123-139.
- Saarinen, T. (1990). System development methodology and project success: An assessment of situational approaches. *Information and Management*, 19(3), 183-193.
- Schein, E. H. (1985). *Organization culture and leadership*. San Francisco, CA: Jossey-Bass.
- Schrader, S., & Goepfert, J. (1996). *Structuring manufacturer-supplier interaction in new product development teams: An empirical analysis*. Paper presented at the Proceedings of the 12th International Conference of Industrial Marketing and Purchasing, Karlsruhe, Germany.
- Wastell, D. (1999). Learning dysfunctions in information systems development: Overcoming the social defenses with transitional objects. *MIS Quarterly*, 23(4), 581-600.
- Zucker, L. G., Darby, M. R., Brewer, M. B., & Peng, Y. (1996). Collaboration structures and information dilemmas in biotechnology: Organization boundaries as trust production. In R. M. Kramer & T. R. Tyler (Eds.), *Trust in organizations: Frontiers of theory and research* (pp. 90-113). Thousand Oaks, CA: Sage.