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# THE EFFECT OF SOFTWARE ENGINEERING METHODS ON IS GROUP PROCESSES AND PERFORMANCE DURING SOFTWARE MAINTENANCE

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## Abstract

*Organizations must have the right structures and processes in place to support the change process necessary for getting up to speed on new technologies (Nelson and Ghods, 1998). This study focuses on two types of processes that affect the ultimate performance of the IS group: intra-group processes that take place within the context of the IS group, and inter-group processes that take place between the IS group and user groups. In this study, we bring two perspectives of group processes, the “open” system view and the “closed” system view, together to study how the processes that take place within an IS group impact the group’s ability to communicate and coordinate with other groups for the purpose of maintaining software systems. The findings in this study will contribute to our knowledge of how internal group processes contribute to effective inter-rout relations and overall team performance.*

**Keywords:** Inter-group coordination, IS team performance

## Introduction

An organization’s ability to respond to business changes depends on having the right structures and processes in place to support the change process (Nelson and Ghods, 1998). This study focuses on two types of processes that affect the ultimate performance of the IS group: intra-group processes that take place within the context of the IS group, and inter-group processes that take place between the IS and user groups. Past research on group processes have either taken a “closed” system view or “open” system view. We bring these two perspectives together to study how the processes within an IS group impact the group’s ability to communicate and coordinate with other groups for the purpose of maintaining software systems. We investigate how standardization of processes within the group, or a software engineering approach, affects the three processes identified by Nelson and Ghods (1998) that support a flexible information system: (1) the rate at which the IS group responds to change requests, (2) the level of system expertise possessed by both IS staff and users, and (3) the level of coordination between the IS group and users.

## Theoretical Background

Research on organizational work units can be approached from two theoretical viewpoints: as a closed system or an open system. Traditional research on work groups takes a closed system approach that focuses on the group as the unit of analysis and ignores interactions with the external environment. In contrast, the open system approach considers how the organizational entity interacts with its environment in order to survive (Scott 1992) and stresses the importance of boundary activities (Katz & Kahn, 1978). Ancona and Caldwell (1988) view both internal and external team activities as important to team performance. This study focuses on both types of activities and explores how IS team performance is affected by management of activities within the team as well as across team boundaries.

### Intra-group Processes

Work groups are an important research focus as organizations increasingly move to more team-based structures (Denison, et al., 1996). Past research on teams has focused on factors that affect team performance such as group composition, cohesiveness, and motivation (Guzzo and Dickson, 1996). However, these factors are characteristics of either the individual team members (diversity, motivation) or the team as a whole (cohesiveness). In this study, we are interested in the *processes* used by the group to achieve its goals.

Hackman (1987) defines intra-team, or intra-group, processes as interactions that take place among team members. IS groups by nature perform conceptual types of tasks in which the ends and means of production are often not clearly defined. These types of tasks require teams to engage in idea generation, decision-making and negotiating (Goodman, 1986). IS group members possess a wide variety of skills and expertise that impact the group's ability to function smoothly. Designers, programmers, and analysts must work together to provide solutions to users, but these IS professionals possess different training and technical expertise which may contribute to conflict about the task. Although some task conflict leads to more effective group operations (Jehn, Northcraft, and Neale, 1999), the activities of the team still need to be structured so that the team can progress from discussing the task to performing the task.

Standardization, a coordination mechanism that uses predetermined rules to govern the performance of each activity, is commonly used to provide structure within a group for the purpose of managing interdependencies among individual activities (Malone and Crowston, 1994). The improved structure provided by standardization should also enable the IS group to quickly respond to changing business needs (Dekleva, 1992). A rapid rate of response in implementing changes and functional enhancements to the information system should correspond to a high level of coordination within the group and the overall group effectiveness.

### Inter-group Processes

Managing inter-group relations may be more of a challenge than managing new technology (Taylor, 1999). As organizations move to more team-based structures, activities that formerly took place between department heads now are managed at the team level. Because these activities span organizational units, communication and coordination problems arise because of the complexities inherent in crossing organizational boundaries (Kirsh 1996). Boundary activities increase because boundary management takes place at a lower level in the organization and are spread across a broader range of work units and organizational actors (Cross, et al. 2000). This study focuses on boundary spanning activities that take place between the IS group and users: (1) coordination of actions between the groups, and (2) the extent of knowledge, or expertise, that each group has about the information system. We expect the level of standardization and rate of response within the group to correspond to higher levels of boundary spanning activities and IS group performance.

## Research Method

We will test the proposed relationships shown in Figure 1 using data from the Nelson and Ghods (1998) study on technological flexibility. We will use the Lisrel software program to analyze the model using path analysis. Path analysis is capable of assessing causal relationships (Kerlinger and Pedhazur 1973) and provides more accurate conclusions about relationships among variables.

## Contribution

This study takes a group process approach to investigating the relationship between standardization and team

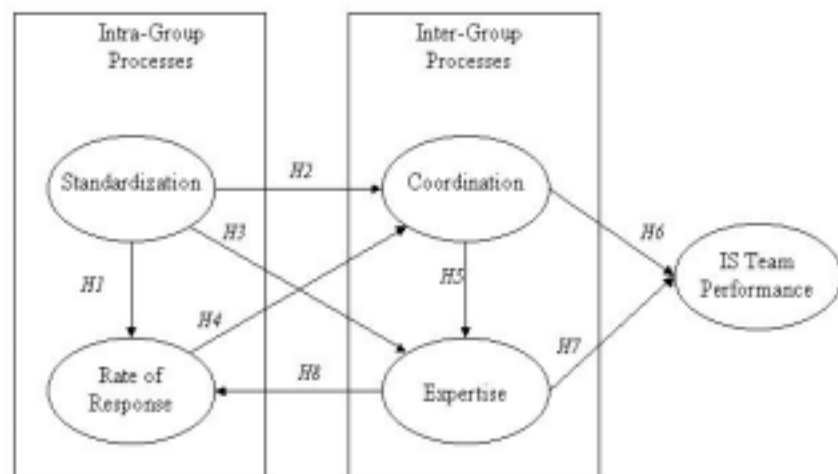


Figure 1:  
Path Model of IS Group Processes

performance. The findings in this study will contribute to our knowledge of how internal group processes contribute to effective inter-group relations and team performance. In the IS context, we will gain a better understanding of the benefits from a software engineering approach to software development and maintenance. The results of this study may further support the idea that the main benefits of software engineering methods are realized during the maintenance period of software system evolution, and provide insight into the processes that mediate relationship between standardization and team performance.

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