



**IDENTIFYING SUCCESS FACTORS FOR
HIGH PERFORMANCE PROJECT TEAMS**

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**A Report to
The Construction Industry Institute
The University of Texas at Austin**

**Under the Guidance of the
High Performance Work Teams Research Team**

Austin, Texas

July 1998

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Printed in the United States of America.

Table of Contents

Executive Summary	i
List of Tables	iii
List of Figures	iv
1. Introduction	1
2. A Literature Review of Groups.....	5
2.1. Research on Inputs to Groups.....	6
2.1.1. Group Composition	6
2.1.2. Diversity of Group Membership	8
2.1.3. Group Environments	10
2.2. Research on Group Processes	12
2.2.1. Group Structure.....	12
2.2.2. Conflict Within Groups	17
2.2.3. Task and Technology.....	18
2.3. Research on the Outputs of Groups.....	20
2.3.1. Group Performance	20
3. Case Studies of Project Teams	29
3.1. Methodology	29
3.1.1. Data Sources.....	29
3.1.2. Interview Guide	31
3.2. Data Analysis	32
3.3. Findings: Themes Emerging From Project Team Interviews.....	33
3.4. Applications	48
4. Survey of CII Project Teams.....	49
4.1. Methodology	49
4.2. Data Analysis	51
4.2.1. Responding Organizations and Respondents	51
4.2.2. Measures of Project Performance	56
4.3. Findings.....	63
4.3.1. Defining High Performance.....	63
4.3.2. Factor Analysis – Grouping Predictors of Performance	66
4.3.3. Predicting High Performance – Correlation and Regression Analyses	72
4.3.4. Comparing High Performance and Low Performance Projects	78
4.4. Applications	95
5. Conclusions and Recommendations	101
Appendix 1: Description of Projects for Project Team Interviews	105
Appendix 2: Sample Interview Guide Questions	109
Appendix 3: Comments from the “Not High Performance Project Team”	110
Appendix 4: Project Team Survey	111
Appendix 5: Information on Respondents	121
Appendix 6: Importance of Metrics	125
Appendix 7: Regression Analyses.....	128
References	129

Executive Summary

The purpose of this research was to determine methods for establishing high performance project teams that achieve breakthrough project performance, focusing on cost and cycle time reduction. The objectives of this research were to:

- Identify common characteristics of high performance project teams in the construction and related industries.
- Define what connotes “high performance” for a project team in the construction industry.
- Identify tangible and measurable benefits of high performance project teams.
- Develop metrics to predict and measure high performance project team success.
- Develop tools and methods for the establishment of high performance project teams in the construction industry.

Using interview sessions with members of eight high performance project teams we found a number of characteristics high performance teams had in common. These characteristics included critical project manager / leader behaviors, team members having “a sense of belonging to a team,” team members' ability to lead the team when their expertise was required, a sense of ownership of the project, a sense of competition with other or previous projects, team colocation and/or physical isolation from other projects, use of team building (formal or informal), and high level sponsorship and high visibility. Based on the findings from the interviews a survey instrument was created and sent to project teams in CII companies.

“High performance” was defined by the CII project team members who responded to our survey as a 10% (or better) improvement over the cost target or a 10% (or better) improvement over the schedule target, where the targets have been “aggressively set.” It was evident from the findings that a trade-off between cost and schedule existed – of the one hundred and fifty-one

projects in our study, only one was “high performance” (10% improvement on target) on both cost and schedule. Thus the tangible benefits from having a high performance team appear to be improvements to cost *or* improvements to schedule.

Through statistical analyses of survey data from one hundred and fifty-one CII project teams, we found that the common characteristics of high performance project teams in the construction industry (as perceived by the respondents) were (1) leader behaviors (e.g. communicating project goals, setting high standards and expectations, supporting team decisions, etc.) and (2) member characteristics (e.g. commitment and dedication to the project, sense of ownership of the project, the right qualifications to meet the team’s needs, etc.). To a lesser extent, team building-type behaviors (e.g. participation in formal and informal team building, recognizing and celebrating success, etc.) were also associated with these teams. Objective improvements in actual project cost were associated with leader behaviors. Consistent with previous CII research, use of best practices was found to be associated with actual project cost and schedule performance.

Our research team is developing tools that would enable project team members to assess the leadership behaviors, member characteristics, and team building efforts either before (or as) the team is being put together or after the project is underway. The survey used in our study provides a template for the development of assessment surveys.

In our survey, as in any survey of this type, our data do not allow us to make causal statements (our analyses identify associations between variables and we infer *probable* cause). What remains is verification that these associations in fact operate the way we believe them to operate. Further study of these associations in controlled or experimental settings to separate out their effects is recommended.

List of Tables

Table 3.1: Summary of Theme Analysis from Interviews	34
Table 4.1: Typical Project Descriptions	53
Table 4.2: Comparison of Surveyed Projects with 1996 CII Metrics Report	56
Table 4.3: Correlations Between Predicted and Predictor Variables	74
Table 4.4: Regression Analyses	76
Table 4.5: Comparison of Top Cost Growth Projects with the Remaining Projects.....	81
Table 4.6: Comparison of Bottom Cost Growth Projects with the Remaining Projects.....	83
Table 4.7: Comparison of Top Schedule Growth Projects with the Remaining Projects	84
Table 4.8: Comparison of Bottom Schedule Growth Projects with the Remaining Projects	87
Table 4.9: Comparison of Top Use of Planning and Project Controls Best Practices Projects with the Remaining Projects	90
Table 4.10: Comparison of Top Use of Scope Management and Project Alignment Best Practices Projects with the Remaining Projects.....	92
Table 4.11: Comparison of Top Use of Quality Best Practices Projects with the Remaining Projects	93
Table 4.12: Comparison of Top Users of all Best Practices Projects with the Remaining Projects	94

List of Figures

Figure 4.1: Types of Contracts Used	54
Figure 4.2: Project Team Size (Number of Members).....	55
Figure 4.3: Project Team Membership	55
Figure 4.4: Initial Predicted Cost	57
Figure 4.5: Cost Growth	58
Figure 4.6: Initial Predicted Duration.....	59
Figure 4.7: Schedule Growth.....	60

1. Introduction

Project teams characterize the majority of work units in the construction industry. A team is usually created when a specific construction project is being conceptualized and team membership changes as the project moves from concept to finished product. The time taken to move through this cycle and the cost of the overall project are impacted by the performance of the project team - presumably, a higher performing project team will result in a reduction in the project cycle time and/or reductions in overall project cost. In an ever-increasing competitive world market, the need for dramatic reductions in costs and cycle time are paramount. Research in various industries has shown that some project teams are more effective at achieving breakthrough results than other teams. If possible, it is critical that a project team be designed with this enhanced effectiveness from the outset. Findings which identify the key characteristics that differentiate highly effective teams from less effective teams in the construction or related industries are rare, however. Even more rare are studies that identify causal reasons for the effect these characteristics have on team effectiveness. Research that identifies the benefits of effective project teams and how these teams can be created and maintained can benefit organizations that utilize them.

The purpose of the research conducted over the past two years was to determine methods for establishing high performance project teams that achieve breakthrough project performance, focusing on cost and cycle time reduction. Specifically, the objectives of this research were to:

- Identify common characteristics of high performance project teams in the construction and related industries.
- Define what connotes “high performance” for a project team in the construction industry.
- Identify tangible and measurable benefits of high performance project teams.

- Develop metrics to predict and measure high performance project team success.
- Develop tools and methods for the establishment of high performance project teams in the construction industry.

We believe that the process of effectively forming and maintaining high performance project teams in the construction industry is an issue that has not yet been systematically studied and that the effects of project team capabilities and performance on project cycle time and cost can be expected to be large. As the primary motivator for all project activity, the consequences of exceptionally good project team performance are likely to be felt across all phases of the project. Being able to systematically form project teams, monitor their performance, and suggest mid-cycle improvements to teams are expected to result in breakthrough reductions in project cycle-time and overall cost. As well, being able to quantify the benefits of high-performance project teams will help justify any potential increases in project start-up costs to organizations that implement high performance project teams. The research we have undertaken here is intended to provide a starting point for learning how to implement these processes and how to estimate their benefits to project performance.

This report is organized as follows: We first present an extensive review of the literature in Organizational Psychology and Management on project teams. Then we describe nine extensive case studies of project teams in the construction and related industries that we conducted. Eight of the teams were characterized by their organization as "high performance" while the ninth was not. The purpose of these case studies was to identify common factors that appeared to be associated with high performance and which discriminated between high and low performance. We next provide a description of the large scale survey research study that we began in April, 1997. The intent of this study was to validate the findings from the case studies

with a larger sample, concentrating on project teams in the construction industry. Finally, we conclude with some recommendations for developing and maintaining high performance project teams.

2. A Literature Review of Groups

The purpose of this literature review is to provide our research team with a foundation of knowledge and a deeper understanding of research on groups. This is important so that we may make more informed decisions regarding the development of interview and survey questions, the subsequent analysis of the data collected from these questions, and the reporting and interpretation of this data. Our literature review focused on peer-reviewed research articles published in academic journals representing systematic observation of groups rather than articles found in the popular business press that are often anecdotal accounts of successful teams in organizations.

When studying systems, it is often useful to think in terms of *inputs*, *processes*, and *outputs*. If we think of a project team as a system, we can think of the persons, task assignments, context, and other resources as inputs to a project team, the way the team goes about its work as a process, and the completion of the task and the effects of performing the task on the team members as outputs of the system. Organizational Psychology and Management literature on teams and groups is reviewed here using the general framework of what is known from research on inputs, processes, and outputs. As there is no theoretical distinction between the terms *group* and *team*, they will be used interchangeably here.

There has been a tremendous amount of research on groups and this review is intended to give the reader a sampling of the major areas of research and the findings. The area of group processes and group outputs has been most heavily studied, while group inputs represents the least-studied area of group research. In this review we discuss first the research on group inputs, then group processes, and finally group outputs.

2.1. Research on Inputs to Groups

In this section, we review the research on group composition, diversity of group membership, and group environments as inputs to the group process.

2.1.1. Group Composition

Research on group composition has focused on (1) size (e.g., number of group members), (2) demographic characteristics of group members (e.g., age, gender, education level, experience), (3) abilities of group members, (4) personalities of its members, and (5) opinions and attitudes that members hold. Measurement of group composition relies on measures of central tendency (e.g., average education level of group members), variability (i.e., how homogeneous or heterogeneous the group is), or by studying special configurations of group members. Group composition has been researched as a causal factor, a contextual factor, or as a consequence (Levine & Moreland, 1990).

Group Composition as a Cause. Most “composition as cause” studies try to meet the objective of creating successful groups by selecting people who can work together most productively (e.g. Foushee, 1984; Harrison & Connors, 1984). With respect to group size, people in larger groups are less satisfied with group membership, participate less often in group activities, and are less likely to cooperate with one another (e.g. Kerr, 1989; Markham, Dansereau, & Alutto, 1982; Pinto & Crow, 1982). There is more misbehavior in larger groups, possibly because members feel more anonymous or are less self-aware (e.g. Latane, 1981; Prentice-Dunn & Rogers, 1989). Coordination problems and motivation losses often prevent larger groups from achieving their potential level of effectiveness (e.g. Albanese & Van Fleet, 1985; Gooding & Wagner, 1985; Harkins & Szymanski, 1987).

Some research on the effects of group composition examines homogeneity or heterogeneity of personalities of group members (e.g. DeBiasio, 1986; Driskell, Hogan, Salas, 1987). Homogeneous groups have been found to generally engender feelings of warmth and acceptance while heterogeneous groups engender conflicts. For example, turnover has been found to be greater in work groups whose members vary more widely in age (e.g. Wagner, Pfeffer, & O'Reilly, 1984). The effects of diversity of group membership is discussed in more detail below.

Group Composition as a Context. Group composition has also been researched as a social context within which other psychological phenomena occur, serving to *moderate* these phenomena rather than being a *cause* of them. For example, Wright, Giammarino, and Parad (1986) found that popularity in children's peer groups depends on the match between the child's behavior and the behavior of the rest of the group -- aggressive children, for instance, were very unpopular in groups where aggression was rare but were not unpopular in groups where aggression was common. In groups of college students, the more emphasis the group put on academic values, the more impact a student's academic ability had on his or her grades (Schrager, 1986). As well, studies have shown that the effectiveness of leadership styles depends on the characteristics of those being led (Schriesheim, 1980).

Research on the behavior of males and females in mixed-sex groups has found some (albeit mostly weak) evidence that males are more likely to engage in task-based and influence-garnering activities than females, are less likely than females to engage in communal activities, and are more concerned than females about resolving issues of status, power, and wealth (Anderson & Blanchard, 1982; Dion, 1985; Eagly, 1987; Martin & Shanahan, 1983; Mabry, 1985). These gender differences can be eliminated or even reversed by situational factors, e.g. in

group situations where males are usually presumed to have higher competence than females, females who are portrayed as having higher competence than males engage in more task-based behavior than positive social behavior (Wood & Karten, 1986). It is possible that membership in a mixed-sex group simply reminds individuals of their conventional sex roles, in turn leading them to adopt these roles (Levine & Moreland, 1990)

Group Composition as a Consequence. Work on natural groups indicates that people prefer smaller groups, but why this is so is unclear. Burgess (1984) suggests that small groups maximize the advantages of group membership for inclusive fitness. People are attracted to groups whose members seem similar to themselves (e.g. Royal & Golden, 1981) while people are often repelled by groups whose members seem dissimilar to themselves (e.g. Bouma, 1980). A natural consequence of exit of dissimilar members is an increase in the homogeneity of the group. Although this may create a group context that is more satisfying to group members, performance in homogeneous groups is not necessarily improved.

2.1.2. Diversity of Group Membership

Much research has been done specifically on the effect of diversity of membership on group outputs such as performance and membership stability. In general, empirical evidence shows that homogeneous teams produce outcomes different from those of heterogeneous or diverse teams (e.g. Jackson, Stone, & Alvarez, 1993; Haythorn, 1968; Jackson, 1991; Shaw, 1976). In this section, we review the effects of diversity on performance tasks, intellectual tasks, idea generation and decision-making tasks, and team cohesiveness.

Performance Tasks. Performance tasks refer to tasks that engage primarily perceptual and motor skills, and require cooperation rather than competition among team members (McGrath, 1984). According to Jackson et al. (1993), a tentative conclusion is that, for

performance tasks, demographically heterogeneous teams tend to perform less well than homogeneous teams. They report that, while heterogeneity of skills appears to be beneficial for performance tasks, demographically heterogeneous teams do not necessarily have a corresponding heterogeneity of skills. Moreover, heterogeneous (as well as homogeneous) teams must successfully match their member's abilities with the tasks to realize performance levels (Voiers, 1956). Matching of members to tasks may be partially influenced by events occurring during socialization of new members, wherein *perceptions* of skills and abilities of team members (driven by demographic characteristics, rather than by objective measures of skills and ability) can be expected to influence task allocations (Jackson et al., 1993).

Intellective Tasks. Intellective tasks are cognitively-based and require problem-solving activities -- they are tasks for which a "correct" answer exists (McGrath, 1984). Jackson et al. (1993) report that too few studies exist for firm conclusions to be drawn about the effect of demographic diversity on intellective task performance, although they do cite one study (Wood, 1987) which has weak support for the conclusion that mixed-sex teams outperform same-sex teams on these types of tasks.

Idea Generation and Decision-Making Tasks. These tasks are also cognitively-based like intellective tasks: creative idea generation tasks emphasize new ideas while decision-making tasks require peer consensus in reaching not necessarily a correct solution, but a preferred one (McGrath, 1984). For these types of tasks, heterogeneous groups outperform homogeneous groups across several types of diversity attributes (Filley, House, & Kerr, 1976; Hoffman, 1979; McGrath, 1984). Although over time the socialization process may suppress the use of multiple perspectives on tasks (thus leading to lower creativity in groups) (Katz, 1982), high levels of

initial heterogeneity in a group may act to attenuate the effects of this socialization process and hence attenuate the decline of creativity (Jackson et al., 1993).

Team Cohesiveness. Cohesiveness and conflict (covered in more detail below) are thought to be mediators of the effects of diversity on group outcomes. Greater heterogeneity is associated with less cohesiveness (McGrath, 1984; Shaw, 1971) and this is supported by the general social psychological finding that people are attracted to others with similar attitudes (Byrne, 1971; Heider, 1958; Newcomb, 1956) and by the fact that cohesiveness is often defined as the extent to which individuals are attracted to the group (e.g. Back, 1951). Demographic diversity has been shown to be associated with higher turnover rates (Jackson, Brett, Sessa, Cooper, Julin, & Peyronnin, 1991; McCain, O'Reilly, & Pfeffer, 1983; O'Reilly, Caldwell, & Barnett, 1989; Wagner, Pfeffer, & O'Reilly, 1984). This is presumably because diversity has an impact on the group at the group level by inhibiting the development of stronger ties between group members (e.g. O'Reilly et al., 1989) and at the individual level by inhibiting the socialization of newcomers into the group (e.g. Wagner et al., 1984), with both effects eventually increasing the turnover propensity for all members of the group (Jackson et al., 1991).

2.1.3. Group Environments

The environment represents an important source of resources, tasks, norms, members, etc., for a group. Researchers (e.g. Ancona, 1987) have called upon their colleagues to include the effects of environment in their study of internal group processes. Here we consider social environments and temporal environments.

Social Environments. According to Ancona and Caldwell (1988), work groups adapt to organizational settings through activities such as negotiation (bargaining for resources), scanning (acquiring information), profile management (impressing others), and buffering (defending the

group from external forces). They found that special roles associated with these activities develop within groups (e.g. a scout acquires information) and that the effective performance of these activities is associated with group success. Research has also been done on how groups react to their environment. In response to threatening external environments, Staw, Sandelands, and Dutton (1981) theorized that a “threat rigidity” mechanism existed in which individuals, groups, and organizations respond to a threat by becoming more rigid in their adherence to tradition and control and by performing much more restrictive information gathering and processing. This was later empirically supported by Argote, Turner, and Fichman (1988).

Temporal Environments. In terms of the effect of time pressure, Gersick’s (1988) work on deadlines showed that when group members (in natural work groups) were given a task, they began to work on that task immediately, doing little strategic analysis. Consistently, after approximately one half of their allotted time had passed, most groups paused to review their progress, make strategic changes, and typically worked hard to finish their job on time. Teams that did not perform this mid-stream review often did not meet the objectives of the task. McGrath, Kelley, and Machatka (1984) discovered that when given a specific amount of time to complete a task, group members adjust their behavior to “fit” the time given. Subsequently, if more time is made available to complete the task, they continue to work as though time were still scarce (work harder, are less concerned about the quality of their work, and focus on task rather than emotional or social issues).

Katz (1982) found that the “older” a work group became, the more likely the group was to refuse or neglect to consult key information sources whether inside or outside the organization, and that this limited their performance, particularly on more complex tasks. Work on task-oriented groups by Insko et al. (1982) has shown an interesting result of changing

membership in a group over time. In their study, small work groups were created and subsequently had their membership changed by periodically replacing “oldtimers” with “newcomers.” The groups exhibited significant increases in effectiveness over time, attributed to the acquisition and transmission by group members of knowledge about the task (e.g. Argote, Beckman, & Eppler, 1990).

2.2. Research on Group Processes

In this section, we review the research on group structure, conflict within groups, and task and technology as important components or mediators of group processes.

2.2.1. Group Structure

The structure of a group is the pattern of relationships that emerges among its members. Most research has focused on status systems, norms, roles, or cohesion.

Status Systems. Status systems are indicative of the general patterns of social influence of members in a group. People with higher status speak more often, are more likely to criticize, command, or interrupt others, and are spoken to more often than people with lower status (e.g. Skvoretz, 1988; Weisfeld & Weisfeld, 1984). They have more opportunities to exert social influence, try to influence other group members more often, and are in fact more influential (e.g. Gray, Griffith, von Broembsen, & Sullivan, 1982; Skvoretz, 1988; Weisfeld & Weisfeld, 1984). People with higher status are often evaluated more favorably than people with lower status even when those with lower status exhibit similar behaviors (e.g. Humphrey, 1985; Sande, Ellard, & Ross, 1986).

Status was once viewed as a reward earned over time by helping a group achieve its goals, making personal sacrifices for the group, or conforming to group norms (Bottger, 1984; Insko et al., 1982; Weisfeld & Weisfeld, 1984), but there is evidence that status systems can

develop within minutes of group formation (e.g. Barchas & Fisek, 1984). Two major theoretical explanations exist for this, both of which have received empirical support.

First, “expectation state” theorists (e.g. Berger, Rosenholtz, & Zelditch, 1980; Berger & Zelditch, 1985) contend that members develop expectations about each person’s probable contributions to the group based on personal characteristics purposely revealed to the group. Characteristics relevant to the achievement of group goals have more impact on expectations, but irrelevant characteristics are evaluated as well. Persons with more valued characteristics will have more positive expectations developed about them and consequently will be assigned higher levels of status in the group.

A second explanation (advanced by “ethological” theorists) is that group members, soon after meeting one another, attempt to assess the strength of each member by evaluating their appearance and demeanor (e.g. Mazur, 1985; Dovidio & Ellyson, 1985; Keating, 1985). Evaluations are based on personal characteristics such as size, musculature, and facial expression. Persons who seem weak or strong are accorded low or high status accordingly, while persons in the middle of the strength spectrum engage in brief and often quite subtle dominance “contests” (e.g. staring at someone until he or she looks away) until the “winners” and “losers” are assigned their status. After initial status assignments, updating may occur as actual behavior is observed and evaluated; interestingly, those whose initial status assignments are unfairly low often have trouble raising their status (“proving themselves” to their peers) later on (e.g. Ridgeway, 1982).

Norms. Norms are shared expectations about how members in a group ought to behave: in a group, behavioral regularities are interpreted as conformity to group norms, whereas behavioral irregularities are interpreted as deviance from group norms (Levine & Moreland,

1990). Group norms are thought to arise from initial patterns of behavior in a group (e.g. Feldman, 1984), evolve in response to external forces (e.g. Opp, 1982), or develop from cognitive scripts for behavior that members bring to the group (e.g. Bettenhausen & Murnighan, 1985). Norms can positively or negatively affect group performance: performance should be enhanced when group norms regarding effort, efficiency, production, etc. are positive and when these norms are strongly and cohesively held by the group's members (e.g. Argote, 1989; O'Reilly & Caldwell, 1985).

Roles. Roles are shared expectations about how a *particular person* in a group ought to behave; formal roles (e.g. foreman, team captain) as well as informal roles (e.g. newcomer) have been studied. One common role is that of the leader -- group members often share a prototypical idea of what an ideal leader looks like, and their evaluations of their own leader is based on how closely his or her behavior conforms to this prototype (Lord, 1985). Newcomer acceptance by oldtimers is increased to the extent that the newcomer fits this role, that is, appears anxious, passive, dependent, and conforming (Moreland & Levine, 1989).

Role conflicts can lead to increased tension and decreased effectiveness in groups (e.g. Jackson & Schuler, 1985); these conflicts are sometimes resolved by changing a role. The success of this role innovation often depends on the particular role-player's self-confidence, the level of consensus among other members of the group about what the role should be, and how important the role is to the group (e.g. Brett, 1984; Nicholson, 1984). For example, a member of the group may want to act in the leader role but other group members may not accept this. Thus, this member would need to negotiate another role or the group would experience conflict.

Little is known about the psychological processes by which roles are produced within small groups, other than some speculative arguments (e.g. Diamond & Allcorn, 1986). As well,

there is little research that links the effects of roles on groups, but there is some evidence that role differentiation is associated with increased group performance (e.g. Roger & Reid, 1982).

Cohesion. Cohesion (or cohesiveness) appears to be a complex construct, as evidenced by the many definitions for it that are in use (e.g. Drescher, Burlingame, & Fuhrman, 1985; Evans & Jarvis, 1980). Measurement of cohesion has involved observing groups in action: nonverbal behavior such as sitting closer together, displaying mutual affection and coordinated patterns of behavior indicate cohesiveness and members of cohesive groups are more likely to participate actively in conversations, engage in self-disclosure or collaborative narration, and develop close ties (e.g. Eder, 1988; Owen, 1985).

Common definitions for cohesiveness include the extent to which individuals are attracted to the group (e.g. Back, 1951) and the extent to which individual members of a group are motivated to remain in the group (e.g. Steers, 1981; Organ & Hamner, 1982). Goodman, Ravlin, and Schminke (1987) argue that reasons for attractiveness and depth of the attractiveness of the “group” to its members are important for determining the performance outcomes of cohesion -- are all members equally attracted and are they attracted to each other as *individuals* or to the *group’s tasks*? They define cohesiveness as the commitment of members to the group task. Goodman and his associates further state that there is no specific link for cohesion and production (group performance), unless the behaviors that the members are cohesive about bear on group production (similar to the effect of group norms).

Producing cohesion in a group depends on a variety of factors. Cohesion may be produced simply by bringing people together in a group (Hogg, 1987) and the more time people spend together in a group, the more cohesive they generally become (e.g. Manning & Fullerton, 1988). Cohesion is stronger in groups where the members like each other (e.g. Piper, Marrache,

LaCroix, Richardsen, & Jones, 1983; Stokes, 1983) and where members find the groups more rewarding -- do they enjoy its activities, approve of its goals, or believe that membership will be useful to them in other aspects of their life (e.g. Ruder & Gill, 1982; Stokes, 1983). Success is more rewarding than failure, but some groups can preserve, and sometimes strengthen, their cohesion even when they fail (e.g. Brawley, Carron, & Widmeyer, 1987). Leaders can increase cohesion by encouraging acceptance among group members or by serving as targets for projective identification of the members toward the group (e.g. Piper et al., 1983; Smith, 1983).

Cohesion can have a positive effect on a group and its members. A cohesive group is generally easier to maintain -- members are more satisfied and are absent less often (e.g. Lott & Lott, 1965; Stogdill, 1972), are more likely to participate in group activities, stay in the group, convince others to join, and resist attempts to disrupt the group (e.g. Brawley, Carron, & Widmeyer, 1988; Carron, Widmeyer, & Brawley 1988), and are more likely to conform to group norms (e.g. O'Reilly & Caldwell, 1985; Rutkowski, Gruder, & Romer, 1983). One possible negative outcome of conformance is that of "groupthink" in which highly cohesive groups place too much emphasis on conformance (Janis, 1982).

Many studies have linked cohesion to group performance (e.g. Keller, 1986; Miesing & Preble, 1985), but most have done so correlationally rather than experimentally. As a result, it is not possible to tell whether cohesion improves performance, successful performance increases cohesion, or both. The few causal studies of cohesion and performance (e.g. Landers, Wilkinson, Hatfield, & Barber, 1982; Williams & Hacker, 1982) have yielded inconclusive results. Experimental studies have shown that the effect of cohesion may depend on the abilities of group members (Tziner & Vardi, 1983), leadership style (Tziner & Vardi, 1982), and the type of task that the group is performing (e.g. Carron & Chelladurai, 1981; Zaccaro & McCoy, 1988).

2.2.2. Conflict Within Groups

Conflict in groups arises when individual members believe that their goals cannot be reached simultaneously (Pruitt & Rubin, 1986). Conflict often arises over the distribution of resources, information access, and decision-making power. While conflict can have a positive influence by fostering innovation (e.g. Levine & Moreland, 1985; Nemeth & Staw, 1989), it can also have a negative influence by fostering interpersonal hostility, reduced performance, and group dissolution (Levine & Moreland, 1990). Research on social dilemmas, power, and bargaining has provided some useful findings for studying groups.

In groups, social dilemmas include situations where (1) there exist behaviors that are rewarding to individual group members but which yield negative outcomes if performed by enough group members and (2) situations in which behaviors that are costly to individual group members yield negative outcomes if avoided by enough group members. In both situations, the individual must choose between personal gain/sacrifice and group gain/sacrifice.

Research suggests that, in dilemma situations, the group members' social values and motives influence behavior (e.g. Liebrand, 1986) and that communication increases cooperation (e.g. Orbell, van de Kragt, & Dawes, 1988), possibly due to increased identity with the group through discussion (Dawes, Orbell, Simmons, & van de Kragt, 1986; Kramer & Brewer, 1986). As well, the value of the resource in question to the individual, the values of the individual regarding the use of the resource, and the group's norms about use of the resource have been identified as factors influencing cooperation in dilemma situations (e.g. Samuelson & Messick, 1986).

Most research on dilemmas involves the assumption that all group members have the same level of power in groups. This is not always or even often the case. Power involves the

potential ability to influence or control others. High-power group members exert more control over group activities, are better liked, receive more deferential behavior, and are more attracted to the group than are low-power members (Shaw, 1981). The power level of a group member affects the influence tactics that member uses as well as his or her motivation to exert control (e.g. Ford & Zelditch, 1988).

In bargaining situations, integrative agreements are likely to be harder to achieve in groups than in dyads (people bargaining in pairs) because of the greater information-processing demands in a group, the more complex interpersonal dynamics among members, and the greater likelihood of the use of negotiation management techniques which may have negative consequences in the group (e.g. Bazerman, Mannix, Sondak, & Thompson, 1989).

2.2.3. Task and Technology

The role of technology and group task has often been thought to moderate the effect of group process (i.e., under certain task configurations some processes are more important than others). Goodman et al. (1987) suggest that a major weakness of group research is the lack of attention to technological and organizational context factors (they show that these factors can explain most of the differences in performance between work groups in some settings). The primary role of task and technology has been as a moderator of the effects of variables such as size and group composition on effectiveness. In their review of dimensions of task and technology, Goodman et al. (1987) found that both concepts seem to be used, at worst, interchangeably or, at best, used separately but with no guidelines as to how they should be defined as constructs.

Group task dimensions include the most dominant set by Steiner (1972) with unitary, divisible, conjunctive, disjunctive, and additive task dimensions, as well as newer sets by

McGrath (1984) with generate, choose, negotiate, and execute task dimensions and by Shaw (1981) with intellectual versus manipulative requirements, task difficulty, intrinsic interest, population familiarity, solution multiplicity versus specificity, and cooperation requirements task dimensions.

Sets of technology dimensions used in past research all include some variable related to uncertainty (e.g. Comstock & Scott, 1977; Schoonhoven, 1981; Cummings, 1981). Examples of other variables are Hickson, Pugh, and Pheysey's (1969) level automation, rigidity of work flow, specificity of evaluation, and continuity of throughput, Fry and Slocum's (1984) number of exceptions, analyzability, and interdependence, and Cummings' (1981) work flow interdependence, work flow predictability, boundary transaction predictability, spatial and temporal relationships, and mechanization.

As an alternative to the above sets of task and technology dimensions, Goodman et al. (1987) propose a definition of technology as a system of components which are directly involved in changing an object from one state to another, with four classes of components: equipment, materials, physical environment, and programs. Programs are sets of operating rules, heuristics, and criteria that could be used in the transformation process; tasks are the specific activities that must take place using these programs to accomplish the specific transformation. They feel that in this formulation, technology should be viewed as a main effect variable rather than as a moderator variable. They also warn researchers that most groups use multiple technologies and that there may be different configurations of the components of technology that can be used to produce at the same level of effectiveness.

Thus, to study the performance of different groups, one must take into account the use of different processes by the different groups – better processes may result in higher performance

independent of the quality of group processes. In our study, we do this by collecting information about the use of CII best practices of each project team and use this to separate out the effect of task and technology from the effect of good group processes.

2.3. Research on the Outputs of Groups

In this section, we review the research on group performance as an output of the group process. We look at measures and models of group effectiveness and at the effects of leadership and decision-making on group effectiveness.

2.3.1. Group Performance

According to Levine and Moreland, “group performance is the process and outcome of members’ joint efforts to achieve a collective goal” (1990: p.612). They divide the research of group performance into the three topics of effectiveness, leadership, and decision-making.

Effectiveness. Group effectiveness is usually measured in terms of performance of the task and feelings of the team members. Examples of effectiveness measures focusing on task performance include group output (Goodman, 1986; Hackman & Oldham, 1980), customer satisfaction, speed of service, and efficiency (Middlemist & Hitt, 1981). Examples of effectiveness measures focusing on feelings of team members include organizational commitment (Fry & Slocum, 1984), satisfaction of members (Hackman & Oldham, 1980), and ability of the group to exist over time (Hackman & Oldham, 1980). The selection of effectiveness criteria also drives the determinants that can be usefully studied: different determinants are related to different effectiveness criteria (Cheng, 1984). For example, satisfaction (as an effectiveness criteria) may be largely determined by the reward system, but quantity of group output may be largely determined by the type and reliability of equipment (Goodman et al. 1987).

The domain of effectiveness must be carefully selected: from whose perspective is effectiveness to be measured -- the perspective of the organization, the group, or the individuals in the group? It is possible to have a highly effective group negatively affecting the performance of other groups around it (e.g. a hyper-efficient group in an assembly line causing a pile-up of product at downstream stations). Measurement of effectiveness must take these issues into account.

Various models of group effectiveness have been formulated (e.g. Kolodny & Kiggundu, 1980; Hackman, 1983; Guzzo, 1986; Gladstein, 1984; Goodman, 1986). These models are similar in the following respects (Goodman, Ravlin, & Schminke, 1987):

1. They are very general in nature -- they provide a flow-chart of variables that impact on group effectiveness, but provide little explanation as to how each variable has an impact.
2. They acknowledge that variables at the individual, group, and organizational level of analysis all impact on work-group effectiveness.
3. Psychological and organizational factors (e.g. role clarity, group interaction, size, leadership, and potency) are the primary focus as determinants of work-group effectiveness (as opposed to technological-economic variables).
4. Process plays a major role -- group process is the link to group effectiveness and the effect of determinants of work-group effectiveness gets translated through group process.

Goodman, Ravlin, and Argote (1986) criticize much of the empirical work done in the last 20 years for not being specifically tied to the current developments in theoretical models on groups. They suggest that this propensity to focus on specific variables rather than on general models of effectiveness may be due to the relative difficulty of measuring all the variables in a general model versus concentrating on a select few.

An area in group effectiveness which has been well-studied is “social loafing,” wherein group members have a tendency to expend less effort when working together than when alone. Research has shown that loafing can be reduced or eliminated by increasing the identifiability and uniqueness of members’ contributions to a task (e.g. Harkins & Petty, 1982; Kerr & Bruun, 1981), the ease with which those contributions can be evaluated (e.g. Harkins & Szymanski, 1987), members’ involvement in the task and accountability for their work (e.g. Brickner, Harkins, & Ostrom, 1986; Weldon & Gargano, 1988), and task attractiveness (e.g. Zaccaro, 1984).

Strategies have been developed to increase group effectiveness. Three of these involve substantially changing group processes. “Team development” is designed to increase group members’ interpersonal and task skills through a range of activities such as problem identification, sensitivity training, and role analysis (e.g. Buller, 1986). “Quality circles” utilize regular group meetings in which members discuss effectiveness problems and potential solutions to these problems (e.g. Marks, Mirvis, Hackett, & Grady, 1986). “Autonomous work groups” utilize sociotechnical systems theory which posits that group self-regulation improves morale and effectiveness (e.g. Guzzo, Jette, & Katzell, 1985). Two other techniques attempt to increase effort towards a task: “participative goal setting” utilizes concepts from team development and autonomous work groups coupled with research on the motivating potential of goals (e.g. Pearson, 1987; Locke, Shaw, Saari, & Latham, 1981), and “task design” involves creating units of work that are, either objectively or perceptually, more attractive and meaningful to workers (e.g. Hackman & Oldham, 1980; Salancik & Pfeffer, 1978; Griffin, 1987).

Allocation of rewards (e.g. group or individual bonus) and costs (e.g. punishment for missing a deadline, time allocated to complete a task) can affect status, conflict, and leadership in

groups (Levine & Moreland, 1990) and thus would be expected to have an effect on performance. The use of particular allocation rules (e.g. equity, equality, need) appears to be determined by group factors such as success and morale (e.g. Elliot & Meeker, 1986), recipient factors, such as performance and need (e.g. Tindale & Davis, 1985), and allocator factors, such as motives and values (e.g. Stake, 1983). The several analyses of causes and consequences of allocation decisions in groups that can be found (e.g. Komorita 1984b) are all at least partly based on comparisons between the outcomes of different group members (Levine & Moreland, 1990, 1987).

Leadership. A universal aspect of human groups (Hollander, 1985), the effect of leadership on group performance is studied by researchers from many fields. Chemers (1987) organizes research in leadership into three major theoretical orientations: leader-oriented approaches, transactional and exchange approaches, and cognitive approaches.

The best known example of leader-oriented approaches is Fiedler's (1978) contingency theory in which there is posited to be a "best style" of leadership given a leader's personality or behavior (most widely studied are the roles of stress and intelligence in leadership) and various situational factors. There has been some support for Fiedler's arguments (e.g. Chemers, 1987; Peters, Hartke, & Pohlmann, 1985). Two additional contingency theories, not as well-studied as Fiedler's but both providing useful perspectives on leadership, are path-goal theory, where a subordinate's motivation depends on the leader's ability to demonstrate the link between job performance and individual achievement (House, 1971), and normative decision theory, where the leader is systematically guided to an appropriate response based on characteristics of the situation (Vroom & Yetton, 1973).

Transactional and exchange theories examine the development and maintenance of relations between a leader and followers through the exchange of valued resources (Hollander, 1985). Vertical-dyad linkage (VDL) theory (e.g. Dansereau, Graen, & Haga, 1975) is the best-known of the exchange theory perspectives. In VDL, leaders are seen to maintain different exchange relationships with different followers, treating them in different ways (i.e., the leader-follower “dyads” are potentially different for each follower).

In cognitive theories of leadership, the focus is on the leader’s and followers’ thoughts and feelings about one another. In studying emergent leaders, various factors affect a member’s perceived right to exert influence, including personality traits (e.g. Kenny & Zaccaro, 1983), gender (e.g. Geis, Boston, & Hoffman, 1985), verbal participation rate (e.g. Stein & Heller, 1983), and seniority (e.g. Insko et al., 1982). Reactions to elected or appointed leaders appear to be influenced by the leader’s style (e.g. Tjosvold, Andrews, & Jones, 1983) and the group’s level of success (e.g. Larson, Lingle, & Scerbo, 1984). People’s shared beliefs about and expectations of leaders’ behaviors and traits apparently affect how they encode information about their leader, how they form perceptions about their leader, and how well they recall relevant information (e.g. Lord, 1985; Rush & Russell, 1988). The leader-attribution perspective of Green and Mitchell (1989) looks at how leaders make attributions about outcomes based on information they have about their followers’ behavior (e.g. do they attribute success to the group members, to themselves as leader, or to some external factor such as luck or market conditions). These attributions, in turn, affect how leaders evaluate their followers.

Decision-Making. Decision-making is an important part of group work and has a direct impact on group performance. McGrath (1984) suggests that the decision-making process and outcome are influenced by the type of task a group is working on, such as generating plans,

generating ideas, solving problems with a correct answer, deciding issues with no correct answer, and resolving conflicts of viewpoint. Groups have been shown to implicitly use different decision rules on different types of tasks (Laughlin & Ellis, 1986). Groups are found to be superior to individuals on induction tasks because they are more capable at recognizing correct hypotheses once they are proposed (e.g. Laughlin & McGlynn, 1986).

Problems in group decision-making include biases in which members fail to exchange unshared information, when the exchange of this information would usually result in a better group decision (e.g. Vinokur, Burnstein, Sechrest, & Wortman, 1985). Group discussion has often been found to be ineffective at facilitating the sharing of this information, as discussion is dominated by information that members already share and that reflects their existing preferences (e.g. Stasser, Taylor, & Hanna, 1989). Interestingly, minorities are thought to facilitate group performance by helping uncover what would otherwise have been “hidden” information (Stasser, 1988).

Groupthink (Janis, 1982), characterized as poor decision-making due to a goal of extreme consensus, is thought to occur under conditions of high group cohesiveness, directive leadership, external threats, etc., which drive illusions of group invulnerability and pressure on dissenters, ultimately harming decision-making by limiting the consideration of alternatives. While intuitively appealing, groupthink as a theory has received limited empirical support (e.g. McCauley, 1989). Research has found some support for two related phenomena: group polarization and group choice shifts. In group polarization, individuals’ opinions tend to be more extreme after a discussion than before, while in group choice shifts, decisions tend to be more extreme than the average of the individuals’ initial positions (Hinsz & Davis, 1984; McGrath,

1984). Persuasive argumentation and social comparison have been the best explanations for these two phenomena (Isenberg, 1986).

Several techniques have been developed to aid in group decision-making. Computational schemes are available to combine members' preferences in ways that increase group accuracy (e.g. Shapley & Grofman, 1984). Brainstorming, a well-known intervention technique, utilizes a "safe," criticism-free environment in which members are encouraged to suggest novel ideas. Brainstorming seems to be less effective than originally hoped (Diehl & Stroebe, 1987), apparently due to production blocking rather than "free riding" or evaluation apprehension (Diehl & Stroebe, 1987) -- supported by the finding of systematic relationships between vocal parameters of group discussion and idea production (Ruback, Dabbs, Hopper, 1984). Other intervention techniques are also being researched, including the Nominal Group Technique (Bartunek & Murnighan, 1984) and the Delphi process (e.g. Erffmeyer & Lane, 1984), but have not yet been adequately assessed.

Summary. Understanding the effects of group inputs (group composition, diversity of group membership, group environments) and the effects of group processes (group structure, how conflict is handled, and the tasks and technology of the group) on group outputs (group performance) is critical in studying factors that are related to high performance in project teams. Our task is to utilize past research on group inputs, processes, and outputs when creating our interviews and surveys and when analyzing the data from these instruments. While group processes and group outputs have been extensively studied, relatively less has been done on group inputs. Group inputs have important downstream effects on group processes and outputs and we will focus on these effects in our study of construction industry project teams. Specifically, we will utilize structured interviews or case studies of project teams to explore issues such as the composition of the project teams, behaviors of the project leader, and types of

activities (such as team building, scope management) that occur in project teams which may be related to high performance.

3. Case Studies of Project Teams

Structured interviews or “case studies” of members of project teams were conducted in order to identify characteristics of project teams that lead to superior team performance. The literature review was used to inform the research team members when constructing the interview guide and in analyzing the data obtained from these questionnaires. These data were then used to construct a questionnaire to survey project team members on a large scale (described in the next chapter).

3.1. Methodology

Eight project teams that were designated as “high performance” and one project team that was designated as “not high performance” were contacted. Individuals were asked a number of questions regarding the project and the project team for which they were currently working. Data from these interviews were then content coded to reveal the key areas (or “themes”) that seemed to lead to high performance in the project teams. The remainder of this chapter describes the project teams, research method, and the themes in more detail.

3.1.1. Data Sources

The High Performance Project Teams. Eight high performance project teams in the construction, manufacturing, and military service industries were contacted. Projects included the construction of a large, continuous-production chemical facility, the installation of an organization-wide computer system, the design of a commercial aircraft, and the retrofit of a fossil-fuel plant. The project teams had been identified by industry peers as “high-performance,” where high performance usually meant that the team ranked very high relative to other teams on a number of project outcome measures. For example, the project teams contacted typically had completed or were projected to complete their projects 10 to 15% under budget (budgets ranged

from \$10 million to \$1.4 billion) and either on schedule or up to 18% ahead of schedule (schedules ranged from six months to three years) -- a description of the projects and their outcomes is provided in Appendix 1: Description of Projects for Project Team Interviews. Team members typically had very diverse functional backgrounds (e.g. fluids design, structural engineering, computer science, and construction). The project teams represented 12 different organizations (in several of the project teams, multiple organizations were involved) and were located in various geographical parts of the United States and Canada. The different organizations represented by the team members often had competing interests, for example, industry competitors might be on the same team. Project team size typically ranged from 5 to 10 members, and over one-half of the team members from each project team were interviewed.

The “Not High Performance” Project Team. To provide a contrast to the data gathered from the eight high performance teams, six members from a team that had been designated as “not high performance” were interviewed.¹ This team was responsible for designing and overseeing a construction project in the client’s existing continuous process plant. The reason for its designation of “not high performance” was the project’s schedule and budget overrun. The interviews revealed that these overruns were apparently due to a last-minute delay in the plant shutdown by the client, poor scope definition, and client-initiated replacement of key project leadership (three project managers and five resident construction managers were used in a two-year period).

In spite of these problems, the team generally considered itself (and exhibited similar characteristics to) a high-performance team, especially given that their organization (the contractor) made money on the project, the shutdown work was completed on schedule (when

the shutdown finally occurred), and the client was very satisfied with the operability of the new installation (evidenced by their awarding of ongoing work in other areas of the plant to the contractor). Thus, it appears as though the “not high performance” project was high performance on some dimensions. Although the analyses presented in the following sections does not explicitly include data from this project team, relevant comments from these interviews will be included in the discussion of the themes

3.1.2. Interview Guide

Developing the interview guide. The research team, which consists of individuals familiar with project teams in the construction, manufacturing, and military service industries, helped create a list of questions that might be suitable for exploring our research question: What is it that makes a project team a high performance project team? The first two interview sessions were used to further refine this prior instrumentation into the interview guide that was used in subsequent interview sessions.

Interview questions. The interview guide was designed to be structured in terms of question format, yet open-ended enough to let the interviewees introduce any ideas and thoughts that they believed were pertinent to the discussion and to allow the interviewer to explore concepts introduced by the interviewee. Appendix 2: Sample Interview Guide Questions shows a sampling of the questions used to elicit responses from the informants in their own words that would target what they felt were key factors or characteristics associated with a project team’s success. While there was an attempt by the researchers in preparing the interview questions to separate out the characteristics of the *project* from the *project team*, in practice this distinction was often not fully grasped by the informant. For example, in response to the question “How do

¹ In order to provide a more comprehensive contrast with the eight high performance teams it would have been preferable to interview more teams that did not achieve superior performance. However, it was difficult to identify

you know if a team is a high performance team?,” informants often answered in terms of the success of the project, rather than in terms of, for example, team harmony and willingness to work together on the next project. This is an interesting observation -- it appears as though the *team’s success* is often difficult to distinguish from *the project’s success*, and that a logical extension of this is the linking of an *individual’s* success with the team’s and project’s success.

3.2. Data Analysis

Informants and the interview sessions. Individuals contacted for interviewing in the high performance project teams consisted of team leaders, senior assistants, lower-level managers, foremen, and laborers in the project teams. Of the 51 interviews, 48 were held face-to-face with the informants and three were conducted by telephone. Of the 48 face-to-face interviews, three were held with two informants and one was held with three informants. In two of the phone interview sessions, one interviewer was present, while two interviewers were present in the other 49 sessions. 47 of the interview sessions were audio tape-recorded and four sessions were not tape-recorded at the request of the informant. Interview sessions typically lasted one hour, with a range of 30 minutes to two hours.

Developing a theme list. Interview data from a subset of the 51 interviews were used to develop 18 major groupings. These major groupings were general classifications of what we felt were “broad categories of themes,” where a theme was a recurrent topic of discussion or often-mentioned key characteristic of an informant’s project team (Bjorkegen, 1989). These groupings were used as an interim step to developing individual themes. Each grouping or broad category held within it from one to five themes (the number of themes changed as the interview data was analyzed). The purpose of each theme was to provide a classification label for a common idea or

such teams due to the sensitivity of such an identification, thus, we were only able to interview one team.

issue that was articulated by informants. Each theme was placed on a separate sheet on a coding form in preparation for the next step of coding the interview data onto the themes.

Coding the interview data onto the themes. Interview data from all 51 interviews were then coded onto the theme list. After this coding was complete, we could evaluate the importance of a theme by the number of informants who mentioned the theme in the interview sessions.

Reducing the theme list. Given our theme list, we focused on themes which had the largest amount of support based on the number of times they were mentioned by informants. All themes that were retained were mentioned by at least one member of each team interviewed. The themes were then analyzed in terms of their relevance to our research question of factors leading to high performance project teams and are presented in the following section. A similar analysis of the data from the “not high performance” project team was done and excerpts from this analysis are provided where relevant.

3.3. Findings: Themes Emerging From Project Team Interviews

This section summarizes and discusses the themes that emerged from the analysis of the interviews conducted with members of the project teams. For each theme, the percentage of respondents from high performance project teams making comments related to this theme are given, along with examples of their comments. The themes and their frequency of mention are listed in Table 3.1: Summary of Theme Analysis from Interviews. Note that Theme 15 is a collection of two issues, selection of team members and contract type that were not the focus of the theme analysis but should be included in the survey based on prior research. As well, Theme 16 is not a theme, rather, it is a listing of the most commonly mentioned measures of project performance.

Table 3.1: Summary of Theme Analysis from Interviews

Theme	HPPT ¹ %	< HPPT ² %
1. Team orientation: sense of belonging to a team, working well together	71 %	100 %
2. Critical Project Manager / Leader behaviors	67 %	0 %
3. Team communication: frequent team meetings	61 %	50 %
4. Ownership: sense that personal success is directly tied to project's success	47 %	33 %
5. Location: colocation and/or physical isolation of team	43 %	33 %
6. Performed team building:		
• Formal	43 %	0 %
• Informal	43 %	67 %
7. Competition: sense of competition with other or previous projects	35 %	0 %
8. Importance of scope package:		
• Importance of having well-developed scope package	31 %	0 %
• Importance of focusing on clear goals	29 %	17 %
9. Rewards or bonuses for excellence:	25 %	0 %
10. High level support or sponsorship / high profile / high visibility of project	20 %	0 %
11. Clear processes to follow:		
• Formal design policies	18 %	0 %
• Benchmarking practices	16 %	0 %
• Use of "lessons learned"	12 %	0 %
• Documentation procedures	10 %	17 %
12. Empowerment / Independence / Autonomy:		
• Responsibilities assumed by being given independence	18 %	0 %
• Capabilities realized through independence to do what needs to be done	16 %	0 %
13. Egalitarianism or "Situational leadership given expertise"	16 %	0 %
14. Team perks: rewards given just for being part of team	16 %	0 %
15. Other: Selection of team members and contract type		
16. Measures of project performance:		
• Schedule	78 %	83 %
• Budget	69 %	0 %
• Customer satisfaction (operability at mechanical completion)	41 %	50 %
• Rework	16 %	0 %
• Safety	16 %	0 %

¹HPPT = % responding from Project Teams that were "High Performance": Number of respondents=51 from 8 Project teams.

²<HPPT= % responding from Project Team that was "not High Performance": Number of respondents=6 from 1 Project team.

As discussed, we also include Appendix 3: Comments from the “Not High Performance Project Team,” which summarizes some of the comments made by members of this project that are related to the themes resulting from our analyses.

Theme 1: Team orientation: sense of belonging to a “team”, working well together

This theme represents a broad feeling of being part of a team and enjoying being part of the team (71% of respondents gave comments related to this theme). Comments ranged from “you [are] part of a team so you can’t let others down” to “being part of the project is a rush.” There were frequent references to team members being energetic, excited, hard-driving, task-committed, and enthusiastic, and that the team interactions were fun and “led to synergy - more gets done better - things don’t fall through cracks because people are working together.” Some members commented that these feelings of team orientation were stronger when the teams had fewer members.

Generally speaking, being happy and excited about being part of a team is likely a result of the prestige felt by being a member of the team (given that the teams are high-performance). The synergy that comes from having this orientation is indicative of the factors traditionally associated with well-functioning groups: interpersonal interaction, liking, etc. Having less of a feeling of team orientation in a big team may be the result of a bigger team being harder to cognitively identify as a “team.” Being hard-driving and task-committed reflects their desire for the project to succeed and a likely end result of these feelings is to reinforce a feeling of “identification” with the project team.

It is interesting to note that while not all of the team members interviewed reported attending formal or informal team building sessions for the project team, there did not seem to be any less of a sense of team orientation among the teams that apparently did not engage in explicit

team building. It is possible that the environment of a good project team naturally contains within it the characteristics that team building seeks to build, and that the “sense of team orientation” is itself an indicator of such an environment.

Comments from members of the “not high performance” team indicate that they too (100% of respondents) believed that their team worked well together, were open and cooperative and helped each other out. The only major loss of team orientation occurred at the interface of the team with the client, as evidenced by comments about the client being “unwilling to respect other people’s points of view” and the client being unwilling to participate in any kind of formal or informal team building.

Theme 2: Critical Project Manager / Leader behaviors

The overwhelming volume of comments from team members on the impact of behaviors of the project team leader on the performance of the project team indicates that team leader behaviors are perceived to be highly influential (67% of respondents gave comments related to this theme). Based on these comments, the most important role of the project team leader appears to be to communicate the desired goals and values of the team -- the team leader “portrays these objectives...[and] it percolates through,” works to “realign attitudes,” “fosters tremendous work ethic,” and “forces collegiality and communication” among members. A secondary, but still important role of the team leader is to keep members informed of the status of the project. As a result of the size of some projects, team members in some project teams often can only see (or cognitively identify) the entire project through the information provided by the team leader.

The team leader provides the most visible indicator of the project team’s values and practices that potentially make it distinct from other project teams. The team leader can invoke

comparisons with other projects to increase other projects' salience as "out-groups" and thus reinforce awareness of the "in-group" project team. As well, a prestigious team leader can bring prestige (or the perception of prestige) to a project, thus enhancing members' identification with the project.

In stark contrast to the high performance projects, the "not high performance" team members indicated that their project leadership was very "uninvolved" and did not work to reduce client interference. As well, one of the resident construction managers was found not to have followed procedures and the lack of documentation (e.g., engineering service requests and change orders) that resulted made it difficult for the contractor to justify some of the subsequent cost overruns. This project appears to have had a particularly difficult client - three project managers and five resident construction managers were used in the project's two-year span - with the client requesting each change in leadership. The lack of consistency in leadership caused by these changes may explain the relative weakness of those positions.

Theme 3: Team communication: frequent team meetings

One of the most common informant comments concerned the regularity with which meetings were held for members of the project team and with external parties (61% of respondents gave comments related to this theme). A meeting of some type was usually held at least weekly with core team members and regular status meetings were held with the entire team. Given the colocation of team members, it is likely that spontaneous meetings occurred amongst team members. In fact, in one project team several members spoke of the understanding that it was their job to "eavesdrop" on meetings held in their common area and to join them if they had something to offer. These meetings generally were used to share information and solve

problems of a technical nature, but also served to provide a forum where the team members could interact socially with each other.

A common feature of many of these meetings was the “status report” that told team members how the project was doing in relation to the benchmarks - usually a past project with which the team was in competition. In addition to regular meetings, special meetings were used to align team members’ goals and priorities together with the project-task goals and priorities. Informants reported the use of “kickoff meetings” at the beginning of the project to introduce project goals to team members, and occasional “alignment sessions” held during the project to re-align members with these goals.

The “not high performance” team indicated that they too held constant meetings and that the colocation of their team members resulted in an almost daily “heads-up” on the project. One potentially disruptive feature of the meetings was that the client (who was viewed as difficult) was invited to most of the meetings and, to the chagrin of the project team, usually showed up. Thus, having meetings is not a guarantee of high performance and it appears that at some point attendance to critical meetings should be restricted based on the objectives of the meeting.

Theme 4: Ownership: sense that personal success is directly tied to project’s success

This theme generally was articulated as a sense of being with the project from beginning to end (a sense of ownership) and a sense of the goals of the project being the goals of the individual (47% of respondents gave comments related to this theme). Numerous comments were made about the high-performance project teams being unusual in that almost all of the project team members had been with the project since its inception and that a result of this was that “people were willing to get involved in all aspects to get the job done; people didn’t mind doing this.” As well, being with the project from beginning to end resulted in a “consistency of

the intent” that seemed to drive project success. Alignment of goals for success between individuals was evidenced by comments such as, “people [were] concerned with the overall project, not just themselves on paper...[they would] spend the necessary hours to make the project a success” and “[we] understand we’re all after the same goals.” Internalization of group goals appears to be a key factor in the team members’ desire to seemingly do whatever it takes to make the project succeed.

Some members of the “not high performance” team indicated that they felt a sort of personal tie to the project (33% of respondents). Another theme, one that is negative in nature, was that the members often felt they wanted to distance themselves personally from the project and the team; one member commented that one of the most-shared goals was that “everybody wanted to finish and get off of the job...because of the client mostly.” Also, the “revolving door policy” at the top may have resulted in a lack of “consistency of the intent” mentioned above that leads to team members’ feelings of ownership of the project.

Theme 5: Location: colocation and/or physical isolation of team

In a number of the project teams interviewed, members reported that being physically located in the same office with all or a majority of members of the project team (colocation) was a contributing factor to the success of the team (43% of respondents gave comments related to this theme). A number of reasons were given, ranging from a need to facilitate communication necessary for project execution and restricting the ability of functional managers from taking them temporarily off the project, to enabling “camaraderie, cooperation, [and] accommodating team spirit.” Several of the groups were also physically isolated from the rest of the organization, and this, in conjunction with numerous team events, was believed to heighten the development of “team spirit.” Colocation obviously makes it cognitively easier to *identify the*