INFORMATION USE ENVIRONMENT
OF SELF-MANAGED TEAMS
A CASE STUDY

DISSERTATION

Presented to the Graduate Council of the
University of North Texas in Partial
Fulfillment of the Requirements
For the Degree of

DOCTOR OF PHILOSOPHY

By

Deborah M. Barnes, B.B.A., M.Ed.
Denton, Texas
May, 1996
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This research investigated how self-managed teams get the information they need to perform their job tasks. Two important factors prompted this study: the growing importance of self-managed teams in the workplace and the impact of the information system on team performance.

Four case studies were conducted in a manufacturing environment, with two teams having high team performance and two teams having low team performance. The case studies supported the theoretical propositions of the study. However, the data revealed another important factor which enhances or inhibits the teams' ability to access the information they need. In addition to the openness of the information system and the amount of information, information-seeking and communication skills were found to also affect the teams' access to information.

A taxonomy depicting the differences in the information use environment of high-performing versus low-performing teams was developed to illustrate the results from the data. The results indicate there are differences in the information use environment of high- and low-performing teams. Although teams have access to the same information, some are more effective than others in utilizing that information. Data reveal, teams that nurture relationships outside the team in efforts to gather external information perform at a higher
level than those that do not. Low-performing teams are usually working in a crisis situation, therefore, must focus on current, immediate problems. This allows little time to expand team boundaries for gathering external information or for innovating to develop ideas and understand trends. When information-seeking and communication activities are impaired, teams develop special communication channels or networks to obtain the information they need.

The findings of this study can be used by information system designers to develop group information support systems to support team-based environments. Decision-makers may use these findings to incorporate information-seeking and communication skills training for self-managed teams.
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ACKNOWLEDGMENTS

This study was funded by the National Science Foundation as part of a grant research project entitled, Creating the High-Performing Self-Managed Work Team: A Comparison of Theory to Practice. Dale E. Yeatts, and Cloyd Hyten, are the principal investigators for this grant. I want to acknowledge and thank Dr. Yeatts for allowing me to work with the NSF research team to experience and learn firsthand about how to conduct research. Dr. Yeatts literally coached me through the entire research process, providing invaluable opportunities to actively participate at every stage of the project.

Also, I would like to express my sincere appreciation to Amanda Spink, for her contributions to this work in developing the theoretical framework and for being my mentor professionally and academically. There are numerous others who have contributed to this work, however, I want to thank especially the members of the doctoral committee, who have each contributed in part to this study: Amanda Spink, Mary Thibodeaux, Ray von Dran, Dale E. Yeatts, and Jon Young. Also, I want to thank Paul Gandel, Kandice Salomone, June Lester, and John Windsor for their advice and counsel throughout my doctoral program.
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CHAPTER 1

INTRODUCTION

This research investigated how self-managed teams get the information they need to perform their job tasks. Two important factors prompted this study: the growing importance of self-managed teams in the workplace and the impact of the information system on team performance. These factors will be presented next, followed by a discussion of information-seeking and communication processes, statement of the problem, significance of the research, limitations and key assumptions of the study, and the research approach.

Importance of Self-Managed Teams

Intense international competition has required companies to find ways of improving productivity and quality while reducing expenses. Since the workforce itself, represents one of the most viable resources for potential contributions, many companies are re-organizing their employees into self-contained teams. These self-contained teams have the skills and knowledge to do all or most of the jobs within the unit, rotate jobs regularly among team members, have no immediate supervisor, and make all or most management decisions related to the team (Goodman, Devadas, & Griffith-Hughson, 1988; Pearce & Ravlin, 1987; Hackman & Oldman, 1980). These teams are referred to as self-directed, self-managed, and autonomous.
Impact of the Information System on Team Performance

Lawler (1986) contended that the information system is key to effective coordination and feedback in any organization, but it is vitally crucial for a high involvement system such as self-managed teams. For the purpose of this study, the information system includes the entire information flow process among human and computer networks. With the flatter organizational structure, which lacks many of the levels of hierarchy and staff support, the information system must provide the capability for people to coordinate and manage themselves. Without an effective information system, employees cannot become self-regulating (Lawler, 1986). When considering models focused specifically on self-managed teams, one of the most comprehensive and useful was developed by Yeatts and Hyten (Figure 1) (1994).

Figure 1. Factors Affecting Self-Managed Work Team Performance
Their model considers four groups of factors that affect the level of team performance: teeming process, the environment within and outside the organization, team design, and the work process. The information system is included as an important factor contributing to the environment surrounding the team, which ultimately affects the level of team performance. The system must provide the team with the crucial information it needs so that good decisions can be made (Hackman, 1988). However, it has been argued that self-managed teams are often not provided information but are expected to seek out whatever information they need. Therefore, teams are left on their own to develop strategies to obtain information that is required to perform their tasks (Lawler, 1986; Manz & Sims, 1989). Information includes anything the team needs to know in order to perform their job tasks.

**Information-Seeking and Communication Processes**

This research provided an in-depth analysis of the information-seeking behavior and communication activities of self-managed teams. Self-managed teams have assumed increasing responsibility for decision-making and problem solving related to their job tasks. Hence, the teams have also assumed the responsibility for seeking the information they need in responding to their expanded role. Information can be anything the team needs to know in order to effectively perform their job tasks. The information-seeking process includes how the team decides what information is needed, strategies used by the team to get the information, barriers to getting information (real or perceived), and how the team uses the information. Feedback information is particularly important to self-
managed teams because of its potential to impact team performance (Lawler, 1986).

Feedback information includes quantitative performance measures compared with baseline standards, as well as formal and informal qualitative evaluation from customers and management. Effective information-seeking is a learning process in which feedback provides a means for evaluating the impact of the information gathered (Belkin, 1980; Dervin, 1992). However, information must be transmitted or exchanged in order to impact team performance. Therefore, the communication activities of self-managed teams was also explored as an integral part of the information system of the team.

Although there is a body of empirical studies investigating information-seeking behavior of individuals, few studies have examined information-seeking behavior and communication activities of self-managed teams (Hackman, 1980). Of particular importance to this study are the theoretical models of information-seeking by managers (Mintzberg, 1973; Aquilar, 1967) and the communication activities of organizational teams (Ancona & Caldwell, 1992). The responsibilities of self-managed teams and managers are somewhat similar characterized by their decision-making role. However, information-seeking strategies may differ because managers seek information based upon individual needs and team members seek information based upon their team's needs. The theoretical models from information-seeking of individuals, particularly managers, and theoretical models from communication studies investigating project teams were adapted to provide the framework for investigating the information-seeking behavior and communication activities of self-managed teams. Mintzberg (1973) in his observational
study of five chief executives, described the information processing system of managers by representing their information roles as monitor of external and internal information, nerve center, disseminator, spokesman, and strategy maker. Within these roles, he defined kinds of information that were needed by managers. Ancona and Caldwell's (1992) model of communication activities of organizational teams includes four main information roles: ambassadorial, task coordinator, scouting, and guard. While Mintzberg's and Ancona and Caldwell's models provided a substantive theoretical framework, Taylor's (1990) general model of the information environment of managers provided a general framework for investigating the information use environment of self-managed teams. Chapter 2 presents a more detailed explanation of the theoretical models used to guide this study.

Problem

While self-managed teams are growing in the workplace and it is generally agreed that the information system is an important factor in the level of team performance, very little is known about how self-managed teams get the information they need to perform their job tasks. Specifically, what "strategies" do teams use to get the information they need? Furthermore, what factors "enhance or hinder" their efforts to get that information? How does the type and amount of information affect team performance? Is there a difference in information-seeking and communication activities of high- and low-performing teams? However, before investigating these questions, it is important to identify the "kinds" of information that are needed by self-managed teams to effectively perform their tasks.
Significance of the Research

The primary goal of this study is to provide a broad investigation as an impetus for an extensive study of information-seeking and -use and communication activities by self-managed teams in an organizational environment. The existing research to support this work consists of a small body of empirical studies investigating the role of information in the resolution of human and economic problems and the process of information-seeking.

This research provides management and self-managed teams with a taxonomy of the kinds of information required for self-managed teams. Because of their decision-making responsibility, self-managed teams' work roles are drastically different from traditional work roles. Their decision-making role directly affects their information need. A taxonomy of the kinds of information needed for high team performance could play an important part in assisting teams to develop effective strategies for getting the pertinent information they need. Sometimes, irrelevant information can misguide teams in their decision-making role (Hackman, 1990). Moreover, the assumption cannot be made that available information is also accessible (Taylor, 1990). Therefore, this research investigates those factors that may enhance or hinder the teams' efforts to get the information they need. There are certain organizational factors and characteristics that promote or inhibit information-seeking and communication activities of self-managed teams. Hence, the study of the information-seeking and communication activities of teams within the context of their work environment is critical. The findings of this study may be incorporated into the original design of teams by recruiting individuals who possess certain
information-seeking, information-gathering, and communication skills. On the other hand, the organization could provide training in these skills to enhance team performance. Further, organizational factors found to support the information needs of self-managed teams may be developed and promoted.

This research is also important to providers of information services to self-managed teams. Many organizations support corporate libraries as well as many specialized information resource personnel, such as engineers, accountants, designers, marketing consultants, vendors, customers, etc., to provide information needed by teams. This study provides information to decision makers about information services and information resource personnel that may promote high team performance.

Because of the competitiveness in industry, information technology may impact team performance. Human and computer communication networks are increasing the scope and flexibility of organizational effectiveness (Grosser, 1991; Porter & Millar, 1985). This study identifies whether networked information services are used and/or needed by self-managed teams. This research is a necessary precursor to quantifying the potential economic benefit of information technologies for self-managed teams. Furthermore, the findings of this study may contribute to the information needed by systems designers in designing group information support systems for team-based environments, including the development of digital libraries for providing information resources for teams. Digital libraries provide electronic access to expansive repositories of information. In their review of literature regarding information needs and uses, Dervin
and Nilan (1986) proposed that organizations that develop a "user-centered information system," provide the best environment for facilitating information-seeking behavior. Such an information system takes into consideration the context within which self-managed teams work.

Limitations and Key Assumptions

The primary goal of this research was an in-depth analysis of self-managed teams to gain an understanding and insight into how self-managed teams get information they need, as well as how that information is communicated among the team members. While this approach strengthens the case for internal validity, it has less significance for external validity. Therefore, the results of this study are applicable only to manufacturing environments similar to that of Texas Instruments. Although this study compares the information use environments of high- and low-performing teams, it is not the purpose of this study to imply a causal effect between the information use environment and the level of team performance.

Information-seeking and communication activities may differ in organizational environments with different organizational cultures and organizational structures. International cultural differences influence organizational environments. Hofstede and Bond have documented cultural dimensions in over twenty countries. They found that responses to their Chinese Values Survey (CVS) correlated highly with the respondents' respective countries' economic growth over the past quarter century (Hodgetts, 1993). Since organizations are influenced by the culture of the country in which they are located,
the international culture of organizations should be considered before applying the results of this study. This study investigated the information-seeking and communication activities of self-managed teams within the cultural dimensions and organizational environments of the United States. The key assumption of this research is based upon Lawler's (1986) contention that self-managed teams must seek out the information they need in order to perform their job tasks.

Research Questions

This research investigated how self-managed teams get the information they need to perform their job tasks. The following study questions were developed from a review of related literature to study the information use environment of self-managed teams: (1) What kinds of information are needed by self-managed teams to perform their job tasks? (2) How do self-managed teams decide what kind of information they need to perform their tasks? (3) How do self-managed teams get the information they need to perform their job tasks? (4) What factors enhance or inhibit efforts by self-managed teams to get information needed by the team to perform job tasks? and (5) Are there differences in the information use environment of high-performing versus low-performing self-managed teams?

Research Approach

This research is part of a National Science Foundation (NSF) grant entitled, Creating the High Performing Self-Managed Work Team: A Comparison of Theory to Practice, (Yeatts & Hyten, 1994). Therefore, the data set collected by the NSF research
team provides the appropriate means for investigating the study questions of this study. The research team used several "mid-range" theoretical approaches, such as information-seeking behavior and communication activities of project teams, to study the organizational factors that support high team performance. A multiple-case, multi-method replication design (Yin, 1989) was used to assess the accuracy of the theoretical model. The multiple-case, replication design uses a theoretical framework from the literature to predict what should be found for each case. The cases either supported or refuted theories found in the literature. Such a research design requires multiple case studies and uses multiple methods to collect data on each case.

The research team then conducted four case studies at Texas Instruments (Sherman facility), with two teams having high team performance and two teams having low team performance. The theoretical study questions were used to guide the data analyses to focus attention on certain data and contribute to the organization of the entire case study. At least three research methods were used to measure each study question in order to increase construct validity. The research methods were self-administered questionnaires of the team members; in-person interviews with team members, the teams' leaders, facilitators, and/or managers; observations of team meetings; content analysis of organizational documents; and researchers' overall observations and perceptions of the factors that affect team performance. The researchers' overall observations and perceptions of the team was critical to this study as it allowed consideration of organizational factors that may affect information-seeking and communication activities of
self-managed teams. It also permitted consideration of the chronology of events for the team so the entire process of information-seeking and communication activities could be analyzed within context of events. By using this approach, organizational factors which enhance or inhibit information-seeking and communication activities of self-managed teams could be more clearly identified.
CHAPTER 2

REVIEW OF LITERATURE

This chapter presents a review of related literature investigating the information-seeking behavior and communication activities of self-managed teams. There are a number of studies that have focused on the information-seeking behavior of individuals such as retired women and low-skilled workers within a university (Chatman, 1986/1987/1991), battered women (Harris, 1988/1989), students and library users (Kuhlthau, 1993); health workers (Dee, in press, Lundeen, Tenopir & Wermager, 1994), university researchers (Ellis, Cox & Hall, 1993), managers (Mintzberg, 1973; Aquilar, 1967; Taylor, 1990,) and some 40 empirical case studies with a wide variety of populations and organizations such as library users, librarians, preschool children, doctoral students, southeast Asian refugees, blood donors, and developmentally disabled adults, (Dervin, 1983). Researchers have also proposed models of information-seeking processes and the role of information in problem solving (Dervin & Nilan, 1986; Krikelas, 1983; Kuhlthau, 1993; Wilson, 1981). These studies provide theoretical and methodological tools for investigating information-seeking while describing information-seeking in different contexts. Because these studies approach information-seeking from the information user's perspective, they provide lucid models for particular users but not necessarily all users. Groups may seek information differently than individuals and self-
managed teams may seek information differently than either individuals or groups.

Although the studies about information-seeking behavior of individuals are limited in considering the information-seeking behavior of self-managed teams, they do contribute to a theoretical framework for investigating the information use environment of self-managed teams. In developing the proposed theory of the information use environment of self-managed teams, theories were adapted from studies about information-seeking of individuals and organizational teams.

Theoretical models of information searching and feedback having particular relevance for the proposed research were developed by Spink (1995) and Lawler (1986). Lawler presented a survey-feedback model that could be used to disseminate needed information to all employees. Spink's study investigated effective sources of search terms for query expansion during term relevance feedback (TRF). She found that the effectiveness in expanding the query was influenced by the term sources. Gersick found similar results in her study based on observations of project teams to document stages of the problem solving process, which she labeled punctuated equilibrium. She discovered that the initial information made available to the team influenced their interpretation of the problem at each stage of the process of problem solution. Also, Kuhlthau (1993) documented stages in students' information-search process when preparing research paper assignments. Although these studies were conducted in different contexts, they provide the theoretical proposition that feedback information at different stages of development of
self-managed teams may affect their formulation of the problem and outcome in decision-making.

Theoretical propositions about how groups obtain information include the support of certain information roles, formally or informally, to obtain information for the group (Allen, 1971; Hall & Ritchie, 1975, Taylor, 1975; McClure, 1978). Sandstrom (1994) presented an interesting analogy by applying "optimal foraging theory," initially used to illustrate group success over individual success in hunting food to the information-seeking process. Information must be transmitted or exchanged in order to impact team performance. Therefore, the communication activities of self-managed teams should be explored as an integral part of the information system of the team. One of the most pertinent studies to the goals of this research was Ancona and Caldwell's (1992) study of communication activities of organizational teams and its impact on team performance. Their study found an effective strategy for gathering information used by some teams involved distinct communication roles assumed by team members based upon the kind of external information needed by the team. They concluded that both the type and amount of external communication affected the team's performance, with highest performance existing when a combination of communication activities were used. Likewise, self-managed teams may appoint individual team members to obtain information for the team.

Although, very little is known about how self-managed teams obtain information they need (Hackman, 1980), the related literature and theories about how individuals (particularly managers), and organizational teams obtain information were adapted to
provide a framework to propose a theory about the information use environment of self-managed teams. This proposed theory guided the data collection and analysis for this study being revised until it reflected what actually exists in practice.

This chapter is organized into separate sections to discuss theoretical propositions of each study question. The first section of this chapter discusses the theoretical propositions about the "kinds" of information needed by self-managed teams, followed by how teams decide what information is needed, strategies used by self-managed teams to get information, factors enhancing or hindering their efforts to get information, and finally a discussion of the differences in the information use environment of high-performing versus low-performing teams. Theories from the literature provided a framework for investigating the information use environment of self-managed teams. Each section concludes with definitions of terms used in the study questions and in some cases operational measures of terms.

Kinds of Information Needed by Self-Managed Teams

Self-managed teams' information environment is similar to that of managers as both groups must make decisions related to their work. Therefore, the literature related to managers' information use environment lent theoretical propositions for guiding the investigation of the information use environment of self-managed teams. Information is essential to the decision-making role of managers (Wilkin, 1977), and the kinds of information they need are diverse, covering a wide range of technical, economical, social, and political information about the organization as well as its external environment.
Mintzberg (1973) in his observational study of five chief executives, categorized the manager's working roles. Mintzberg's model, The Manager as Information Processing System is illustrated in Figure 2.

Figure 2. The Manager as Information Processing System
Modified from (Mintzberg, 1973)

Pertinent to this proposed study is the information role of managers related to the receiving and transmitting of information. According to Mintzberg, three roles characterize managers as the nerve center. In the monitor role, managers are informed about the organization and its environment, and in the disseminator and spokesman roles, managers transmit this information to others. The role of strategy maker represents how managers use the information to formulate strategies and procedures. According to Mintzberg's study, the kinds of information received by managers as monitor are of a wide variety and from many different sources. The information received in the monitor role fits into five categories:
• Internal Operations. Information on the progress and events of operations in the organization comes in many forms: standard operating reports, ad hoc inputs from subordinates, and observations from touring the organization.

• External Events. Chief executives seek and receive information about clients, personal contacts, competitors, associates, and suppliers, as well as information on market changes, political moves, and developments in technology. Personal contacts inform managers about various events and gossip of the trade; subordinates act as a filter, sending in information on external events, trade organizations routinely feed chief executives special trade information by way of reports and newsletters; chief executives subscribe to a wide variety of periodicals, which carry a steady flow of information on events in the trade, in technology, in business in general, and in the world at large.

• Analyses. Analyses and reports of various issues, solicited and unsolicited, come to chief executives from various sources. After expressing an interest in a particular subject, subordinates then provide managers with clippings and reports on the subject. Frequently, chief executives will request a report or briefing on factors associated with an upcoming decision; subordinates and outsiders, hired or retained because of a special expertise, produce these analyses.

• Ideas and Trends. Managers attend conferences, pay attention to unsolicited letters from clients, glance at trade organization reports, and receive ideas from contacts and subordinates.
• Pressures. In addition to the usual types of information, chief executives' channels also bring information in the form of pressures of various kinds. This kind of information is at the heart of managers' information system. Managers develop an understanding of their milieu by piecing together all the scraps of data they can find. As a result, managers can expect little help in the performance of the monitor role from the traditional formal information system. Chief executives design their own information system by developing their own contacts and by establishing special communication channels within the organization. Aguilar (1967) found that personal sources greatly exceed impersonal sources in importance (71% versus 29%), emphasizing the reliability that managers place on their personal networks of communication.

In the disseminator and spokesman roles, managers transmit two distinct kinds of information—factual, which can be tested as to its validity, and value, which deals with preferences, someone's arbitrary belief of what "ought" to be (Mintzberg, 1973). In relation to self-managed teams, value information that is communicated from or to the team can affect their strategy for performing job tasks and ultimately the level of team performance. Each time data is interpreted and relayed (value information) it loses factual detail and assumes preconceptions (Swap, 1984).

Achleitner and Grover (1988) found that managers need task-related information, such as procedures and meeting objectives, and that problem-solving dominates their activities. Likewise, McKinnon and Bruns (1992) determined that middle- and upper-level
managers in Canadian and United States manufacturing firms obtain and use information to control their daily operations. They found that information needs are largely influenced by operational tasks. For example, production teams need information to order materials and manage production facilities while sales and marketing teams seek information about orders, prices, competitor actions, and customer needs (McKinnon & Bruns, 1992).

Much of the information needed from within the organization deals with effectively performing duties by providing feedback about performance and supplementing training and development (Galbraith, 1973 in Lawler, 1986). Therefore, team-based information systems are required that include information on the team's performance for self-management and interface with other teams (Lawler, 1986).

Lawler (1986), consultant and expert on self-managed teams, presented a particularly cogent discussion about the kinds of information systems required for self-managed teams. He emphasized the importance of teams having access to financial and production information so they can effectively evaluate how they are performing in relation to standards and their competitors. Goals and standards of information systems could be participatively set and based on input from each work area. This may promote individual commitment when feedback is perceived as relevant and motivating. In addition to financial operating results, information systems could include information on the human system of the organization. The survey-feedback model could be incorporated by regularly collecting survey data from individuals in the organization and disseminating it back to the employees. The availability of inexpensive computing and the capability to
create networks among computers could significantly improve the feedback process. This approach offers the potential for real-time problem solving and gives the organization a much better opportunity to sense how people feel about critical decisions (Lawler, 1986). The results of this study were used to develop a Taxonomy of the Information Use Environment of Self-Managed Teams (Table 10). As revealed in the literature, kinds of information needed by self-managed teams could relate to internal operations (feedback), external events (competitors, suppliers, market, and new technologies), analyses (reports and briefings), ideas and trends (contacts), and pressures (human networks).

**Study Question #1:** What kinds of information are needed by self-managed teams to perform their job tasks?

How Self-Managed Teams Decide What Information is Needed

In addition to the kinds of information needed by teams, the research design and qualitative methods permitted an opportunity for the NSF research team to also observe how the teams actually decided upon the kind of information they need. Therefore, this data will also be presented in the results of the study.

**Study Question #2:** How do self-managed teams decide what kinds of information they need to perform their job tasks?

While managers' information use environment is similar to that of self-managed teams, their information-seeking behavior and communication activities could differ since managers seek information to satisfy individual information needs, and self-managed teams seek information to satisfy group information needs. Therefore, next is a discussion of the
related literature about strategies groups use to obtain information, which provide theoretical propositions for investigating how self-managed teams gather information they need to perform tasks.

Strategies Used by Self-Managed Teams to Get Needed Information

It has been argued that self-managed teams are often not provided information but are expected to seek out whatever information they need (Lawler, 1986; Manz & Sims, 1989). Therefore, teams are left on their own to develop strategies to obtain information that is required to perform their tasks. One of the most prevalent theories in the literature is that groups and teams support certain information roles, formally or informally, to obtain information for the group (Allen, 1971; Hall & Ritchie, 1975, Taylor, 1975, McClure, 1978).

Similarly, in their study of external activity and performance in organizational teams, Ancona and Caldwell (1992) identified roles that were assumed either formally or informally on organizational teams to provide certain expertise needed by the team. From their study, they formed a topology of Four Main Communications Activities and Team Strategies Directed Toward the Environment (Table 1): ambassadorial activities to provide access to the power structure of the organization (vertical communication); task coordinator activities to provide access to the workflow structure (horizontal communication); scouting activities (scanning) to provide access to the information structure; and guard activities, which do not include interaction with the environment but are designed to avoid releasing information to the environment. The scouting activities
allow the group to update its information base and provide new ideas about technologies and markets (Ancona & Caldwell, 1992). Interestingly, Mintzberg (1973) found similar information roles in his study of the manager's work roles (Figure 2), which are included parenthetically in Table 1.

Table 1. Four Main Communications Activities and Team Strategies Directed Toward the Environment (Modified from Ancona & Caldwell, 1992)

<table>
<thead>
<tr>
<th>Team Member Role</th>
<th>Purpose</th>
<th>Type of Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambassadorial (Nerve center)*</td>
<td>To provide access to the power structure of the organization</td>
<td>Vertical</td>
</tr>
<tr>
<td>Task Coordinator (Internal Monitor)*</td>
<td>To provide access to the workflow structure</td>
<td>Horizontal</td>
</tr>
<tr>
<td>Scouting (Monitor External)* (Strategy Maker)* (Disseminator)*</td>
<td>To provide access to the information structure (allows group to update its information base and provides new ideas about technologies and markets)</td>
<td>Scanning</td>
</tr>
<tr>
<td>Guard (Spokesman)*</td>
<td>Designed to avoid releasing information to the environment</td>
<td>No interaction involved</td>
</tr>
</tbody>
</table>

* Mintzberg's (1973) Managers' Roles as Information Processing System (Figure 2).

Ancona and Caldwell (1992) concluded that the type and amount of external communication affected the team's performance, with highest performance existing when a combination of all four communication activities was used.

When substantial coordination among team members is required and there is a vast amount of information to be processed, it often makes sense to support a leadership role in the group. This team member would be the liaison with other groups or with higher management and would assume the internal leadership role naturally, based upon the group norms and other member roles (Hackman, 1988). More than likely this person would have access to internal and external information, as well as possess information-
seeking and -gathering skills. There are certain individuals who are better able to acquire, process, and utilize information than are other individuals in the organization (McClure, 1978). These information roles within a work group are vital, as they are preferred sources to documentary or computer-based information sources (Taylor, 1975). Although the literature supports the theoretical proposition that teams utilize certain individuals to act as gatekeepers by linking different hierarchical levels, or divisions, to strategically important data (Grosser, 1991), there is little known about how self-managed teams utilize individuals to gather information for the team. This study explored information and communication roles on self-managed teams as a strategy for obtaining information needed by the team, as well as individuals' specific methods for obtaining information.

Study Question #3: How do self-managed teams get the information they need to perform their job tasks?

This study question represents the crux of this study. Once the team decides what information is needed, how do they proceed in gathering that information. Are there strategies which are particularly effective for different kinds of information? Does the team use different strategies to get information at different stages of the project? The literature supports the strategy that self-managed teams may utilize certain information-seeking and communication roles of team members, however, little is known about how these roles are assigned and if they are effective. Kuhlthau (1993) found the information requirements of students to complete research assignments differed during the information search process. Similar findings were documented with project teams in Gersick's (1988)
study where she described groups' development as a "punctuated equilibrium." Gersick described the impact of information at different phases of the project. Therefore, this study includes the observations and perceptions of the NSF research team about the information requirements and strategies used by the self-managed teams. Certain factors from related literature which may enhance or hinder the team's efforts to get information are discussed next.

Factors that "Enhance or Hinder" the Team's Efforts to Get Needed Information

The information system must provide the team with the crucial information it needs so that good decisions can be made (Yeatts & Hyten, 1994; Hackman, 1988). Therefore, it is important to identify those factors which "enhance or hinder" the team's efforts to get the information it needs.

Open Information System

According to Peters and Waterman (1982), intense informal communication activity and openness of communication exist in "excellent" companies. An open information system allows employees to communicate and exchange information directly with management at all levels, as well as with other teams within the organization. It provides a means for the transfer of technical information and a social understanding of other organizational members (Honeycutt, 1989; Thomas & Griffin, 1983). In organizations using self-managed teams, communication between teams is encouraged to enhance working relationships. Employees and teams that receive a service or product
from another team or employee are referred to as "internal customers." "Internal suppliers" within organizations are employees or teams who supply a product or service to others in the organization. Therefore, it is important that the organization support an open information system for self-managed teams to exchange information and communicate needs.

Amount of Information Made Available to the Team

Although Hackman (1988) agreed that the amount of information available to the team affects team performance, he cautioned that the issue of how much information to make available to the team is not as straightforward as one might think. While it is important to make sure that data needed by a team are realistically available to it, this is not always easy because the relevant data may not exist, they may be costly to obtain, or managers may be unable to convince colleagues that it is appropriate to share with the team politically or competitively sensitive information. In this case, the group needs to know that they must do with imperfect information. The team has the responsibility for deciding what information it requires and deciding when and how to obtain it (Hackman, 1988). Whether the team knows how much information is pertinent to their tasks is an important factor that can either enhance or inhibit the team's efforts to acquire needed information.

On the other hand, information overload can have devastating effects as illustrated by the Three-Mile Island catastrophe. Information systems should never be used as mere mechanisms for producing unrelated data, without any thought to how the data will be
used or to the information-handling processes of the people acting upon it (Burns, 1985).

Behavioral science espouses three limits to information acquisition: (1) most people can understand only seven choices plus or minus two (Miller, 1967), (2) the brain is capable of processing only a limited number of symbols per second (as the rate is increased, the brain begins discarding them according to their sources) (Driver & Streufert, no date), and (3) the amount of information the symbol carries does not seem to affect the processing speed (Miller, 1967). Hence, the amount of information (whether too little or too great) is a factor that can hinder the efforts of teams to access pertinent information.

Study Question #4: What factors enhance or hinder efforts by self-managed teams to get information needed by the team to perform tasks?

Factors revealed by the literature that may affect the team's ability to get needed information are openness of the information system and the amount of information made available to the team. Information overload will be measured by the team's perception of how much is too much information or how much is not enough to perform their job tasks. The team's perception is the only feasible measure since they are the ones using the information to perform their job tasks. From experience with self-managed teams, I predict that the ability to handle varying amounts of information is positively correlated with the maturity level of the self-managed team.
Differences in Information Use Environment of Self-Managed Teams

Related to Team Performance

In view of the theoretical propositions presented in previous sections, it is appropriate to theorize that effective strategies used by teams to obtain the kinds of information they need, as well as factors that may enhance or inhibit efforts to get the information needed may impact the level of team performance (Hackman, 1988; Peters & Waterman, 1982, Ancona & Caldwell, 1992; Yeatts & Hyten, 1994). Although, it is not the purpose of this study to infer a causal relationship between information-seeking behavior and communication activities of the team and the team's performance level, any differences and similarities are compared and presented.

Study Question #5: Are there differences in the information use environment of high-performing versus low-performing self-managed teams?

The information use environment of self-managed teams is described and explored through study questions one through four. The results of the study questions one through four are then compared for existence or lack of existence on high-performing and low-performing teams. Since this study is part of a comprehensive research project funded by the National Science Foundation to investigate the factors that support high team performance, the three dimensions the NSF research team used to measure the level of team performance also applied to this study:
The degree to which the team's productive output (that is, its product, service, or decision) meets the standards of quantity, quality, and timeliness of the people who receive, review, and/or use that output (Hackman, 1990);

The degree to which the process of carrying out the work enhances the capability of members to work together interdependently in the future (Hackman, 1990; Ilgen & Klein, 1988);

The degree to which the group experience contributes to the growth and personal well-being of team members (Hackman, 1990; Kaplan & Greenbaum, 1989; Schwalbe, 1988, Peters & Waterman, 1982).

In these cases team performance is viewed as low when the team is performing such that it will ultimately disband or discontinue providing a team output that is satisfactory and when development of team members is blocked and the satisfaction of personal needs is frustrated.

Summary

Taylor's (1990) general model of information use environment of managers was adapted as a general framework to guide this study about the information use environment of self-managed teams. The theory emphasizes the environment of the information user based upon the process of a problematic situation that is context based (Taylor, 1990; Dervin, 1983, and Gersick, 1988). Since self-managed teams are organizationally based (Zand, 1981), their activities are influenced by encompassing systems within the organization such as the organizational setting and socio/cultural states (Taylor, 1990).
Knowledge of the information environment of self-managed teams promotes a more useful understanding of their information and communication behaviors (Katzer & Fletcher, 1992). Next is a discussion of the theoretical propositions gleaned from related literature to guide the investigation of the kinds of information needed by self-managed teams, strategies for gathering needed information, and factors that may enhance or hinder information-seeking and communication activities of teams.

**Kinds of Information Needed**

According to Mintzberg, managers need information about internal operations, external events, analyses, ideas and trends, and pressures on the organization. Since self-managed teams' information use environment is similar to that of managers, Mintzberg's model of information needs provides appropriate theoretical propositions for investigating the information needs of self-managed teams. By definition, self-managed teams make all the decisions related to their job tasks, therefore, they need information about internal operations such as the resources required, project time frame, and the best procedures to use in accomplishing job tasks. Information needs about external events include customer requirements, budget restraints, and regulatory practices. Self-managed teams also need information for analyses in relation to continuous improvement and reengineering work processes. To support their decision-making role, teams should be aware of ideas and trends related to their industry, as well as pressures from environmental threats and opportunities affecting their organization.
Strategies for Gathering and Disseminating Information

Self-managed teams may use a strategy much like organizational teams described by Ancona and Caldwell (Table 1), where they identify information roles on the team used to obtain information needed and to communicate that information to the team. Because individual team members possess certain expertise, they may be assigned an information role for acquiring that type of information. For example, if a team member had expertise in governmental and corporate safety regulations, they might assume the responsibility for updating the team's information database on current and upcoming safety regulations. Or, if a team member possessed skills in information-gathering or -disseminating, they might assume these responsibilities for the team as the team spokesman.

Factors that Enhance or Hinder Efforts to Get Information

According to the literature, the propensity of the information system to be open or closed and the amount of information made available to the teams (Hackman, 1988) are factors that enhance or hinder efforts of teams to get needed information. The presence of these factors is measured using the perceptions of the teams since it is unrealistic to dictate the tolerance of each team concerning these two factors. Hence, what the team perceives as openness of its information system and as too much or too little information is the most accurate and appropriate measure.

As the results of the data from the case studies presented in Chapter 5 supported or refuted these theoretical propositions, the proposed theory was revised until it reflected...
what actually exists in practice. The study questions were investigated through a multiple-case, multi-method replication design, which will be discussed next in Chapter 3.
CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

This chapter presents the methodology used to gather the data set to be analyzed to investigate the study questions of this research. Case study methodology provided a distinct advantage in answering "how" or "why" questions about a contemporary set of events over which the investigator has little or no control. Case study design is a comprehensive research strategy that helps to describe the intervention of information-seeking behavior and communication activities of self-managed teams within real-life context (Yin, 1989).

A multiple-case, multi-method replication design was used to investigate the study questions. The multiple-case replication design uses a theoretical background to predict what should be found for each case. Each case either supported or refuted the proposed theory gleaned from related literature. If the existing characteristics of cases existed as the theory proposed, the case studies in the aggregate, provided strong support for the initial set of theoretical propositions supported by the literature. If the cases were in any way contradictory, the initial propositions were revised and retested with another set of cases. Replication logic provided the most appropriate and reliable research design to investigate the study questions.
The first step in the multiple-case, multi-method replication design is to establish a theoretical framework from a review of the literature to guide the data collection and analysis. This was followed by case selection, developing the data collection protocol, conducting a pilot study, conducting the case studies, analyzing the data, writing case reports, and drawing cross-case conclusions. A discussion of how each of these steps was carried out in collecting the data set is provided below. First, however, is a discussion of the procedures and techniques that were used to address the validity and reliability of the case studies.

Research Design

Yin (1989) identified a variety of case study tactics that can be used to increase a case study's construct validity, internal validity, external validity, and reliability (Table 2).

Table 2. Case Study Tactics for Four Design Tests
Modified from (Yin, 1989, p. 41)

<table>
<thead>
<tr>
<th>Tests</th>
<th>Case-Study Tactic</th>
<th>Phase of Research Tactic Occurs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construct Validity</td>
<td>Use multiple sources of evidence</td>
<td>Data collection</td>
</tr>
<tr>
<td></td>
<td>Establish chain of evidence</td>
<td>Data collection</td>
</tr>
<tr>
<td></td>
<td>Have key informants review draft case study report</td>
<td>Composition</td>
</tr>
<tr>
<td>Internal Validity</td>
<td>Do pattern matching</td>
<td>Data analysis</td>
</tr>
<tr>
<td></td>
<td>Do explanation-building</td>
<td>Data analysis</td>
</tr>
<tr>
<td>External Validity</td>
<td>Use replication logic in multiple-case studies</td>
<td>Research design</td>
</tr>
<tr>
<td>Reliability</td>
<td>Use case study protocol</td>
<td>Data collection</td>
</tr>
<tr>
<td></td>
<td>Develop case study database</td>
<td>Data collection</td>
</tr>
<tr>
<td></td>
<td>Establish chain of evidence</td>
<td>Data collection</td>
</tr>
</tbody>
</table>
Construct Validity

Construct validity refers to establishing correct operational measures for the concepts being studied (Yin, 1989). Case studies have been criticized often for failing to develop a sufficiently operational set of measures, thereby, using subjective judgments to collect the data. To increase construct validity, the study questions to be examined were clarified with justification for why particular measures do indeed reflect the concepts in the questions. The study clarified the propositions by presenting and discussing in the literature review the theoretical background for the information use environment of self-managed teams. To increase the construct validity of the study at least three sources of evidence were used to measure each concept in a manner encouraging convergent lines of inquiry. Table 3 displays the study questions that were investigated along with the methods that were used to investigate each.

Table 3. Study Questions and Methods*

<table>
<thead>
<tr>
<th>Study Questions</th>
<th>SAQ</th>
<th>IPI</th>
<th>OBS</th>
<th>RO</th>
</tr>
</thead>
<tbody>
<tr>
<td>What &quot;kinds&quot; of information are needed by self-managed teams to perform their job tasks?</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>How do self-managed teams decide what kind of information they need to perform their tasks?</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>How do self-managed teams get the information needed to perform their job tasks?</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>What factors &quot;enhance or hinder&quot; efforts by self-managed teams to get information needed by the team to perform tasks?</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Are there differences in the information use environment of high-performing versus low-performing self-managed teams?</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

* Self-administered questionnaire = SAQ; In-person interview = IPI, Observations of Team Meetings= OBS, and Researchers' Observations = RO
Further, a draft of each case study report, resulting from the data collection, was reviewed by the NSF research team, and in some cases was reviewed by team members, facilitators, and managers of the self-managed teams in this study for accuracy of facts. If there was disagreement over the actual facts of the case, additional evidence was sought to clarify and correct the discrepancies.

**Internal Validity**

Internal validity refers to establishing a causal relationship, whereby certain conditions are shown to lead to other conditions, as distinguished from spurious relationships (Yin, 1989; Campbell & Stanley, 1966). If the investigator incorrectly concludes that there is a causal relationship between "x" and "y" without knowing that some third factor "z" may actually have caused "y," the research design has failed to deal with some threat to internal validity. Further, when an investigator of a case study infers that a particular event resulted from some earlier occurrence, the internal validity of the inferences come into question. As Yin (1989, p. 35) noted, "Have all the rival explanations and possibilities been considered? Is the evidence convergent? Does it appear to be airtight?" Tactics for obtaining the answers to these questions and more pointedly for addressing the study's internal validity include pattern-matching and chronology analysis. Pattern-matching requires examining the case to determine whether the causal relationships proposed by the theory match the experiences of the case. The use of rival theories is helpful here by providing alternative causal relationships and, subsequently, a consideration of rival explanations. The analysis of chronological events is
a special form of time-series analysis (Yin, 1989) that traces events over time. The consideration of events into a chronology permitted the investigators to compare information-seeking behavior and communication activities at different stages of the project.

**External Validity**

External validity refers to whether a study's findings are generalizable beyond the immediate case study. This has been a major barrier in doing case studies. Critics typically state that single cases offer a poor basis for generalizing. However, as Yin (1989) points out:

"Such critics are implicitly contrasting the situation to survey research, where a 'sample' (if selected correctly) readily generalizes to a larger universe. This analogy to samples and universes is incorrect when dealing with case studies. This is because survey research relies on statistical generalization, whereas case studies (as with experiments) rely on analytical generalization" (p. 43).

The primary goal of this research is to gain an understanding and rich insight into the information-seeking behavior and communication activities of self-managed teams. Therefore, this study investigated a few teams in-depth to increase internal validity, although it decreased the external validity of the study.

**Reliability**

Reliability exists when an investigator follows exactly the same procedures as described by an earlier investigator, conducting the same case study all over again, and
arriving at the same findings and conclusions. Yin (1989) points out that the emphasis is on doing the same case over again, not on "replicating" the results of one case by doing another case study. The goal of reliability is to minimize the errors and biases in the study. The tactics for increasing reliability involve obtaining accurate documentation of the procedures followed. This can be accomplished through the use of a case study protocol and a case study database. The protocol contains the data collection instruments used as well as the procedures and general rules followed in employing the instruments. Having a case study protocol is desirable under all circumstances, but is essential when using a multiple-case design. The data collection protocol is discussed further below. The case study database includes all the data collected for the case studies. It is independent of the case study report which presents and draws conclusions from the data. Included in the database are case notes, records, tabular materials (such as questionnaires of team members), and narratives.

Theoretical Framework

The development of a theoretical framework prior to the collection of case study data is an essential step in doing case studies. The review of literature in Chapter 2 provided the theoretical framework for deriving the study questions used as a "blueprint" for the research design. The study questions provided guidance in determining what data to collect and the strategies for analyzing the data.
Case Selection

This section discusses the types and numbers of cases that were selected. Two sets of case studies were conducted, with each set including one high-performing team and one low-performing team. Hackman (1990) noted that outside of the laboratory setting, it is difficult to identify what good team performance is. This holds true even when specific outputs can be measured such as the number produced or served, the number returned for rework, the number of complaints, or the amount of time required to do a task. Nevertheless, these are commonly used performance measures (see for example Gladstein, 1984; Nieva, Fleishman, & Rieck, 1978, McGrath, 1984). However, do these measures truly reflect the level of team performance? Team performance does not easily lend itself to quantitative measures that validly indicate how well a team has done its work. This conclusion leads to the first of three dimensions of team performance: (1) The degree to which the team's productive output (that is, its product, service, or decision) meets the standards of quantity, quality, and timeliness of the people who receive, review, and/or use that output (Hackman, 1990), (2) The degree to which the process of carrying out the work enhances the capability of members to work together interdependently in the future (Hackman, 1990; Ilgen & Klein, 1988), and (3) The degree to which the group experience contributes to the growth and personal well-being of team members (Hackman, 1990; Kaplan & Greenbaum, 1989; Schwalbe, 1988; Peters & Waterman, 1982). In these cases, team performance is viewed as low when the team is performing such that it will ultimately disband or discontinue providing a team output that is satisfactory and when
development of team members is blocked and the satisfaction of personal needs is frustrated.

Initially, the manager at Texas Instruments (see Appendix A for letter of support) was asked to provide a name and telephone number of a contact person for each of the four self-managed teams, two of which are perceived to be high-performing teams and two perceived to be low-performing teams. Initial interviews of the teams' manager(s), facilitator(s), and team leader(s) were conducted to obtain information on the teams' tasks and context within the organization. To control for intervening variables, careful consideration was given to selecting experienced teams with approximately the same group member size, who perform the same kinds of task and share a similar operating environment. If any of the teams were not found to be a high- or low-performing team, as specified by the performance measures, the manager was asked to provide a replacement team(s), and the assessment of performance was repeated until four teams were identified.

After completing data analysis of the first two case studies, modification to the theoretical framework was made before analyzing the next two case studies. Yin (1989) suggested that replications may be necessary before the theoretical framework is adequately modified to reflect what exists in practice.

Data Collection

The data collection protocol was used as a guide in carrying out each case study and included the field procedures and schedule, specific methods to be used, study questions, and respondent questions.
Field Procedures and Schedule

Once the teams were identified, data was collected in order to undertake the pattern-matching analysis and the chronology analysis. The methods for collecting the data are presented in Table 3 along with the study questions that were investigated. The study questions were investigated primarily by a self-administered questionnaire of team members, in-person interview of team members, team facilitators, team leaders, and managers; observations of team meetings; and overall researchers' observations and perceptions. The specific schedule followed for carrying out the methodologies was determined with the assistance of the team contact person and other relevant persons (such as team facilitator and manager). The length of time to complete a case study varied since the data collection schedule catered to the interviewees' and teams' schedule and availability. However, each case study averaged about three months.

Research Methods and Procedures

At least three research methods were used to measure each study question, in order to increase construct validity (Yin, 1989). The research methods employed included (1) self-administered questionnaire of team members (2) in-person interview with team members, team leaders, facilitators, and/or managers, (3) observations of team meetings, and (4) overall researchers' observations and perceptions. Table 3 provides a matrix cross-listing of the methods used to investigate the study questions. Several factors were considered prior to matching specific methods with a specific variable, including: (1) the ability of the method to provide measures of the variable, (2) previous research that has
found a method to provide valid, reliable measures of a variable, and (3) the pairing of two different methods.

**Instrument Development**

In all, there were five instruments developed—self-administered questionnaire (team members), in-person interview with team members, team leaders, team facilitators, and/or managers, in-person interview with managers to select teams, observation form for team meetings; and a form to be filled out by the researcher noting overall observations and perceptions of the teams studied (Appendix B). From these instruments, questions and responses pertinent to the study questions of this study were extracted (Appendix C).

**Self-Administered Questionnaire**

The self-administered questionnaire was developed for team members. Questionnaires were distributed by the investigator at the team's location, completed by team members, and then collected by the investigator.

**In-Person Interviews**

In-person interviews were conducted with each team member, the team leader and/or facilitator. A team leader is a member of the self-managed team who typically has been selected by management or elected by team members to serve as the official link between the team and management and to chair team meetings. It is typically a person knowledgeable about the team's tasks and self-management. Usually, the team facilitator is a representative from the organization's human resources development department responsible for helping or facilitating the team in self-management. Notes were taken of
all interviews. In-person interviews were also used to determine the chronology of events for the team.

**Case Selection In-Person Interview with Managers**

Initially, the managers were asked to provide a name and telephone number of a contact person for each of the four self-managed teams, two of which are perceived to be high-performing teams and the other two, low-performing teams. Initial interviews of the teams' manager(s), facilitator(s) and team leader(s) were conducted to obtain information about the teams' tasks and context within the organization. If any of the teams were not found to be a high- or low-performing team, as specified by the performance measures, the manager was asked to provide a replacement team(s), and the assessment of performance was repeated until two high-performing and two low-performing teams were identified.

**Observation**

At least two team meetings for each team were observed by at least two NSF research team members. The observation instrument was completed by each researcher independently, immediately following the observation of a team meeting (Swezey & Salas, 1992; Patton, 1990; Lofland, 1971, and Selltiz, Johada, Deutsh, & Cook, 1959). A limitation of this approach was the potential for the team members to alter their behavior when an observer was present. This heightened the need for a multiple method approach (Aldag & Stearns, 1988; Webb, Campbell, Schwartz, Sechrest, & Grove, 1981; Simon, 1969).
Pilot Study

A final preparation prior to conducting the case studies was the undertaking of a pilot study for a government agency. The pilot study was used to refine the data collection plans and the procedures followed. It was helpful to assess the wording of the questions developed for the instruments discussed above and helped to develop better clarification where necessary. With regard to logistics, the pilot case study was helpful in identifying the best order in which to complete the various data collection methods.

Conducting the Case Studies

As the case studies were conducted, a case study database was created and a record of the chain of evidence was maintained. The case study database is a formal, retrievable database, so that other investigators can review the evidence directly and not be limited to the written reports. While every case study report contains enough data so that the reader could draw independent conclusions about the case study, the database referenced in the report is available for inspection upon request. The database includes case study notes, (from interviews, observations, and minutes from team meetings), and tabular materials (including questionnaire data collected from team members). A record of the chain of evidence (in a sense a diary) was maintained throughout each case study. This allows an external observer to follow the derivation of any evidence from initial research questions to ultimate case study conclusions, and subsequently, increases the study's reliability.
Data Analysis

The theoretical propositions were used to guide the data analysis in focusing attention on certain data, thereby, contributing to the organization of the entire case study. The specific modes of analysis include pattern-matching (using rival explanations) and chronologies. With regard to pattern-matching Yin (1989) stated that:

"For case-study analysis, one of the most desirable strategies is the use of a pattern-matching logic. Such a logic compares an empirically based pattern with a predicted one (or with several alternative predictions). If the patterns coincide, the results can help strengthen the internal validity of the case" (p. 109).

An even stronger conclusion can be drawn when a second case is examined where the opposite is predicted (such as propositions relating to high-performing versus low-performing teams) and the empirically based pattern is again as predicted. When the results from the case study did coincide as predicted by the theoretical framework, the proposition in question was re-examined and modified to reflect the empirical evidence. An advantage of using rival explanations is that alternative variables and causal relationships are considered.

The analysis of chronological events is a special form of time-series analysis. The chronological sequence focuses directly on the major strength of case studies over other methods, the case studies allow for the tracing of events over time. For each of the self-managed team's primary tasks, the causal events leading to the team's performance of the task was documented. The analytic goal was to compare the chronology with that
predicted. If the actual events of a case study supported a different or new proposition(s), then the case study provided the initial basis for causal inferences. Comparisons to other cases, as well as the explicit consideration of threats to internal validity further bolstered this inference.

Writing Case Reports and Drawing Cross-Case Conclusions

For each case study, a single narrative was written to describe and analyze the case. The narrative was augmented with tabular and graphic displays and refers back to the case study database. Also, for each case study was a report listing all the study questions and answers for each. This allows a reader to examine the answers to the same question(s) within each case study and, subsequently, to begin making cross-case comparisons. Because each reader may be interested in different questions, the question-answer format facilitates the development of a cross-case analysis tailored to the specific interest of its readers. Finally, a book was prepared that consists of the cross-case analysis. Each section or chapter was devoted to a separate study question across cases. This study analyzed the section that includes data collected about the information use environment of self-managed teams (Appendices E, F, G, & H).
CHAPTER 4

PRESENTATION OF DATA ABOUT

THE ORGANIZATION AND

THE TEAMS

This chapter presents a history of Texas Instruments and its evolution to teaming, followed by background information and description for each of the four teams involved in this study.

History of Texas Instruments

"Doc" Karcher and Eugene McDermott founded Geophysical Service, Inc., (GSI) in Newark, New Jersey, in 1930. The company specialized in reflective seismology, a new technology used to explore for oil and gas deposits. In 1934, GSI moved its headquarters to Dallas. GSI started making defense electronics during World War II, when it made submarine detectors for the United States Navy, and established a defense division in 1946. The company changed its name to Texas Instruments in 1951 and was listed on the New York Stock Exchange in 1953. Texas Instruments started manufacturing transistors in 1952, after buying a license from Western Electric. They invested about $2 million in an effort to reduce the price of the germanium transistor, which expanded the market for its uses and made possible the pocket transistor radio in 1954. Texas Instruments produced the first commercial silicon transistor in 1954, and Texas Instruments engineer
Jack Kilby (with Intel founder Bob Noyce) invented the integrated circuit in 1958. By 1959, their semiconductor manufacturing division accounted for half of its total sales. Texas Instruments' technological know-how led to other firsts in microelectronics, including terrain-following airborne radar (1958), forward-looking infrared (FLIR) systems (1964), hand-held calculators (1967), single-chip microcomputers (1971), and the list processing language (LISP) chip, a 32-bit microcomputer for artificial intelligence applications (1987). Texas Instruments shifted from defense and semiconductors into consumer products in the 1970s with calculators, digital watches, and home computers. Although they developed the basic technologies for these products, their inability to gain market share because of low-cost foreign competition led them to lose money and then abandon its digital watch and personal computer businesses. Attempts to meet competitors' prices, as well as plunging semiconductor prices, led to Texas Instruments' first annual loss in 1983. Texas Instruments' Kilby patent for the integrated circuit was upheld in Japan in 1989, and all major Japanese electronics firms except Fagots pay royalties to Texas Instruments.

In 1991, Texas Instruments sold its remaining interest in Geophysical Service, Inc. (GSI) to Halliburton; Hewlett-Packard bought its industrial controls business (1991) and multiuser minicomputer business (1992). In 1991, Texas Instruments signed a licensing pact with chip maker Cyrix for its design of a clone of Intel's 486, with which they introduced their TI486 into the market in 1992. During turbulent times, Texas Instruments leveraged its DRAM know-how in a number of strategic alliances that include
a joint venture (26%) with Canon, Hewlett-Packard, and the Singapore Economic Development Board to make 4-megabit DRAMS (TECH, 1991) and an agreement with Hitachi to research and develop 256-megabit DRAM chips (1993). The company posted record profits and sales in 1994, thanks in large part to a strong performance from its semiconductor business. That same year, Texas Instruments and Hitachi announced plans to form a joint venture and build a $500 million DRAM chip plant in Richardson, Texas (Hoover's, 1996).

In 1994, Texas Instruments reported over $10 million in sales from manufacturing operations in eighteen countries. This represented 58% of sales from operations in the United States followed by 26% of sales from East Asian operations, 15% sales from European operations, and 1% from other regional operations. As one of the world's top makers of computer chips, Texas Instruments is experiencing an industry boom. Their income increased nearly 50% in 1994. The company makes computers, defense electronics, personal productivity products such as calculators, and printers, and electrical devices. Texas Instruments' marketing failures and defense cutbacks prompted a recent company restructuring. The company has several joint ventures, including a new Dallas plant (with Hitachi) and two Asian fabrication plants (with Acer and Kobe Steel). About 7% of revenues are spent on research and development at Texas Instruments (Hoover's, 1996). The restructuring of Texas Instruments includes implementation of self-managed teams in an effort to empower employees and encourage intrapreneurship.
Teaming at Texas Instruments

The teaming concept was introduced at Texas Instruments (Sherman, Texas, facility) in the early 1980s with the use of quality circles and effectiveness teams. From this initial experience evolved cell teams with voluntary participation. Voluntary participation on teams was about 50% which caused difficulties in the transition to teaming. Therefore, in 1988, teaming became mandatory for all employees. The organization successfully implemented self-managed teams and in 1990, Teams 2000 incorporated the star point methodology for teaming (Figure 3).

![Figure 3. Information Roles (Star Points) Assumed by Team Members](image-url)
Star points are groups of non-core tasks that are performed by one member of the self-managed team. Seven star point positions (communicator, quality, production planning, safety, administrator, methods, and cost) are assigned on each team. Each star point position receives a documented instruction manual which includes purpose, policy, brief description, detailed description of responsibilities, length of term, and training required for the star point position they have assumed. This standardization of star point positions allows teams to interact across team boundaries to solve global issues. The teams' mission is to create, make, and market useful products and services to satisfy needs of customers throughout the world.

Table 4 denotes demographic data obtained by the self-administered questionnaire from the team members of the four teams. Also included are demographic comparisons with data collected from 362 employees on 40 self-managed teams at other organizations with manufacturing environments similar to Texas Instruments.

Table 4. Summary of Demographic Data for Four TI Teams and Other Organizations, June 1995

<table>
<thead>
<tr>
<th>Individual Characteristics</th>
<th>Harm Fin/Wing 6</th>
<th>PWII (A&amp;T) 11</th>
<th>N/C Precision 12</th>
<th>PWI (TU) 11</th>
<th>Other Org* 362</th>
</tr>
</thead>
<tbody>
<tr>
<td>% female</td>
<td>0%</td>
<td>91%</td>
<td>14%</td>
<td>82%</td>
<td>48%</td>
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<tr>
<td>Age</td>
<td>40.2</td>
<td>40.5</td>
<td>43.1</td>
<td>40.5</td>
<td>38.6</td>
</tr>
<tr>
<td>% ethnic minority</td>
<td>17%</td>
<td>10%</td>
<td>0%</td>
<td>11%</td>
<td>19.3%</td>
</tr>
<tr>
<td>Education</td>
<td>12.6</td>
<td>13.0</td>
<td>12.5</td>
<td>13.0</td>
<td>13.0</td>
</tr>
<tr>
<td>Overall Performance</td>
<td>4.3</td>
<td>4.0</td>
<td>4.2</td>
<td>3.6</td>
<td>--</td>
</tr>
</tbody>
</table>

* Includes aggregate data for 362 employees from 40 self-managed teams at AT&T, Boeing, Department of Defense, and GTE-Valenite.
Self-administered questionnaires from other organizations reported that 48% of team members were female, 19.3% were ethnic minority, and the average level of formal education was 13 years with an average age of 38.6 years. When demographic data of the four self-managed teams at Texas Instruments are compared to other organizations, the only significant difference is in the percentage of females on teams. While other organizations report 48% of self-managed teams are represented by females, at Texas Instruments two teams report high representation of females (91% and 82%) and two teams report low representation of females (14% and 0%). It should be noted, however, that the 48% reported by other organizations depicts the total female representation from 40 self-managed teams and not the average for each team. Next, background information of the self-managed teams that were included in this study is provided.

Description of the Subjects - Self-Managed Teams

**Harm Fin and Wing Team**

The Harm Fin and Wing team formed about five years ago as an effectiveness team to develop Method Improvement Reports (MIRs) for the organization. The team adapted the star point methodology and allowed members to decide which roles they would assume. Originally, there was a supervisor and later a facilitator, who helped the team accomplish their first peer appraisals. Since then, the team has not used a facilitator and has been totally self-managed. As noted in Table 4, the team is made up of six members. They are all male, 17% ethnic minority, and average 12.6 years of formal education and
40.2 years of age. The primary task of the team is to fabricate fins and wings for the Harm missile. Their customers are other teams within the organization who receive their product for further process, as well as external customers on defense contracts who receive the completed Harm missile. The Harm Fin and Wing team is performing at a high level and receives considerable recognition from the organization's Teaming for Excellence program—the last two years they received the Gold Medal. Cost effectiveness is evident from improvements that have been made in the amount of work performed per team member. All team members indicate that personal needs are being met by the team and that the team could continue working together at a high level in the future, assuming there is work to do. The Harm Fin and Wing team had completed its contract, and the team probably would be disbanded because of lack of work. In this case, the team members will be assigned individually to different teams in the organization. On a scale of 1-5, with 5 having most of the characteristic, the team members rated their own overall performance as 4.3. The managers indicate that customers are routinely satisfied with the team's work.

Paveway II (Assembly and Testing) Team

Paveway II team was originally formed with a traditional supervisor. Initially, team members did not have an opportunity for input about decisions that affected the team and did not hold team meetings. The team still has a supervisor, however, the team members now meet weekly to plan their work schedule and have slowly assumed decision-making responsibilities. As noted in Table 4, the team is made up of 11 members. They
are 91% female, 10% ethnic minority, and average 13 years of formal education and 40.5 years of age. The primary task of the team is to solder and test electronic boards to be included in the Paveway missile assembly. Their customers are other teams in the organization who receive their electronic boards for further processing. The Paveway II team members support each other and are focused on continuous improvement. However, they are experiencing production problems caused by a redesign of a valve to be used in the computer assembly. With the improved design of the computer and commitment from members to work overtime, they should be able to meet the contract schedule. Cost effectiveness seems to have improved recently. For this team, hours per unit (HPU) is difficult to measure because of the computer redesign, which will improve their performance over the long-term but has affected their performance negatively for the short-term. Also affecting their performance level is their compliance with the whip model used at Texas Instruments, which means that they are to make only the number of parts needed for that day, and no more. Surplus inventory can be expensive, especially if a defect is found in the design. If a defect is found, the surplus inventory must be disassembled to correct the problem. The production restriction to ten units a day safeguards the team from potential scrap inventory and lost time. The team members use downtime for cross-training and to help other teams meet their production quotas. On a scale of 1-5, with 5 having most of the characteristic, the team members rated their own overall performance as 4.0.
The N/C Precision Team has been in existence for about five years. The present team is strong because the team members have a high level of knowledge which is required to operate the machinery. One team member has a degree in tool and dye making, and they all work well together. As noted in Table 4, the team is made up of 12 members. They are 14% female, have no ethnic minority representation on the team, and average 12.5 years of formal education and 43.1 years of age. Their primary task is to make machine parts. Some of the team members work in a temperature controlled room where they perform job tasks that require high precision. Originally, a supervisor provided them with the information they needed to perform job tasks but currently they compile their own data. The team now has much more responsibility than when it first originated. When first formed, the team only operated three machines. Currently, they operate seven machines, providing parts to six other areas of the shop, including Paveway and Harm missile assemblies and to an external re-drilling corporation. Overall, the N/C Precision team appears to be performing at a high level. Cost effectiveness is evident from improvements that have been made in the amount of work performed per team member. The large majority of team members indicate that personal needs are being met by the team. However, it is clear that personal needs and satisfaction of some team members would be better met in a more traditionally-managed environment or with changes made to various aspects of the team such as the peer appraisal system and use of the Oregon Productivity Matrix (OPM). The OPM is an overall performance measurement tool that
weights certain criteria. Team members generally agree that the team could continue working together at a high level in the future. Managers indicate that customers are routinely satisfied with the team's work. On a scale of 1-5, with 5 having most of the characteristic, the team members rated their own overall performance as 4.2.

**Paveway I (Touchup) Team**

Paveway I team started as a quality circle using brainstorming techniques for improving their work processes. They now have a team coordinator position, which is assumed by a team member on a voluntary basis. If several team members volunteer, the position is rotated. The coordinator represents the team to management and serves as liaison with other teams in the organization. The team currently does not share much in decision-making responsibilities. As noted in Table 4, the team is made up of 11 members. They are 82% female, 11% of ethnic minority, and they average 13 years of formal education and 40.5 years of age. Their primary task is to print, wire, and test a system of electronic boards for the Paveway missile assembly. The team provides the boards to the Encap team who wash, mask, and dip the boards in a special coating. The team members rated their overall performance as 3.6, on a rating scale of 1-5, with 5 having most of the characteristic. They are experiencing serious problems in several areas which is affecting their level of performance. Five of their 11 team members are away on leave so they transferred several new members to the team to compensate. However, the depth of experience and skill could not be replaced so quickly. This deficiency in experience coupled with an inability to supply the units required per day caused a great
deal of friction among team members. This frustration among team members stifled progress which eventually necessitated management intervention. Some of the team members perceive their team as a "bad" team. Because of these problems, this team is not cost effective nor are the team members’ needs being met. Managers indicate that other teams' production is impacted by the inability of this team to supply the required quota per day of electronic boards. If management intervention is not successful in improving this team's performance level, this team may be disbanded.
CHAPTER 5

PRESENTATION AND ANALYSIS OF DATA FOR EACH TEAM

This chapter presents the results from data for each of the four teams for study questions one through four. Finally, is presented results of study question five, which represents an aggregate analysis of study questions one through four.

Harm Fin and Wing Team

When compared to self-managed teams in other organizations, the Harm Fin and Wing team's information system appears to be working well. Table 5 illustrates the concepts that were measured for the Harm Fin and Wing team as compared to other organizations. These figures will be referenced in this section where applicable.

Kinds of Information Needed

The data indicate that the Harm Fin and Wing team perceives feedback information as the most crucial kind of information needed in order to perform at a high level. The Oregon Productivity Matrix (OPM) appeared to be this team's most important measurement tool. The OPM, designed by the Oregon State University Productivity Center in 1986, provides teams with a concrete method for measuring team performance, particularly as it relates to each team's continuous improvement. It is a valuable method
Table 5. Summary of Data for Harm Fin and Wing Team and Other Organizations*, June 1995

<table>
<thead>
<tr>
<th>FACTORS</th>
<th>Team 6</th>
<th>Other Org** 362</th>
<th>Difference +/-</th>
<th>Percent***</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PERFORMANCE:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall Performance</td>
<td>4.3</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td><strong>ORGANIZATIONAL FACTORS:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Available information</td>
<td>4.0</td>
<td>3.2</td>
<td>+0.8</td>
<td>--</td>
</tr>
<tr>
<td>Access to information</td>
<td>2.5</td>
<td>2.6</td>
<td>-0.1</td>
<td>--</td>
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<tr>
<td><strong>GROUP DESIGN:</strong></td>
<td></td>
<td></td>
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<tr>
<td>Decision-Making Process</td>
<td></td>
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<tr>
<td>Domineering team members</td>
<td>1.8</td>
<td>3.3</td>
<td>-1.5</td>
<td>--</td>
</tr>
<tr>
<td>Most knowledgeable have most input</td>
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<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td><strong>Job Characteristic</strong></td>
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<tr>
<td>Knowledge of performance</td>
<td>4.2</td>
<td>3.9</td>
<td>+0.3</td>
<td>--</td>
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<td><strong>STAGE OF DEVELOPMENT:</strong></td>
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<td>--</td>
<td>--</td>
</tr>
<tr>
<td><strong>NATURE OF FEEDBACK:</strong></td>
<td>4.3</td>
<td>2.9</td>
<td>+1.4</td>
<td>--</td>
</tr>
</tbody>
</table>

* Rating scale of 1-5 with the higher the number the more of the characteristic, except the team's stage development, which is 1 = just getting started; 2 = currently struggling; 3 = responsibilities becoming clear, and 4 = responsibilities are clear. For specific questions used to measure each concept see Appendix C.

** Includes aggregate data for 362 employees from 40 self-managed teams at AT&T, Boeing, Department of Defense, and GTE-Valenite.

*** Employees scoring low (Emp Low) scored a 1 on a 5-point scale. Employees scoring high (Emp High) scored a 5 on a 5-point scale.

Note: Dashes (--) indicate zero percent or data that is not available.

for standardizing team performance by using an index that can be uniformly interpreted throughout the organization. The primary features of the OPM are the graphical display of team goals; goals are set by the teams; teams are the users of the feedback information and take ownership; goals are set based on continuous improvement; weights are established for each of the performance areas, thus focusing the team on the most important ones; and OPMs can be used to measure performance of areas of entire functions (Yeatts, Hipkinson, & Barnes, 1993).
Other ways in which the team receives feedback include biweekly reports provided to management by the team and star point meetings, where all production star points from each team meet to discuss their teams' contribution relative to the overall goal. The team members value this feedback because it highlights what they are doing right and identifies problem areas to be addressed. The team also receives feedback information from their customers. They have a customer contact list, which they use to personally call on customers every other month. However, they are confident that if a customer has a problem the customer would call them.

Another valuable tool used to obtain feedback information for the team is the peer appraisal system. The peer appraisal at Texas Instruments is a regularly scheduled, formal document written by members of the team to provide feedback and help individual team members set goals and plans for improvements to accomplish team objectives. The procedure focuses on the technical, administrative, and interpersonal skills the team agrees are essential for successful team membership (Yeatts, Hipskind, & Barnes, 1993). Team members feel that initially the peer appraisal system did not provide the feedback desired because members were cautious about sharing their opinions. However, with time, the members have overcome this barrier and the peer appraisal provides valuable feedback to the team as a whole, as well as to its members.

Although the team members receive feedback about the effectiveness of the HARM missile from pilots of the Gulf War who visited their facility, the team generally feels that information about competitors, the market, and new technologies is better left to
management. Although, it is obvious that it is important to the team to know what it cost to make the missile compared to what a competitor might bid. Decisions about new technology are not left up to the team, however, they were consulted by the Machine and Tooling department about the machines that should be purchased to improve work processes.

On the self-administered questionnaire, team members reported their knowledge of performance and nature of feedback as 4.2 and 4.3, respectively. The concept "nature of feedback" measures whether the feedback is provided by managers and co-workers. A response of 4.3 indicates that this team receives a great deal of feedback from management and co-workers.

**How the Team Decides What Information is Needed**

Data from the case study indicate that the information need of the Harm Fin and Wing team is varied and has changed over time with the education and maturation process of the team. The Harm Fin and Wing team rated themselves as 4.0 when asked about their current stage of development as a mature self-managed team. This is the highest rating available. When first formed, the team members were not experienced decision-makers in the work-related tasks and were, therefore, unaware of the kinds of information they needed. Through trial and error process, management and the team learned what kinds of information were important to the team's performance. Individual team members do not dominate decision-making on this team. Although some talk in meetings more than others, it doesn't appear to influence the team's decision about what information is needed.
The team members reported on the self-administered questionnaire that the characteristic for domineering team members was 1.8 on a scale of 1-5. They reported a rating of 4.0 that the most knowledgeable team members have the most input. This team is very knowledgeable and each team member shares in submitting input that pertains to their area of expertise.

Strategies to Gather and Disseminate the Information

The Harm Fin and Wing team is very effective in gathering and compiling their own information. Star point positions represent different information roles on the teams. Each star point position on the team gathers information for the team and disseminates that information based upon their functional responsibility. When the organization implemented self-managed teams, the role of the supervisor slowly evolved into a resource position for the team. The team relied on management and the Resource team, which was made up of previous supervisors, for most of their information and feedback. However, as the team matured and learned more about the information needed to support high performance, they relied less on the Resource team and more on their own information-gathering skills. In fact, this team perceives the Resource team as a possible crutch for some teams. They feel that in order to manage themselves, teams should be weaned from reliance on the Resource team. The team has an excellent relationship with management, and they feel that management provides good feedback to the team and is fair in handling problems.
The team nurtures relationships with others in the organization who assist them with information needs for getting the work done. They stated that the computer specialist is a valuable resource to the team in providing hardware and software tools for easy and quick access to accurate information. Others within the organization who assist the team are from the Machine and Tooling department, providing information about machine purchases and new technologies; Maintenance department to repair machines; Purchasing department for providing needed parts and supplies to the team; Quality Control department for completing scrap reports, and the Master Scheduler, who plans and allocates machine time and serves as liaison with the external contractors.

Increased communications with others outside the team is considered a viable strategy for obtaining needed information. Although, the Harm Fin and Wing team does not usually work directly with vendors, suppliers, and customers, they do have limited contact with them. When the team receives defective products, they meet with the suppliers to solve the problem. Also, their customers, pilots in the Gulf War who had used the Harm missile on missions, visited and toured the facility and provided feedback to the team about the effectiveness of their product. The team feels it is important to maintain support from these internal and external persons. Almost unanimously, the team reported that they nurtured internal relationships by nominating those persons for bonuses.

They hold informal team meetings where members are encouraged to participate in open and honest exchange. This team has no hidden agendas. For problem solution, the
team uses brainstorming and trial and error techniques. In observations of the team meetings, members of the NSF research team listed communication as one of the major factors affecting this team's efficiency and coordination.

Factors that Enhance or Hinder Efforts to Get Information

Openness of the Information System

Data from the interviews and observations of the NSF research team indicate that the Harm Fin and Wing team have all the information they need to perform at the highest level. The team reports no barriers in getting any information they need. In addition, their access to information will be enhanced with the installation of new software. The new software will allow them to download needed information with less effort. On a scale of 1-5, with 5 having most of the characteristic, team members reported on the self-administered questionnaire that available information rated 4.0 and access to information rated 2.5. Other organizations reported 3.2 for available information and 2.6 for access to information. The Harm Fin and Wing team unanimously supports an open information system. They expressed no reason to withhold information. In fact, they stated it would be counterproductive to withhold information.

Amount of Information

The amount of information available affects the team's performance because if the information needed was available and accessible, it would allow the team to focus on how to improve. One team member reported that the amount of irrelevant information
provided to the team was one of the greatest barriers to accessing pertinent information, offering the following example. When the team was first formed, they nor management knew what information was needed so they were given everything. The team didn't know what to do with it all but after they had consumed each new batch of information, management would send them more. Since the team has evolved through an educational and maturational process, they now know what information they need, ask for it, and get it. In fact, the team now summarizes the information they gather before providing it to management. In this role, the team functions as a filter between the information resource personnel and management.

Paveway II (Assembly and Testing) Team

When compared to self-managed teams in other organizations, the Paveway II team's information system appears to be working okay. Table 6 illustrates the concepts that were measured for the Paveway II team as compared to other organizations. These figures will be referenced in this section where applicable.
Table 6. Summary of Data for Paveway II Team and Other Organizations*, June 1995

<table>
<thead>
<tr>
<th>FACTORS</th>
<th>Team 11</th>
<th>Other Org**</th>
<th>Difference +/-</th>
<th>Percent***</th>
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<tr>
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<td><strong>ORGANIZATIONAL FACTORS:</strong></td>
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<td>Decision-making Process</td>
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<td>Dominating team members</td>
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<td>Most knowledgeable have most input</td>
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<td>Knowledge of performance</td>
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<td>3.5</td>
<td>2.9</td>
<td>+0.6</td>
<td>5 14</td>
</tr>
</tbody>
</table>

* Rating scale of 1-5 with the higher the number the more of the characteristic, except the team's stage development, which is 1 = just getting started; 2 = currently struggling; 3 = responsibilities becoming clear, and 4 = responsibilities are clear. For specific questions used to measure each concept see Appendix C.

** Includes aggregate data for 362 employees from 40 self-managed teams at AT&T, Boeing, Department of Defense, and GTE-Valenite.

*** Employees scoring low (Emp Low) scored a 1 on a 5-point scale. Employees scoring high (Emp High) scored a 5 on a 5-point scale.

Note: Dashes (--) indicate zero percent or data that is not available.

**Kinds of Information Needed**

Data indicate that the team considered the most crucial information to be about resources available to the team in planning for production such as supplies, personnel, production expectations, and accurate blueprints. Performance data is considered crucial for controlling production levels, team members emphasize the importance of information to understand supplier problems in improving cycle time and performance.
Feedback information is considered critical in solving current, immediate problems. For example, the team was required to disassemble completed units because of a redesigned part. The redesign caused delays in production which meant that the team may not meet the contract deadline. This would be a first for the organization, as they have always met contract deadlines with customers. Feedback from management consists of general encouragement and support. However, feedback received from the engineers consulting with the team about the redesign involves more detailed explanation. In all, the dilemma of solving this problem was left to the team. Therefore, the team members assumed an assertive role in obtaining the information they needed from production star point meetings about deadlines and parts required. They also participated actively in the team meeting to supply each other with complete information for problem solution. On the self-administered questionnaire, team members reported their knowledge of performance and nature of feedback as 4.0 and 3.5, respectively.

**How the Team Decides What Information is Needed**

Although the Paveway II team members are clear on their responsibilities and most of their time is spent on performing the team's tasks, they are experiencing a particularly stressful situation in trying to meet production deadlines. The team rated themselves a 3.5 on a scale of 1-4 when asked about their current stage of development as a mature self-managed team. The maturity level of the team is helping them through this difficult time. Under these stressful conditions, individual team members assume total responsibility within their area of expertise. The most knowledgeable team member about an issue has
the most influence on the decision made. On self-administered questionnaires with a rating scale of 1-5, team members reported a relatively neutral position, 3.4, that the most knowledgeable team members have the most input. However, data from interviews of team members indicate that everyone has a say on the team and even a responsibility to participate because they may have a better way of doing things. As intermediate problems arise, the appropriate team member responds and/or commits to handle the situation. During a team meeting, one member committed to work overtime to finish her work on the assembly so that production would continue to the next phase. The team members rely heavily on each other for the information they need to accomplish their job tasks. Individual team members do not dominate decision-making on this team. On the self-administered questionnaire, team members reported 2.6 on a 1-5 scale in measuring the characteristic of domineering team members. This compares to 3.3 at other organizations. About half the team contributed most of the information discussed in meetings. One team member reported that a couple members may dominate the meeting; however, their role was better defined as motivator.

Strategies to Gather and Disseminate the Information

Active communication was ranked by the NSF research team as a major factor affecting the team's performance. The team members were able to understand each other, provide constructive recommendations, and clarify points objectively. This team relied a great deal upon the communicator and the production star points. Most of the team's information was obtained from management in the form of expectations from customer
contracts, suppliers (Paveway I team), engineers, and other resource personnel. During one of the meetings observed by the NSF research team, two engineers presented a redesign of the detector line for the computer assembly and informed the team about plans for a new computer design. The previous lack in communications with management about contract stipulations and with the engineer regarding inaccurate blueprints provided to the team is indicated as the primary reason for the production problems currently being experienced by the team.

The Paveway II team communicates directly with outside vendors who assist the team in completing work. The team discussed with suppliers how defective parts cause a delay in the team's cycle time. Currently, the cycle time is reported as one figure for both the team's and the supplier's time. It was decided that in the future, cycle times will be reported separately. In their meeting, the team members emphasized the importance of communicating with the right people in a timely manner when there is a problem. The communicator star point assumes this responsibility by sending electronic messages to resource people such as management and engineers.

The Paveway II team does not withhold any information. However, they may not document everything that is required to comply with procedures. For example, the team is given quality soldering variances, which means they can sign off parts with a certain variance, if it is documented and in the computer information system. However, the team feels it is easier and more efficient to fix the part than to document the variance.
Therefore, they choose to correct the variance and withhold that information by not documenting it in the computer information system.

Factors that Enhance or Hinder Efforts to Get Information

Openness of the Information System

Data from the interviews and observations of the NSF research team indicate the Paveway II team has most of the information it needs to perform at the highest level. However, the team reported some barriers to getting the information they need for production. The current lag in production is being caused by a breakdown in communications, because the team was not informed by management about production expectations nor from engineering regarding accurate blueprints. On a scale of 1-5, with 5 having most of the characteristic, team members reported available information as 3.5 and access to information as 3.0. Other organizations reported 3.2 for available information and 2.6 for access to information. The team was satisfied with the amount of information they received, however, the accuracy and timeliness was less than satisfactory.

Amount of Information

The amount of information available to the team helps them to identify problems and take corrective action. It also increases their knowledge of how suppliers provide resources to their team, which encourages contact with external vendors. Not having the information they need caused the team to define inappropriate timelines for completion and a delay in cycle time because of the defective design.
N/C Precision Team

When compared with self-managed teams at other organizations, the N/C Precision team's information system appears to be working well. Table 7 illustrates the concepts measured for the N/C Precision team as compared to other organizations. These figures will be referenced in this section where applicable.

Table 7. Summary of Data for N/C Precision Team and Other Organizations*, June 1995

<table>
<thead>
<tr>
<th>FACTORS</th>
<th>Team 12</th>
<th>Other Org**</th>
<th>Difference</th>
<th>Percent***</th>
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<tbody>
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<td></td>
<td></td>
<td>362</td>
<td>+/-</td>
<td>Emp Low</td>
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<td>--</td>
</tr>
<tr>
<td>ORGANIZATIONAL FACTORS:</td>
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<td></td>
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<td>3.2</td>
<td>+0.2</td>
<td>14</td>
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<td>Access to information</td>
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<td>2.6</td>
<td>+0.2</td>
<td>7</td>
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<td>GROUP DESIGN:</td>
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<tr>
<td>Decision-making Process</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domineering team members</td>
<td>3.1</td>
<td>3.1</td>
<td>--</td>
<td>14</td>
</tr>
<tr>
<td>Most knowledgeable have most input</td>
<td>3.6</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Job Characteristics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge of performance</td>
<td>3.9</td>
<td>3.9</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>STAGE OF DEVELOPMENT:</td>
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<tr>
<td>NATURE OF FEEDBACK:</td>
<td>3.5</td>
<td>2.9</td>
<td>+0.6</td>
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</tr>
</tbody>
</table>

* Rating scale of 1-5 with the higher the number the more of the characteristic, except the team's stage development, which is 1 = just getting started; 2 = currently struggling; 3 = responsibilities becoming clear, and 4 = responsibilities are clear. For specific questions used to measure each concept see Appendix C.

** Includes aggregate data for 362 employees from 40 self-managed teams at AT&T, Boeing, Department of Defense, and GTE-Valenite.

*** Employees scoring low (Emp Low) scored a 1 on a 5-point scale. Employees scoring high (Emp High) scored a 5 on a 5-point scale.

Note: Dashes (--) indicate zero percent or data that is not available.
Kinds of Information Needed

The team reports that the most crucial information they need for performing at a high level includes information about available machines throughout the facility which could be used by the team, feedback about defects in their product so they could take corrective action, accurate parts numbers to verify parts received from their suppliers at the warehouse, and their performance data as documented on the Oregon Productivity Matrix (OPM), described on page 57. While the team views the OPM as a valuable production measurement and planning tool, they feel their baselines were set unrealistically. Personal meetings are attended by the production star point of the team to explain discrepancies of OPM measures to management. However, this is not considered useful as feedback by the team because it is perceived by the team as a defensive stance to appease management. The team receives written comments and notices of improvement based on OPM measures from management as well as information about prospective team members available for hire by the team. The N/C Precision team actively solicits input from its customers and upper management regarding their product. They designed a special form for this purpose which they disseminate by fax. This feedback is considered very valuable to the team as it is useful in making adjustments to production. The team provides feedback to each other in the form of peer appraisals, explained on page 59. In data collected by interviews and observations, team members were divided in reporting the usefulness of feedback obtained through the peer appraisal process. On the self-administered questionnaire team members reported their knowledge of performance and
nature of feedback as 3.9 and 3.5, respectively. Other organizations also reported 3.9 for knowledge of performance. However, other organizations reported that feedback from management and co-workers is less (2.9) than that received by the N/C Precision Team (3.5).

Interviews with team members and observations reveal the importance of certain other information to the team about competitors, market, and new technologies. The N/C Precision team relies heavily upon benchmarking other successful teams as a technique to obtain information about new technologies and new training for continuous improvement. Not only do they visit teams within their own organization, but also teams in other organizations. The team's competitors are other teams within the organization who could bid for their work. This was documented during a team meeting when one of the team members suggested that another team may bid on a part they were producing below OPM baseline standards.

How the Team Decides What Information is Needed

N/C Precision team members are clear on their responsibilities and most of their time is spent on performing the team's tasks. Moreover, the team has been very innovative in finding ways to reduce their cost per unit and defect ratio. The team reported 3.8 on a scale of 1-4 when asked about their current stage of development as a mature self-managed team. The most knowledgeable team member about an issue has the most influence on the decision made, with 3.6 reported by the team. Their team meetings are well organized with each star point position gathering and presenting the information in
the area for which they are responsible. Of the teams included in this study, the N/C Precision team reported the highest level of domineering team members during decision-making (3.1) measured by the self-administered questionnaire. This compares to 3.3 at other organizations. Formal training to educate team members how to get the most out of team meetings is encouraged. If there is a question during a team meeting, the responsible star point position responds immediately with information or a commitment to get the information for the team.

**Strategies to Gather and Disseminate the Information**

Data from interviews with team members and observations indicate that the N/C Precision team uses a strategy of nurturing personal contacts within and outside the organization. Of particular importance to this team are contacts in the Machine and Tooling department. In addition to the traditional star point positions assigned to team members were appointments to assist in special areas for benchmarking opportunities and locating available machines for the team to use in production. During a team meeting, members were asked to volunteer to make contact with persons, other teams, and internal customers within the organization who they felt could help the team. Team members report that other resource persons who are helpful to the team are computer programmers, production cost accountants, suppliers of raw materials, and schedulers. They nurture relationships with internal contacts by recommending them for bonuses. Although the team recognized the value of personal contacts in areas useful to them, they acknowledge
that direct contact with outside customers can present risks. For example, the team invested $50,000 into a job with an outside contractor before they realized the machine they needed to do the job was not available.

The N/C Precision team employs a strategy to withhold information from management, as well as other teams. They feel strongly that revealing some things could damage their reputation as a team. The team is very competitive and participates actively in the Teaming for Excellence Program at Texas Instruments. One team member reported that they manipulate the OPM figures in order to extend projects if the team doesn't have another job scheduled. The team also withholds information from outsiders who periodically tour the facility. In some cases to avoid unexplainable changes in the OPM measures of performance, the team controls the speed at which their team members work. This withholding of information is not considered critical to the team's performance, however, the team perceives it as important to stay in a favorable light with management so work will not be taken away from them and given to another team. They prefer to handle personnel problems discreetly and to keep disagreements among team members quiet. They feel if this kind of information is released, persons would not want to join their team. The NSF research team observed a team meeting where the team actually discussed what information should be released and what should be withheld, especially for those team members in contact with management.
Factors that Enhance or Hinder Efforts to Get Information

Openness of the Information System

Data from the interviews and observations of the NSF research team indicate that the N/C Precision team has all the information it needs to perform at the highest level. Having information about available machines in the organization allowed the team to add a new machine to their current production. This resulted in a high team rating, increased pride, and a change in strategies to accommodate additional machines. Having access to information about their defects helped the team to improve their defect ratio.

The NSF research team reported conflicting data regarding the N/C Precision team's openness of their information system. This was dependent upon the issue being addressed and/or the team meeting observed. Team members also report friction and communication problems caused by strong personalities on the team. They are divided over the issue of raises versus bonuses, especially the fact that they are not permitted input in this decision.

Amount of Information

In observations of the team, it is apparent there are times when irrelevant information creates barriers for gathering the information needed by the team. During a team meeting, members appeared to lose interest when there was a detailed explanation about how water and oil atoms attach, when considering the order in which chemicals
should be added to a solution. This information was not considered critical by the team for making a decision about how to mix the solution. In another instance, too much detailed information created a barrier for the team in getting information they needed when using certain software programs that had been developed to monitor work processes. The production star point felt that too much information made the charts difficult to understand. The team expressed the need for more historical information over longer periods of time so they could make better comparisons about performance. This kind of information would affect their effort and use of appropriate strategies. They are aware that this kind of information is available but they lack the ability to access it. On a scale of 1-5, with 5 having most of the characteristic, team members reported 3.4 that information is available and 2.8 for access to information. Other organizations reported 3.2 for available information and 2.6 for access to information.

Paveway I (Touchup) Team

When compared with self-managed teams from other organizations, the Paveway I team’s information system appears to be weak. Table 8 illustrates the concepts that were measured for the Paveway I team as compared to other organizations. These figures will be referenced in this section where applicable.
Table 8. Summary of Data for Paveway I Team and Other Organizations*, June 1995

<table>
<thead>
<tr>
<th>FACTORS</th>
<th>Team 11</th>
<th>Other Org** 362</th>
<th>Difference +/-</th>
<th>Percent***</th>
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<td>Overall Performance</td>
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<tr>
<td><strong>ORGANIZATIONAL FACTORS:</strong></td>
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<td>2.8</td>
<td>3.2</td>
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<td>9</td>
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<td>Access to information</td>
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<td>-0.4</td>
<td>9</td>
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<td><strong>GROUP DESIGN:</strong></td>
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<td></td>
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<tr>
<td>Decision-making Process</td>
<td>2.9</td>
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<td>-0.2</td>
<td>18</td>
</tr>
<tr>
<td>Most knowledgeable have most input</td>
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<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Knowledge of performance</td>
<td>3.9</td>
<td>3.9</td>
<td>--</td>
<td>5</td>
</tr>
<tr>
<td><strong>STAGE OF DEVELOPMENT:</strong></td>
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<td></td>
<td>2.6</td>
<td>--</td>
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</tr>
<tr>
<td><strong>NATURE OF FEEDBACK:</strong></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>3.0</td>
<td>2.9</td>
<td>+0.1</td>
<td>5</td>
</tr>
</tbody>
</table>

* Rating scale of 1-5 with the higher the number the more of the characteristic, except the team’s stage development, which is 1 = just getting started, 2 = currently struggling, 3 = responsibilities becoming clear, and 4 = responsibilities are clear. For specific questions used to measure each concept see Appendix C.

** Includes aggregate data for 362 employees from 40 self-managed teams at AT&T, Boeing, Department of Defense, and GTE-Valenite.

*** Employees scoring low (Emp Low) scored a 1 on a 5-point scale. Employees scoring high (Emp High) scored a 5 on a 5-point scale.

Note: Dashes (--) indicate zero percent or data that is not available.

Kinds of Information Needed

Data from interviews with members on the Paveway I (Touchup) team and observations by the NSF research team indicate a general lack of information for this team. The team has serious problems in meeting production levels caused by their inability to work through the teaming process. Therefore, team members are not able to address problems or determine what information is needed. On the self-administered questionnaire, team members report their knowledge of performance and nature of
feedback as 3.9 and 3.0, respectively, which is closely correlated with reports from other organizations. Other organizations reported 3.9 for knowledge of performance and 2.9 for nature of feedback.

How the Team Decides What Information is Needed

Interviews and observations reveal that the team allows the most vocal persons to have authority for making decisions. They do have a facilitator but she is not one of the dominating members, therefore, her authority is usurped during the team meetings. Team members report they are criticized for making suggestions. Although, management encourages the team to make decisions and come to consensus, the team agrees only by default.

The team reports 2.6 on a scale of 1-4 when asked about their current stage of development as a mature self-managed team, and the NSF research team describes them as just starting or currently struggling with how to accomplish their tasks. The team rates itself 4.0 on a scale of 1-5 on the self-administered questionnaire for allowing the most knowledgeable team member about an issue to have the most influence on the decision made. In addition, they reported a 2.9 to measure the characteristic of domineering team members, which compares to 3.3 at other organizations. One of the team members revealed that some of the quiet team members have great ideas but don't project them. This causes a great deal of frustration among team members. During this study, management called a special team meeting as an intervention to help the team work through the teaming process.
Strategies to Gather and Disseminate the Information

Data from interviews of team members and observations indicate that the team gathers information in a two-step flow process. Since management communicates with select people on the team, those persons act as filters to the other team members releasing selective information with their own values assigned. In addition to the breakdown of communication flow among team members, there is also a tendency for team members to isolate themselves from any contacts outside the team. The facilitator could be an important contact with outside persons, however, her influence is affected by the interpersonal problems on the team.

Factors that Enhance or Hinder Efforts to Get Information

The team reports several barriers to getting the information they need to perform their job tasks: (1) Management's tendency to share information with select team members instead of the whole team, (2) Lack of information regarding the Catchball process; and (3) Lack of skill in planning, organizing, and facilitating effective team meetings. The Catchball process originated in Japan and was adapted at Texas Instruments to monitor goal deployment and alignment with components necessary for accomplishing tasks. Every entity affecting the work process must do its part to accomplish the overall goal.

Openness of the Information System

One of the team members reported that management goes to select individual team members instead of sharing information with the whole team, which affects team trust.
The manager reported the use of the two-step information flow as a more expedient method of communicating with the team.

**Amount of Information**

One of Paveway I's team meetings was devoted exclusively to an explanation of the Catchball data sheet. This kind of information provides the foundation which is essential for high team performance. The fact that the team lacked this kind of information is indicative of a weak information system to support even the basic information needs of the teams.

Data reveal that most team meetings were ineffective. The team members did a lot of talking but no minutes were taken and no decisions were made. There is someone assigned on the team to take minutes, however, she doesn't. One instance was reported when another team member began taking notes in her stead and was told to stop because it was not her job to do so.

**Differences in Information Use Environment of High- and Low-Performing Teams**

This section presents a response to study question five to address the differences in the information use environment of high- and low-performing teams, and is an aggregate analysis of the results from study questions one through four. It begins with an explanation of how the level of performance was determined for each of the self-managed teams included in this study and is followed by a description and comparison of the high- and low-performing teams by study question.
Performance Level of Self-Managed Teams

Performance dimensions.

Two sets of case studies were conducted, with each set including one high-performing team and one low-performing team. Team performance does not easily lend itself to quantitative measures that validly indicate how well a team had done its work. Therefore, the teams were evaluated using three dimensions: (1) The degree to which the team's productive output (that is, its product, service, or decision) meets the standards of quantity, quality, and timeliness of the people who receive, review, and/or use that output (Hackman, 1990); (2) The degree to which the process of carrying out the work enhances the capability of members to work together interdependently in the future (Hackman, 1990; Ilgen & Klein, 1988); and (3) The degree to which the group experience contributes to the growth and personal well-being of team members (Hackman, 1990; Kaplan & Greenbaum, 1989; Schwalbe, 1988, and Peters & Waterman, 1982). In these cases, team performance is viewed as low when the team is performing such that it will ultimately disband or discontinue providing a team output that is satisfactory and when development of team members is blocked and the satisfaction of personal needs is frustrated.

High- and low-performing teams.

The teams were selected by members of the NSF research team and managers using the above criteria to measure team performance. The two teams considered high-performing are Harm Fin and Wing and N/C Precision teams. The two teams considered
low-performing are Paveway II and Paveway I teams. Table 9 shows the summary of data
for the four teams from Texas Instruments that were included in this study.

Table 9  Summary of Data for Four TI Teams

<table>
<thead>
<tr>
<th>FACTORS</th>
<th>Harm Fin/Wing</th>
<th>PWII A &amp; T</th>
<th>N/C Precision</th>
<th>PWI Touchup</th>
<th>Other Org*</th>
</tr>
</thead>
<tbody>
<tr>
<td>PERFORMANCE:</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Overall Performance</td>
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<td>4.2</td>
<td>3.6</td>
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<td></td>
</tr>
<tr>
<td>Available information</td>
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<td>2.8</td>
<td>3.2</td>
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<td>Access to information</td>
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<td>2.8</td>
<td>3.0</td>
<td>2.6</td>
</tr>
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<td>GROUP DESIGN:</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Decision-making Process</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dominieering team members</td>
<td>1.8</td>
<td>2.6</td>
<td>3.1</td>
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<td>Most knowledgeable have most input</td>
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<td>Job Characteristics</td>
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<td>Knowledge of performance</td>
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<td>4.0</td>
<td>3.5</td>
<td>3.5</td>
<td>3.0</td>
<td>2.9</td>
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</table>

* Rating scale of 1-5 with the higher the number the more of the characteristic, except the team's stage development, which is 1 = just getting started; 2 = currently struggling; 3 = responsibilities becoming clear, and 4 = responsibilities are clear. For specific questions used to measure each concept see Appendix C.

** Includes aggregate data for 362 employees from 40 self-managed teams at AT&T, Boeing, Department of Defense, and GTE-Valenite.

Note: Dashes (--) indicate zero percent or data that is not available.

On the self-administered questionnaire, with 5 having most of the characteristic, the team members report their overall performance to be 4.3 for Harm Fin and Wing, 4.2 for N/C Precision, 4.0 for Paveway II, and 3.6 for Paveway I. All are considered high ratings except the 3.6 reported by the Paveway I team. Although Paveway II team met the criteria of the study for a low-performing team, their own evaluation of 4.0 implies that
their current performance level may be the result of circumstances beyond their control.

One of their suppliers is the Paveway I team, which was also classified by the NSF research team and managers as a low-performing team, validated by their self-reported rating of 3.6 for overall performance. The problems experienced by the Paveway I team is obviously affecting the performance level of the Paveway II team.

Differences in the Information Use Environment of Teams by Study Question

Kinds of information needed.

As indicated in the Taxonomy of the Information Use Environment of Self-Managed Teams (Table 10), there are differences among high- and low-performing teams when considering their expressed information needs. High-performing teams share characteristics of a very rich information use environment. The high-performing teams report that feedback information about performance and operations within and outside the team is crucial in monitoring their own progress and making adjustments where needed.

In addition to the internal and external information required by the high-performing teams, the N/C Precision team reports that training for interpersonal skills is important to their team. This training helps them balance the personality conflicts on their team. The Harm Fin and Wing team does not emphasize the importance of interpersonal skills training, however, their team members are not currently experiencing problems with personal conflicts on the team.
Table 10. Taxonomy of the Information Use Environment of Self-Managed Teams

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Harm Fin/Wing</th>
<th>PWII A&amp;T</th>
<th>N/C Precision</th>
<th>PWI Touchup</th>
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<td><strong>Kinds of Information:</strong></td>
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<td>Communication/Team Meeting Skills</td>
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Low-performing teams focus more on information needed to deal with immediate problems which leaves very little time for planning, process improvement, and evaluation.
They react to their environment rather than controlling and directing their team toward shared goals. Paveway I team lacks the basic information such as an understanding about the Catchball process, which is considered an essential knowledge base for self-managed teams at Texas Instruments. This conclusion is supported by Paveway I team's emphasis upon technical and interpersonal skills training as the information they most needed. They receive information about their production expectations but lack the information and knowledge as a team for how to accomplish their tasks. The low-performing teams report relatively no external information exchange, except with suppliers. As an exception, the Paveway II team is experiencing problems with a defective part supplied to them for the computer assembly as well as the quantity of electronic boards being supplied to them from the Paveway I team. Hence, because of immediate problems they are exchanging information with suppliers.

All the teams receive analyses and reports, solicited and unsolicited. The difference in the high- and low-performing teams is in how they use this information to improve performance. The high-performing teams are effective consumers of information. They know what information to gather and they know where to go to get the information they need. Because the high-performing teams are meeting their goals, they have more time to devote to gathering information about ideas and trends pertinent to their job tasks. The Harm Fin and Wing team is goal oriented and operates in an environment of trust; therefore, they successfully employ techniques such as brainstorming and actual trial and error. However, the N/C Precision team favors benchmarking other teams to gather
information about ideas and trends. Use of special communication channels is most emphasized by teams as a substitute when usual communication channels have broken down as a result of personality conflicts on the team or lack of trust among team members. These characteristics are reported and observed on one high-performing team (N/C Precision) and one low-performing team (Paveway I). N/C Precision team assigns members to nurture relationships with others outside the team who could assist them. Their work environment includes suspicion of management and other teams who may attempt to bid on one of their jobs. Therefore, they place more emphasis on controlling their information environment. The Paveway I team also operates in an environment where management and other team members are suspect which causes them to mistrust information filtered to the team from team members who communicate with management.

How teams decide what information is needed.

Data from interviews and observations of teams indicate there is a difference in how high- and low-performing teams decide what information they need. Harm Fin and Wing team communicates in meetings very effectively. One NSF research team member reported that they operate their team meetings like a group of executives. They have clear goals and continually compare their performance to the baseline standard on the Oregon Productivity Matrix (OPM). Harm Fin and Wing team reports that the most knowledgeable team members have the most input in making certain decisions and that no one member dominates decision-making. Although, the N/C Precision team is considered a high-performing team, they report neutral positions (3.1 and 3.6) for domineering team
members and whether the most knowledgeable team members have the most input in
decision-making, respectively. This is most likely due to the personality conflicts on the
team and the fact that some of the team members prefer a more traditionally-managed
work environment. The low-performing teams report a 2.6 (Paveway II) and 2.9
(Paveway I) for domineering team members. In data collected by interview and
observation methods, it is obvious that Paveway II communicates among themselves very
effectively. However, their current problem in production is largely due to communication
breakdown with people outside the team such as managers and engineers. Paveway I
team reports a low score on the self-administered questionnaire for domineering team
members, however, through data collected by other methods, it is apparent that one of
their major problems is domineering team members. They also report that the most
knowledgeable team members have the most input (4.0), which is consistent with data
collected by other methods. There is a vast difference in the level of skill and knowledge
on the Paveway I team because of different experience levels. Therefore, it may be that
the team members with the most experience dominate the team because they are
considered the most knowledgeable by the team.

Strategies for gathering and disseminating the information.

The results of this study support Ancona and Caldwell's (1992) findings that team
members assume information and communication roles. The four main communication
activities documented by Ancona and Caldwell (ambassadorial, task coordinator, scouting,
and guard) were exemplified on the four self-managed teams included in this study. All
the teams use information roles as a strategy to obtain information for team (Table 10), however, some are more effective than others. Because Texas Instruments has implemented the star point methodology, all the teams use information roles to gather and disseminate information to the team. The difference in high- and low-performing teams is in how effective team members are in these assigned roles. For example, the communicator star point on the Paveway I team doesn't take notes of meetings nor does the team facilitator conduct effective meetings. This breakdown in the communicator and facilitator star point positions affects the quality and quantity of the team's information system. The high-performing teams have learned to be very effective in using information roles (star point positions) to gather and disseminate the information needed by the team to impact performance. Even though Paveway II is considered a low-performing team, this team uses the star point positions effectively as information roles.

Factors that enhance or hinder efforts to get information

There is no significant difference in high- and low-performing teams about whether the openness of the information system and the amount of information available to the team affect team performance (Table 10). However, through interviews and observations, data reveal that each team's tolerance of these two factors is substantially different. Their tolerance for how open the information system should be as well as how much information to make available correlates to the maturity level of the team. The Harm Fin and Wing team reports these factors as barriers when they first formed as a team. However, the team members unanimously report its current level of maturity at 4.0, which is the highest
rating on the self-administered questionnaire. Over time, they have learned which
information is crucial to their performance and how best to gather and disseminate that
information. N/C Precision, also a high-performing team, reports a maturity level of 3.8
and demonstrates information-gathering and -disseminating skills that have been acquired
by the team. Although, Paveway II reports a 3.5 maturity level for the team, they are
experiencing some problems in getting the information they need such as production
expectations from management and accurate blueprints from the engineers. Paveway I
reports a low 2.6 maturity level along with major problems in getting the information they
need, particularly training in technical and interpersonal skills. The lack of information-
gathering and -disseminating skills of the Paveway I team, which can be learned over time,
exacerbates their efforts to obtain pertinent information for performing their job tasks.
Next is Chapter 6 which presents a discussion of the results of this study.
CHAPTER 6

DISCUSSION

This chapter presents a discussion of the results which includes sections pertaining to the information use environment of self-managed teams followed by implications, conclusions, and recommendations from the study. First is a comparison of the information use environment of self-managed teams, derived from comparing proposed theory to what actually was found to exist in practice.

Information Use Environment of Self-Managed Teams

A multiple-case, multi-method replication design (Yin, 1989) was used to assess the accuracy of the proposed theory of the information use environment of self-managed teams. Hence, each study question will be discussed separately comparing what was predicted by theory with findings from practice that either supported or refuted the proposed theory. As the cases supported or refuted the proposed theory, revisions were made to model what actually exists in practice. The analyses of data from the case studies presented in Chapter 5 about the information use environment of self-managed teams provide the foundation for the ensuing discussion. This section references, where applicable, the Taxonomy of the Information Use Environment of Self-Managed Teams (Table 10), which was developed to illustrate the results of this study.
Kinds of Information Needed by Teams

Theoretical Propositions

Self-managed teams' information environment is similar to that of managers; as both groups must make decisions related to their work. Therefore, the literature related to managers' information use environment lent theoretical propositions for guiding the investigation of the information use environment of self-managed teams. Information is essential to the decision-making role of managers (Wilkin, 1977), and the kinds of information they need are diverse, covering a wide range of technical, economical, social, and political information about the organization as well as its external environment. Mintzberg (1973) in his observational study of five chief executives, categorized the manager's working roles. Mintzberg's model, The Manager as Information Processing System categorized managers as the nerve center monitoring external and internal information. In the monitor role, managers are informed about the organization and its environment, and they in turn assume information roles as disseminator and spokesman to transmit this information to others. According to Mintzberg's study, the kinds of information received by managers as monitor are of a wide variety and from many different sources. The information fits into five categories: internal operations, external events, analyses, ideas and trends, and pressures.

Achleitner and Grover (1988) found that managers need task-related information such as procedures and meeting objectives, and that problem-solving dominates their activities. Likewise, McKinnon and Bruns (1992) determined that middle- and upper-level
managers in Canadian and United States manufacturing firms obtain and use information to control their daily operations. The related literature supported the theory that much of the information needed from within the organization deals with effectively performing duties by providing feedback about performance and supplementing training and development (Galbraith, 1973 in Lawler, 1986 & Solomon, 1993).

**Findings from Practice**

The data support the theory that self-managed teams need a wide variety of information from different sources to effectively perform their job tasks. As indicated in the taxonomy, there are differences among high- and low-performing teams when considering their expressed information needs. Each kind of information need as described by Mintzberg will be discussed next in context of the teams' performance levels.

**Internal.**

High-performing teams require a wider scope of internal information than do low-performing teams and emphasize that continuous feedback on performance is the most crucial information needed by the team. In fact, they felt a profound responsibility to gather their own information and placed a higher value on information gathered by the team. All the teams required information on production expectations; however the low-performing teams were experiencing communication problems with managers affecting their access to accurate, timely information regarding production expectations. Information about operations and available resources and equipment were expressed as important information affecting performance for all the teams except Paveway I.
However, this team was experiencing serious problems in working as a team, and most of their time and effort were wasted. This could explain why they felt the most important information they needed to improve performance was training for technical and interpersonal skills. N/C Precision team also reported that training for interpersonal skills is important to their team, however, they were experiencing some personality conflicts on the team that was affecting the team's performance.

**External.**

External information includes feedback from customers, competitors, suppliers, market changes, political moves, and developments in technology. This kind of information is needed by teams in order to plan their work and respond to threats and opportunities in their work environment. The high-performing teams included in this study actively pursue and nurture relationships external to the team to assist the team in performing their tasks. Neither one of the low-performing teams in this study emphasized the importance of external information to their team, with one exception. Paveway II (Assembly and Testing) team had contacted a supplier when there was a problem with a defective part, however, this was not an on-going practice. It could be that low-performing teams must stay focused on current, immediate problems for survival, leaving little time to expand their boundaries to cultivate external relationships for gathering information for the team.
Analyses and reports.

All the teams in this study received information in the form of analyses and reports. However, the difference in how teams used the information influenced their level of performance. The high-performing teams relied more on their own information system rather than information sent to them from other sources.

Ideas and trends.

Only the two high-performing teams expressed they needed information relative to ideas and trends, although they used different techniques for gathering this kind of information. There again, it could be that the low-performing teams are working in a crisis situation, which forces them focus inwardly.

Pressures.

One high-performing and one low-performing team reported the use of communication channels and networks. Both of these teams were experiencing communication problems and had substituted open communication with other means such as grapevine and two-step flow.

How the Team Decides What Information is Needed

The case study research design provided an opportunity for the NSF research team to explore the process of how teams decide upon the information they need for performing their job tasks. The model of Factors Effecting Self-Managed Work Team Performance (Figure 1) indicates that team design includes consideration of the methods used by the team to identify the best procedures. Concepts measured by the self-administered
questionnaire which reveal the decision-making process of the teams are the level of domineering team members on the team and whether the most knowledgeable team members have the most input in decisions made by the team. Data reveal that the level of information and communication skills of the teams did, indeed, affect their performance level. The Harm Fin and Wing team exhibited a high level of skill in gathering the information they needed for the team and conducting team meetings. Although the N/C Precision team reported a neutral position (3.1) in regard to domineering team members, data from interviews and observations reveal that the decision-making process of the team is impaired by domineering team members. N/C Precision team members also report a relatively neutral position (3.6) in measuring the concept of whether the most knowledgeable teams members have the most input. However, observations of team meetings support an effective use of information and communication skills by the team. Paveway II and Paveway I teams demonstrated a less than satisfactory level of information-gathering and communication skills. While Paveway II (Assembly and Testing) communicated very effectively internally among their team members, they were experiencing problems in gathering accurate information from management and engineering representatives who were external to the team. Paveway I (Touchup) team lacked the basic information-gathering and communication skills both internally and externally, which has brought the teaming process to a halt. The decision-making process of the team influences its ability to formulate effective procedures for determining what information is needed by the team to perform at a high level.
Strategies for Gathering and Disseminating Information

Theoretical Propositions

The theory from the literature that groups and teams support certain information roles, formally or informally, to obtain information for the group (Allen, 1971; Hall & Ritchie, 1975; Taylor, 1975; McClure, 1978) is supported by the case studies. Ancona and Caldwell (1992) identified roles that were assumed either formally or informally on organizational teams to provide certain expertise needed by the team. Their topology included four main communications activities and team strategies directed toward the environment (Table 2): ambassadorial activities to provide access to the power structure of the organization; task coordinator activities to provide access to the workflow structure; scouting activities to provide access to the information structure; and guard activities, which do not include interaction with the environment but are designed to avoid releasing information to the environment.

Findings from Practice

Effective self-managed teams use all these information roles through star point positions assigned by function. Each star point is responsible for creating and maintaining relationships within a functional area such as production, planning, communication, quality, safety, methods, cost, and administrator with others outside the team who could assist them in performing their tasks. Although information roles are assigned on all teams for the star point positions, individual team members exhibit varying levels of skill in performing their information role. High-performing teams are clear on their goals and
responsibilities as a team and as individuals representing the team as a star point. The effectiveness of the star points correlate with overall team effectiveness.

Since Texas Instruments utilizes the star point methodology, information flow is facilitated primarily by star points and team meetings. Therefore, if a team lacks communications and meeting skills, their availability and access to needed information is impaired. These basic skills are necessary to employ techniques such as brainstorming, trial and error, benchmarking, and building communication networks for gathering information about ideas, trends, and pressures in their work environment.

Factors that Enhance or Hinder Efforts to Get Information

Data from the case studies indicate the theoretical propositions that amount of information and openness of information do enhance or hinder attempts by the team to gather and disseminate the information it needs. However, data also provide evidence that the decision-making process of the team affects how the team determines what information is needed. Information-gathering and communication skills are impacted by the process that the team uses in deciding upon information needs. Important concepts to measure the effectiveness of the decision-making process of teams are the level of domineering team members on the team and whether the most knowledgeable have the most input when the team is making decisions. Study question two, How do self-managed teams get the information they need to perform their job tasks?, explored these concepts and provides evidence that the level of information-gathering and communicating skills is an important factor for enhancing or inhibiting the team in getting the information they
need. Although, the case studies support the theoretical propositions that the amount of information and degree of openness of the information system are factors that enhance and inhibit the information use environment of self-managed teams, data reveal that the level of information and communication skills of team members is also an important factor.

Implications of the Findings

The findings of this study contribute to a general base of knowledge about information use environments as well as potential applications for decision-making about effective information services and resources that should be supported to promote high performance of self-managed teams. The significance of this research is discussed next in terms of general applicability and potential applications.

General Applicability

The primary goal of this study was to provide a broad investigation as an impetus for an extensive study of information-seeking and use and communication activities of users in context of their work environment. The development of models representing the information use environment of self-managed teams will assist systems designers in designing group information support systems for team-based environments, as well as the development of digital libraries to provide information resources for effective use by teams.

Potential Applications

This study provides information to personnel in organizations who are responsible for maintaining effective information systems to support the work of self-managed teams.
The findings can be incorporated into training programs that include information-gathering and -using skills, as well as effective communication activities. Managers and teams can benefit from the taxonomy (Table 10) comparing the information use environment of high- and low-performing teams. Referencing a taxonomy of crucial information should assist managers and teams in accessing information that will improve performance. In a business environment, information can model reality to assist in decision-making before capital is actually committed to a project. Simulations comprised from information resources can assist teams in avoiding costly mistakes. This study supports the theories that organizational factors, such as an open information system and computerized networks connecting the team to external resource persons, improve team performance. Therefore, organizations could use these findings in implementing information and communication technologies that support team-based environments.

**Conclusions**

This study was part of a National Science Foundation (NSF) grant entitled, *Creating the High Performing Self-Managed Work Team: A Comparison of Theory to Practice*, (Yeatts & Hyten, 1994). The purpose of the NSF grant was to use a series of case studies to provide an empirical assessment of several competing theoretical models of work team performance and to provide further theoretical development. In their theory of Factors Affecting Self-Managed Work Team Performance (Figure 1), Yeatts and Hyten consider four groups of factors that affect the level of team performance: the teaming process, the environment within and outside the organization, team design, and the work
process. The information system is included as an important factor contributing to the environment surrounding the team, which ultimately affects the level of team performance. The information system includes the entire information flow process among human and computer networks, which must provide the team with the crucial information it needs so that good decisions can be made (Hackman, 1988). However, it has been argued that self-managed teams are often not provided information but are expected to seek out whatever information they need (Lawler, 1986; Manz & Sims, 1989). Therefore, teams are left on their own to develop strategies to obtain information that is required to perform their tasks. Information includes anything the team needs to know in order to perform their job tasks. According to Yeatts and Hyten, an effective information system provides the information the team needs to effectively develop its team design, teaming process, and work process, which all ultimately affect team performance. The case studies support the theoretical propositions of the information use environment of self-managed teams. However, the data reveal another important factor which enhances or inhibits the teams' ability to access the information they need to perform job tasks. Decision-makers in team environments should be sensitive to the affects that information-gathering and communication skills can have on team performance. These are necessary tools for self-managed teams to accomplish their job tasks. It cannot be assumed that information-gathering and communication skills occur naturally on teams. Although, some individuals do have expertise in these areas, other do not. Therefore, in order to provide an environment that promotes high performance, these interpersonal skills must be trained
and cultivated. Alternatively, decision-makers, responsible for recruiting and assigning team members, could purposely design teams to include the important information-gathering and communication skills.

Data from this study revealed that some teams, over time, learn and develop effective information-gathering and communication skills. However, training programs could intervene to expedite this process leveraging the team for early success and reducing the learning curve for the team.

The results of this study provide an impetus for continued research in developing a model of the information use environment of self-managed teams. These findings contribute to the theoretical development of the environment within the team, specifically the information system of the team, which is included as an integral part of Yeatts and Hyten's model. Additionally, the findings provide theoretical development for modeling information-seeking behaviors and communication activities of self-managed teams. Next are recommendations for further endeavors for research about information use environments of self-managed teams.

Recommendations

Because information science is a young discipline, there is a lack of theoretical development. Therefore, this research contributes to the maturity of the discipline by providing a theory for testing in other contexts or in replicating the research design. The interdisciplinary approach of developing the proposed theory and research design from
diverse academic disciplines, introduces other perspectives and tools into the field of information science.

This investigation into the information use environment of self-managed teams provides a general framework for further research. To increase reliability and validity of the findings, additional case studies could be conducted in other manufacturing environments similar to Texas Instruments. Additional findings could recommend further revisions and enhancements to model the information use environment of self-managed teams. After comparing the information use environment of self-managed teams in similar manufacturing environments, case studies could be conducted in other work environments such as government organizations and service organizations. This would lead to a classification of those core factors which are common across work environments, as well as classifying those factors that are unique to certain kinds of work environments. Other collaborative work arrangements such as project teams, cross-functional teams, and geographically-dispersed teams could be compared to improve the external validity in modelling the information use environment of self-managed teams by expanding it to represent other kinds of information use environments.
Mr. Dale Yeatts  
Dept. of Sociology and Social Work  
University of North Texas  
Denton, TX  76203  

REF: Longitudinal Study of the factors affecting Self Managed Work Team Performance  

Dear Dale:  

I am excited about the opportunity to participate on this project. Our Management Team has been involved in Self Managed Work Team performance measurements for some time and have determined that with the proper ingredients teams are very successful. We understand that the real difficulty is to determine 'what are the right ingredients' to make every team successful.  

Please include my team in this much needed pursuit of teaming excellence.  

Regards,  

Barry Johnson  
FBC Mfg. Control Manager
APPENDIX B

INSTRUMENTS
Please use the following scale:

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<tr>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
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1. There is a good mix of knowledge and skill among those on my team.
2. Management helps my team obtain training.
3. This job is one where a lot of other people can be affected by how well the work gets done.
4. My team does NOT have the opportunity to use its own initiative or judgement in carrying out its work.
5. Managers and co-workers often let me know how well they think I am performing.
6. First line management gives my team a lot of freedom to make decisions about how the work gets done.
7. The job requires me to use a variety of skills.
8. I am able to see how my work contributes to a completed product or service.
9. Team members create new ways of performing tasks.
10. I feel a very high degree of RESPONSIBILITY for the work I do.
11. The people in my team efficiently COORDINATE their efforts.
13. My specific goals at work are NOT well defined.
14. I feel I am fairly paid, when comparing my pay to other employees.
15. People in my team get all the information they need to make good decisions.

16. My job is fairly simple and very repetitive.

17. I know I can rely on my team members when things get tough.

18. My team members have all the knowledge needed to perform at a high level.

19. The persons on my team have good interpersonal skills.

20. One or two people generally dominate during team decision-making, even when others might be more knowledgeable.

21. Upper level management encourages my team to make its own decisions.

Please use the following scale, for the next group of questions:

1 2 3 4 5
Never Seldom Occasionally Very Often Always

1. How often is your team permitted to decide on its own how to go about doing the work?

2. How often must team members rely on the "grapevine" or rumors for information?

3. How often are the results of your work likely to significantly affect the lives of others?

4. How often does first-line management step in and make decisions for the team that were supposed to be made by the team?

5. How often does upper level management step in and make decisions for the team that were supposed to be made by the team?

6. How often is your work CHALLENGING?
7. How often is the equipment needed by your team working and easily available?

8. When considering a particular decision to be made, how often does the most knowledgeable team members have the most influence on the team's final decision?

9. How often are team members tactful and sensitive to one another during decision-making?

10. How often does your organization make training available?

11. How often does your team use the best possible PROCEDURES for getting the work done?

Please use the following scale:

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<td>Agree</td>
<td>Strongly Agree</td>
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</table>

12. Almost all my time and effort is spent directly on doing my job and NOT on other things like employee complaining or things unrelated to work.

13. When comparing my pay to others, I feel I am paid fairly.

14. I find no challenge in my work.

15. I have easy ACCESS to my organization's training resources.

17. My organization has a variety of training programs AVAILABLE.

18. The work I do on this job is very MEANINGFUL to me.
Please use the following scale, for the next group of questions:

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
</tbody>
</table>

1. My team uses the best procedures possible for getting the work done.
2. I can see how my tasks contribute to a whole product or service.
3. My opinion of myself goes up when I do this job well.
4. I am very clear on what my specific goals are at work.
5. A lot of trust exists between my team members.
6. Most of the things I have to do on this job seem useless or trivial.
7. I feel a great sense of personal satisfaction when I do this job well.
8. I frequently think of quitting/changing my job.
9. People in my team coordinate their efforts efficiently without getting in each other's way.
10. I often have trouble figuring out whether I'm doing well or poorly on this job.
11. My team comes up with new ideas regularly.
12. My own feelings generally are not affected by how well I do on this job.
13. I have easy access to the training resources that I need.
14. I feel a strong sense of commitment to the team concept.
15. I receive valuable rewards when I perform my work at a high level.
16. The persons on my team have the skills needed to perform at a high level.
18. The procedures used by my team have evolved over time rather than being specifically designed.

19. The materials needed by my team are always easily available.

20. At work, I find that I focus at least a quarter of my time on things other than the work itself.

21. I feel a great deal of personal responsibility for the work I do.

22. I have a pretty good idea of how well I am performing my work.

23. I feel bad or unhappy when I have performed my work poorly.

Please use the following scale, for the next group of questions:

1-------------------2-------------------3-------------------4-------------------5
Strongly Disagree Disagree Neutral Agree Strongly Agree

1. I am highly committed to working on a team.

2. I feel a great sense of personal satisfaction when I do the job well.

3. Managers and co-workers almost NEVER give me any "feedback".

4. I have received enough training on how to work together as a team.

5. I have received enough technical skills training.

6. My performance evaluation is linked to how well my team does.

7. My performance evaluation is linked to how well I work with others on my team.

8. My performance evaluation is linked to my pay increases and promotions.

9. A lot of my pay is tied to my team’s performance.
10. The way we get paid encourages our team to perform at a high level.

11. I trust management to consider the interests of employees when making decisions.

12. When compared to similar teams, my team’s performance is second to none.

13. When considering the mix of persons on my team, I would say people are:
   a. too different (always disagreeing)
   b. too similar (always agreeing without considering alternative ideas)
   c. the mix is about right

14. The best description of my team's level of development is:
   a. just getting started,
   b. currently struggling with how we can best get our tasks accomplished
   c. effective working procedures have been developed and team members are becoming clear on what their responsibilities are,
   d. team members are clear on their responsibilities and most of their time is spent on performing the team's tasks.

15. When considering the number of persons on your team, would you say it is:
   a. too large    b. about right    c. too small

Finally, we would like to get some biographical information:

16. Sex: _______

17. Age: _______

18. Race: _______________

19. Education: What is the highest grade level you have completed? If beyond high school, please list degree_____

Name: ___________________________(We are asking for your name so we can combine this survey information with the information we collect from you in-person. All information will be kept strictly confidential).
need to add to #64 list of things team may have control over

Date of observation:
Name of team:
Number of team members on team:
Number present:
Observer Name:

HISTORY/BACKGROUND (note: questions 1-3 are only for first few interviewed until facts are clear)

1. Which best describes the team's level of development:
   a. just getting started,
   b. currently struggling with how it can best get its tasks accomplished
   c. effective working procedures have been developed and team members are becoming clear on what their responsibilities are,
   d. team members are clear on their responsibilities and most of their time is spent on performing the team's tasks.

   Please explain.

PERFORMANCE

1The numbers for each question correspond to the question numbers in the researcher questionnaire. After each question, please skip one line and answer the question in lower case, single spaced. If you don’t know the answer, please give a best guess and note that it is your best guess. Please give any information you have even if it is only tangentially related to the question. If you don’t have any information regarding the particular question, please state don’t know. Please always follow up a “yes” or a “no” answer with at least a brief explanation. If you find that you have already answered a question through your answer to another question, please simply refer the reader to the appropriate location where the answer can be found. Please use examples in your answers when they occur to you, it is almost certain that some of the answers you give will go directly into articles/book for publication.
Quantity, Quality, Timeliness

10. Which three factors (ranked if possible) would you say had the most positive impact on the team's performance. Please explain each.

Capability to Continue

12. When thinking about the team’s ability to continue in the future, were there conditions within the team that could eventually cause the team to break down or perform poorly, unless something is changed? If yes or possibly, what were these conditions? What caused them?

Satisfaction

13. On a scale of 1 to 5, with 1 being very satisfied and 5 very dissatisfied, how satisfied would you say the team members were overall? Please explain.

INTERMEDIATE CRITERIA

Motivation and Effort:

14. How would you rate the motivation level of the team overall: exceptional, above average, average, below average, exceptionally poor? Please explain.

15. Is the level of team motivation affecting the team’s performance? How?

16. What factors appear to be affecting the team’s motivation?

17. How would you rate the team members’ “effort” placed directly on doing the work: exceptional, above average, average, below average, exceptionally poor? Please explain. The idea of “effort” here is how much of the team members’ time is actually spent doing the work verses doing other things such as talking about the weekend, arguing, etc. Effort is related to motivation in that a highly motivated worker will likely place more effort directly on doing the work. However, it is possible that a highly motivated worker is constantly distracted by bickering among team members which must be attended too.
Knowledge and Skill:

21. Did all team members have the same knowledge or were some responsible for some types of knowledge while others were responsible for other types of knowledge? Did you notice anything noteworthy regarding K&S?

Appropriate Strategies:

Strategies Used

38. Are any specific procedures used to develop work strategies?

Boundary Management:

41-45. Did you learn anything with regard to the team’s Relation to others outside the team, but within same organization or outside the organization?

46. Did you learn anything with regard to the team’s Relation to competitors, suppliers, market, new technologies

50-53 Did you learn anything with regard to the team’s Relation to management.

54-56 Did you learn anything with regard to the team’s Need to keep info from outside persons.

GROUP SYNERGY


GROUP DESIGN

Decision-Making Process

64. How much authority does the team appear to have over its tasks? That is, how much decision-making is the team authorized to do? What kinds of decisions does the team make?
65.5 When making a decision, does the team consider foremost its performance goals? Does it consider how its decision will affect its goals?

66. Do one or a few team members dominate team decision-making or does everyone have a say in the decisions made by the team?

68. When making a team decision, does it appear that the team members with the most knowledge about the issue have the most influence on the decision made? Please explain.

71. How important does it appear that a consensus be reached at any cost during decision-making?

73. If possible, Give an example where striving for consensus had positive or negative consequences?

74. What generally happens when team members disagree during the decision-making process?

75. Does this seem to have positive or negative consequences for the team's motivation and effort? Knowledge and skill? Appropriate strategies? Overall performance?

### Homogeneity vs Heterogeneity of group

77.1 What was the gender make up of the team and did it seem to affect the team's performance? What about effort? Motivation? Knowledge and skill? Appropriate strategies used? Boundary management (working with persons outside the team)?

77.2 What was the racial make up of the team and did it seem to affect the team's performance? What about effort? Motivation? Knowledge and skill? Appropriate strategies used? Boundary management (working with persons outside the team)?

### Job Characteristics

77.5 Any perceptions of how the team's job characteristics (eg. skill variety, task significance) are affecting the team?
ORGANIZATIONAL CHARACTERISTICS

Available Information

78. What information appears to be most crucial to the team performing at a high level?

79. Any idea of “Where were the places” and “who were the people” from which the team got the information it needed? (eg. management, customers, suppliers, others outside the organization)

81. How would you rate the team’s “level of information available”: (1) has all the information needed to perform at the highest levels, (2) lacks some information, or (3) lacks a lot of information needed. Please explain. Who or what was responsible for the lack of (or sufficiency of) information.

83 Did you learn anything with regard to the team’s Available Training?

100-104 Did you learn anything with regard to the team’s Goals? (eg. clarity, challenge)

105-109 Did you learn anything with regard to Feedback? (eg. from management, each other, nature of feedback)

112-117 Did you learn anything with regard to Management Support (eg. help? hindrance?)

Anything Else?
There are two goals for the questions we have developed here. One is to learn more so we can provide you with useful suggestions. The other is to learn more so we can better understand what the differences are between a high and low performing team.

When did you start working with these teams?
How long have you been with TI?

Our first questions are about the peer evaluation system.

53. What are the advantages and disadvantages of the peer evaluation?

50. What procedures do you feel work best for doing the peer evaluation?

55. What are the advantages and disadvantages to linking the peer evaluation to bonuses?

The next few questions are about the OPM and bonuses:

56. How are the OPM goals established?

58. What problems, if any, have you had with the OPM?

59. With regard to bonuses, who determines who will get a bonus and who won’t?

60. What criteria are used in determining who will receive a bonus? (e.g. JC’s OPM and the team’s OPM)
The next few questions are about teams in general.

62. What do you see as the major advantages and disadvantages to using self-directed teams?

9.5 What have you found to work best when trying to deal with persons who are resistant to participating in teams?

Team Design

64. Is there a best size for an effective team?

66. Have you run into any major problems having 3 shifts on one team? (PROBE: Has the 3rd shift had difficulty participating in teaming activities?)

67. How do you handle team overhead and have you found that some star points require more overhead time than others?

68. Should all team members be equally involved in teaming activities such as scheduling, productivity, and quality star points, OR, should those less interested in teaming activities be allowed to spend more time on the technical work while those more interested in teaming activities be allowed to do more of this? (PROBE: How does all this relate to bonuses?)

The next few questions focus on your relationship to the teams

16. Have you ever had a problem with one or more team members trying to take a supervisory role within one of the teams?

22. What do you see as your responsibilities with regard to your teams?

26. How often do you have to step in and make decisions for the team that were supposed to be made by the team?

28. How do you provide feedback to the teams?

38a. What kinds of things can teams do to gain and maintain your support?

The last few questions are related to you and upper-level management

41. How is your personal performance formally evaluated and how often?
42. Is your performance evaluation linked to how well your teams do?

38b. How important is it that you receive support from your boss with regard to teaming?

38c. How has this affected your ability to make teaming effective?
PHASE V: TI TEAMS

DATE: 
ORGANIZATION: 
TEAM: 
TEAM MEMBER: 
NOTE TAKER: 

Star point: 
When did you join the team? 
How long have you been with TI? 

History/background  (note: questions 1-3 are only for first few interviewed until facts are clear) 

1. Could you please give us a background of your team? When was it first formed, how was it put together, and how were team members prepared for working on the team? 

Characteristics of the Work/Tasks 

2. What is your team's primary task or tasks? 

3. Who do you see as your team’s customers and suppliers? 

3.5 What types of training do you receive? Technical? Teamwork training? 

Performance: Quantity, Quality, Timeliness 

4. How do you know when your team is performing at a high level with regard to the quantity, quality, and timeliness of the work completed? 

PROBE: What measures are used for each?
Performance: Capability to Continue

5. When thinking about your team's ability to continue in the future, are there conditions within your team that could eventually cause the team to break down or perform poorly, unless something is changed? Yes, No, or Possibly?

Team Satisfaction

6. Do you like working on a team or would you prefer going back to having a supervisor?

Group Synergy

7. How efficiently would you say your team carries out its work, on a scale of 1 to 10 with 1 being completely efficient. For example, is there highly effective coordination among the team members and are the members willing to do whatever it takes for the work to be done efficiently.

9. If you could discuss one issue in an open way, involving the whole team in the discussion, what would that issue be?

Procedures Followed

10. When thinking about your team's primary task or one of them, what procedures are generally followed to accomplish the task?

11. Does your team usually decide the procedures that will be followed for doing a particular job?

11a. (If yes) How does your team usually decide on the particular procedures to be followed?

12. What factors help your team to produce the best possible procedures for doing the work?

13. What factors can prevent your team from producing the best possible procedures?
Now I'm going to ask you a few questions about Decision-Making

14. What are some of the decisions your team has been empowered to make?

**Probe:**
- holds regular team meetings
- assigns work to team members
- makes decisions regarding training
- makes decisions regarding overtime, with management approval
- selects persons who are to be new team members
- determines how bonuses are to be divided up among team members
- control of budget
- fire team members

16. Do one or a few team members dominate team decision-making or does everyone have a say in the decisions made by the team?

16a. (If dominate) What effect does this have on the team's performance?

17. When making a team decision, do the team members with the most knowledge about the issue have the most influence on the decision made?

18. Do team members tend to avoid making suggestions that might conflict with those already made by another team member?

19. How important is it that everyone agree before making a team decision?

20. What generally happens when team members disagree during the decision-making process? Do hard feelings generally result?

**Responsibilities of Managers**

22. What are the responsibilities of first line management with regard to your team?

**PROBE:** Have these responsibilities been clearly stated by management?

23. What are the responsibilities of middle and upper level management with regard to your team?

**PROBE:** Have these roles been clearly stated by management?
The next questions are about Management

24. What kinds of things does management do that help your team in decision-making and getting the job done?

25. What kinds of things does management do that hinder your team in decision-making and getting the job done?

26. How often does management step in and make decisions for the team that were supposed to be made by the team?

27. Does management generally support your team's decisions once made?

The next questions are related to performance evaluations and compensation.

Performance Evaluation

41. How is your personal performance formally evaluated and how often?

42. Is your performance evaluation linked to how well your team does?

43. Is your performance evaluation linked to how well you work with others on your team?

44. Is your performance evaluation linked to your pay increases and promotions?

45. Would you say your current performance evaluation system has a positive, negative or no influence on your team's performance? Please explain.

46. Are you happy with the current way that performance is evaluated and, if not, how would you like to see it changed?

Compensation

47. Is there anyone on your team who feels he or she is not fairly compensated for their work?

47a. (If yes) Why do they feel they are unfairly compensated?

47b. (If yes) What have they done, if anything, to overcome this problem?
(If yes) Has this affected their performance and, if so, how?

The next few questions deal with Feedback

28. Do you receive feedback from management? What is the nature of the feedback and how is it useful?

29. Do you receive feedback from internal or outside customers? What is the nature of the feedback and how is it useful?

30. Do you receive feedback from your teammates? What is the nature of the feedback and how is it useful?

31. Research has found that in some jobs, when one team member is working a lot harder than others on the team, he or she receives pressure from team members to work less hard. Have you ever felt something like this was happening in your team?

The last questions ask about persons outside your team. (Boundary Management)

32. Are there persons outside your team who assist your team or are otherwise important to your team in getting the work done (other than management)?


33. (If there are important persons) What happens when your team lacks support from these persons?

34. (If there are important persons) What kinds of things does your team do to gain and maintain support from these persons?

Relation to Competitors, Market, New Technologies

35. How important is it to your team's performance that team members collect information about competitors, the market, or new technologies?

37. (If this is important) What kinds of things does your team do to gain this kind of information?
Relation to Management

38. What kinds of things does your team do to gain and maintain support from management?

PROBE: Who on your team does this?

Need to Keep Info From Outside Persons

39. How important is it to your team's performance that your team keep certain information to itself? This might include, for example, facts that could hurt the team's image or product.

40. (If information kept within team) What kinds of things does your team do to keep this kind of information from going outside the team?

48. Finally, if you could change any thing in order to help your team reach its productivity, quality, and/or scheduling goals, what would it be?

ADDITIONAL NOTES/THOUGHTS OF NOTETAKER:
APPENDIX C

QUESTIONS USED TO MEASURE
THE STUDY QUESTIONS
### APPENDIX C  Questions Used to Measure the Study Questions
Modified from (Yeatts & Hyten, 1995)

<table>
<thead>
<tr>
<th>Study Question*</th>
<th>Instrument Question</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Self-Administered Questionnaire:</strong></td>
<td></td>
</tr>
</tbody>
</table>
| 4 | People in my team get all the information they need to make good decisions.  
(1=Strongly disagree  2=Disagree  3=Neutral  4=Agree  5=Strongly Agree) |
| 3, 4 | How often must team members rely on the “grapevine” or rumors for information?  
(1=Never  2=Seldom  3=Occasionally  4=Very often  5=Always) |
| 1 | Managers and co-workers often let me know how well they think I am performing.  
(1=Strongly disagree  2=Disagree  3=Neutral  4=Agree  5=Strongly Agree) |
| 1 | Managers and co-workers almost NEVER give me any “feedback.”  
(1=Strongly disagree  2=Disagree  3=Neutral  4=Agree  5=Strongly Agree) |
| 5 | When compared to similar teams, my team’s performance is second to none.  
(1=Strongly disagree  2=Disagree  3=Neutral  4=Agree  5=Strongly Agree) |
| 2 | One or two people generally dominate during team decision-making, even when others might be more knowledgeable.  
(1=Strongly disagree  2=Disagree  3=Neutral  4=Agree  5=Strongly Agree) |
| 2 | When considering a particular decision to be made, how often does the most knowledgeable team members have the most influence on the team’s final decision?  
(1=Never  2=Seldom  3=Occasionally  4=Very often  5=Always) |
| 1 | I often have trouble figuring out whether I’m doing well or poorly on this job.  
(1=Strongly disagree  2=Disagree  3=Neutral  4=Agree  5=Strongly Agree) |
| 1 | I have a pretty good idea of how well I am performing my work.  
(1=Strongly disagree  2=Disagree  3=Neutral  4=Agree  5=Strongly Agree) |
| 2 | The best description of my team’s level of development is: 1. just getting started, 2. currently struggling with how we can best get our tasks accomplished, 3. effective working procedures have been developed and team members are becoming clear on what their responsibilities are, 4. team members are clear on their responsibilities and most of their time is spent on performing the team’s tasks. |
| 1 | Managers and co-workers often let me know how well they think I am performing.  
(1=Strongly disagree  2=Disagree  3=Neutral  4=Agree  5=Strongly Agree) |
| 1 | Managers and co-workers almost NEVER give me any “feedback.”  
(1=Strongly disagree  2=Disagree  3=Neutral  4=Agree  5=Strongly Agree) |

### In-Person Questionnaire

<table>
<thead>
<tr>
<th>Background Info</th>
<th>1. Could you please give us a background of your team? When was it first formed, how was it put together, and how were team members prepared for working on the team?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background Info</td>
<td>2. What is your team’s primary task or tasks?</td>
</tr>
<tr>
<td>Background Info</td>
<td>3. Who do you see as your team’s customers and suppliers?</td>
</tr>
<tr>
<td>Study Question*</td>
<td>Instrument Question</td>
</tr>
<tr>
<td>----------------</td>
<td>---------------------</td>
</tr>
<tr>
<td><strong>Background Info</strong></td>
<td>3.1 How would you describe the job characteristics with regard to skill variety? Task identify (can see how her/his work fits into big picture)/ Task significance? Meaningfulness? Responsibility in hands of team members? Autonomy?</td>
</tr>
<tr>
<td><strong>Background Info</strong></td>
<td>3.5 What types of training do you receive?</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>6.15. Where were the places and who were the people from which the team got the information it needed? Please briefly consider each of the following: management, customers, suppliers, others outside the organization (e.g., technicians), persons/teams inside the organization.</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>16. Do one or a few team members dominate team decision-making or does everyone have a say in the decisions made by the team? What effect does this have on the team's performance?</td>
</tr>
<tr>
<td><strong>1</strong></td>
<td>28. Do you receive feedback from management? What is the nature of the feedback and how is it useful?</td>
</tr>
<tr>
<td><strong>1</strong></td>
<td>29. Do you receive feedback from internal or outside customers? What is the nature of the feedback and how is it useful?</td>
</tr>
<tr>
<td><strong>1</strong></td>
<td>30. Do you receive feedback from your teammates? What is the nature of the feedback and how is it useful?</td>
</tr>
<tr>
<td><strong>1, 2, 3, 4</strong></td>
<td>35. How important is it to your team's performance that team members collect information about competitors, the market, or new technologies? 36. (If this is important) What kinds of things does your team do to gain this kind of information?</td>
</tr>
<tr>
<td><strong>2, 4</strong></td>
<td>39. How important is it to your team's performance that your team keep certain information to itself? This might include, for example, facts that could hurt the team's image or product.</td>
</tr>
<tr>
<td><strong>5</strong></td>
<td>4. How do you know when your team is performing at a high level with regard to the quantity, quality, and timeliness of the work completed?</td>
</tr>
<tr>
<td><strong>5</strong></td>
<td>4.5. How would you rate your team's overall performance on a scale from 1 to 10 with 1 being the best?</td>
</tr>
<tr>
<td><strong>5</strong></td>
<td>4.6. Would you rate the team's performance as exceptional, above average, average, below average, or extremely poor? Why would you rate them this way? Who are you comparing them to when making this judgment?</td>
</tr>
<tr>
<td><strong>5</strong></td>
<td>4.7. Which three factors (ranked if possible) would you say had the most positive impact on the team's performance. Please explain each.</td>
</tr>
<tr>
<td><strong>5</strong></td>
<td>5. When thinking about your team's ability to continue in the future, are there conditions within your team that could eventually cause the team to break down or perform poorly, unless something is changed?</td>
</tr>
<tr>
<td><strong>4</strong></td>
<td>7.1. What are the major factors that affect the team's efficiency/coordination?</td>
</tr>
<tr>
<td>Study Question*</td>
<td>Instrument Question</td>
</tr>
<tr>
<td>----------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>4</td>
<td>7.2. How would you rate each of the following: commitment, communication, trust among team members, creativity/innovation, interpersonal skills. Please provide a brief statement about your evaluation of each—what caused each to be at the level you perceive, and, what affect has each had on each of the intermediate factors (motivation, effort, knowledge, skill, use of appropriate strategies).</td>
</tr>
<tr>
<td>3</td>
<td>32. Are there persons outside your team who assist your team or are otherwise important to your team in getting the work done (other than management)? Who are these persons? How are they related to the team? What about customers? Internal customers? External customers?</td>
</tr>
<tr>
<td>3</td>
<td>32.1. Are there persons outside the team but within the same organization who assist the team or are otherwise important to the team in getting the work done (other than management)?</td>
</tr>
<tr>
<td>3</td>
<td>32.2. Are there persons outside the organization who assist the team or are otherwise important to the team in getting the work done (including external customers)? 34. (If there are important persons) What kinds of things does your team do to gain and maintain support from these persons? Are any of the persons on your team assigned the specific task of developing and maintaining good relationships with these persons? (Who are they?)</td>
</tr>
<tr>
<td>Observation</td>
<td>1. 46. How important is it to the team's performance that team members collect information about competitors, suppliers, the market, or new technologies? Please explain.</td>
</tr>
<tr>
<td></td>
<td>1. 2. 54. How important is it to the team that it keep certain information to itself. This might include, for example, facts that could hurt the team's image or product. Please explain. 55. (If information kept within team) How important is this to the team's high performance? 56. (If information kept within team) What kinds of things does the team do to keep this kind of information from going outside the team? Are any of the persons on the team assigned the specific task of making sure that such information is kept within the team? Who are they?</td>
</tr>
<tr>
<td></td>
<td>1. 4 78. What information was most crucial to the team performing at a high level?</td>
</tr>
<tr>
<td></td>
<td>2. 79. &quot;Where were the places&quot; and &quot;who were the people&quot; from which the team got the information it needed? Please briefly consider each of the following: management, customers, suppliers, others outside the organization (e.g., technicians, persons/teams inside the organization.</td>
</tr>
<tr>
<td></td>
<td>2. 80. Which persons on the team were responsible for getting information for the team?</td>
</tr>
<tr>
<td></td>
<td>1. 105. Does the team suggest in any way that it has or was receiving feedback? Describe.</td>
</tr>
<tr>
<td></td>
<td>4. 81. Did the team seem to have all the information it needed?</td>
</tr>
<tr>
<td></td>
<td>4, 5 81. How would you rate the team's &quot;level of information available&quot;: (1) has all the information needed to perform at the highest levels, (2) lacks some information, or (3) lacks a lot of information needed. Please explain. Who or what was responsible for the lack of (or sufficiency of) information?</td>
</tr>
</tbody>
</table>
Study Question* | Instrument Question
---|---
1 | 105. Does the team receive feedback from management?
4 | 106. What is the nature of the feedback and how is it useful?
1 | 107. Does the team receive feedback from internal or outside customers?
4 | 108. What is the nature of the feedback and how is it useful?
1 | 109. Do team members receive feedback from each other?
4 | 110. What is the nature of the feedback and how is it useful?

Researchers’ Observations

1-5 | The researchers’ overall observations and perceptions pertinent to information-seeking behavior and communication activities of self-managed teams will be gleaned from their written report and data analyses.

*Study Question #1: What kinds of information are needed by self-managed teams to perform their job tasks?

Study Question #2: How do self-managed teams decide what kind of information they need to perform their tasks?

Study Question #3: How do self-managed teams get information they need to perform their job tasks?

Study Question #4: What factors enhance or inhibit efforts by self-managed teams to get information needed by the team to perform job tasks?

Study Question #5: Are there differences in the information use environment of high-performing versus low-performing self-managed teams?
APPENDIX D

LETTER OF CONFIDENTIALITY
February 17, 1995

Dear Work Team Member:

We have recently received a two-year federal grant to study self-managed work teams. In particular, we are interested in what enables or helps teams to work well and what hinders or keeps them from working well.

We are seeking input from work teams in a variety of organizations (TI, Presbyterian Hospital, US Dept. of Defense, Good Samaritan Nursing Home). We would appreciate very much your input to this study. This would include answering the attached questions and also meeting with Dr. Yeatts or Dr. Hyten personally to answer questions we have about teams. In return for your help, we will provide your team with a report showing how your team, as a whole, responded to our questions. This information may be helpful to your team as you look for opportunities to improve. Further, if you'd like, we would be happy to provide you with information showing how your team scored in comparison to other teams in the study.

All your responses will be kept strictly confidential. You will in no way be penalized, if you choose not to participate in the study. If you have any questions, please feel free to give us a call (817-565-2238).

Sincerely,

Dale E. Yeatts, Ph.D.  Cloyd Hyten, Ph.D.
Associate Professor        Assistant Professor
APPENDIX E

SUMMARY OF DATA FOR HARM FIN AND WING TEAM AND REPORT PREPARED

BY NSF RESEARCH TEAM
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Team 01 - Harm Fin & Wing

Case # 001 - David Pickens
Case # 002 - Phillip Rogers
Case # 003 - Kenny Maddox
Case # 004 - Rick Barrett
Case # 005 - Bill Pearson
Case # 006 - Steve Bollier

M1 - Barry Johnson (Manager on the Design for Cost Team of the Paveway Manufacturing Operations since August 1994, they support Paveway Operations with cost data and there are 12 managers total on his side of operations) Is currently on the design for teaming shop team and the integrated products team, the first deals with improving the internal teams, the latter to external factors such as purchases and materials.

M2 - Bill Crockett (Manager)

dey - Researcher observations

ch - Researcher observations

deb - Researcher observations
NSF RESEARCH: CASE STUDIES
IN-PERSON QUESTIONNAIRE

ORGANIZATION: TI - Sherman
TEAM: Harm Fin/Wing

History/background (note: questions 1-3 are only for first few interviewed until facts are clear)

1. Could you please give us a background of your team? When was it first formed, how was it put together, and how were team members prepared for working on the team?

004: Started 4 years ago. Already an Effectiveness Team - tried to write Method Improvement Reports (MIRs). This evolved into a regular team. Started starpoints. Starpoints decided what their roles would be. Originally, they had a supervisor. Then a facilitator for one year to help in team meetings. Helped to do the first peer appraisals. Since then, haven't had a facilitator.

005: Been on team 2 years. It has been together for about 5. I have been prepared through a variety of courses over time including ET - effectiveness training, SPC training, and on-the-job training as a star point.

Characteristics of the work/tasks

2. What is your team's primary task or tasks?

004: Fabricating fins & wings for the HARM.

3. Who do you see as your team's customers and suppliers?

004: Customers - Downstream people, paint shop, chem finish. They talk to customers once a month and ask if they have any problems. Been doing this for 2 years. Customers will talk to them if problem comes up.
Everyone who handles our parts after us are our customers

What types of training do you receive?
PROBE: Technical? Teamwork training?

Tech-School to Grayson County for computer programming for numerical control.
Team-Starpoint training is on the job. Do have a seminar in Dallas on how to communicate that got to go to for free as a result of winning gold medal.

ET—effectiveness training, SPC training, and on-the-job training as a star point.
Currently the “training” star point.
How to have effective meetings
working in teams
valuing differences
writing peer appraisals
how to deal with different people
safety training. Fire safety mandatory since facility far from fire dept.
technical training is generally on the job; there are also lots of courses
if we don’t feel like we have enough in an area then we can get more of whatever we want

We’d like more money for training but understand why we don’t have more

Performance: Quantity, Quality, Timeliness

How do you know when your team is performing at a high level with regard to the quantity, quality, and timeliness of the work completed?
(V82—1 respondent is very clear on measures, 2 somewhat clear, 3 no idea)
PROBE: What measures are used for each?

Charts- OPM has all the measures. Scheduling meeting once a week. Scheduling starpoints meet with Scheduling Team once a week. All the data is already on the computer. Also a Scrap Review across teams- every 2 weeks they talk about each scrapped piece.

Respondent is very clear on measures #1
OPM sets goals
HPU hrs per unit
12 week av. Plotted by week get once a month
cycle time sheet
defect graph sheet—6 sigma chart

006: Have a Cell team meeting every 2 weeks. HPU is a major cost measure. Quality measures and they focus on scrap issues. Have a 6-Sigman program.

4.5 How would you rate your team’s overall performance on a scale from 1 to 10 with 1 being the best?
(V83—1 thru 10)

004: Didn’t have this question when we interviewed Rick.

006: A 2. Bronze Medal Winner first year, then consecutive Gold, Gold on the Teaming for Excellence

Performance: Capability to Continue

5. When thinking about your team’s ability to continue in the future, are there conditions within your team that could eventually cause the team to break down or perform poorly, unless something is changed? Yes, No, or Possibly? (V84—1 yes, 2 possibly, 3 no)

001: No.

002: No. [Comments about OPM - have to improve 25%/year- 12% each 6 mos]

004: Contract is up in September. Need more parts.

005: 3 all the change is difficult but we can overcome

006: Don’t think so.

STUDY QUESTION #1:

WHAT KINDS OF INFORMATION DO SELF-MANAGED TEAMS NEED TO PERFORM THEIR JOB TASKS.

Self-Administered Questionnaire

Pg. 1, No.5. Managers and co-workers often let me know how well they think I am performing.
In-Person Questionnaire

28. Do you receive feedback from management? What is the nature of the feedback and how is it useful?

29. Do you receive feedback from internal or outside customers? What is the nature of the feedback and how is it useful? (2=yes, 1=somewhat, 0=no)

Yes, customers will call them if there's a problem
Customer contact list. Customer would call if they have a problem
2
Internal. They have a customer contact list. Every 2 mos. they contact them.
Don't know

30. Do you receive feedback from your teammates? What is the nature of the feedback and how is it useful? (2=yes, 1=somewhat, 0=no)

Peer appraisal system - started out mild, but gotten better about giving feedback. Once a year.
Teammates. Tie-in at the shift change. Tell em then.
Don't know
Possibly a peer appraisal system

35 & 46 Obs. How important is it to your team's performance that team members collect information about competitors, the market, or new technologies?

Not at level to figure out markets. Used to have input on what machines to buy. M & T sometimes show them new tools.
Management's job, not ours.
Don't know. It is obviously important to them to know what it costs to make the missile and what a competitor might bid. They want their cost to be less and by doing jobs simultaneously they charge less time to the missile project.
No
Most of the kinds of information they discussed as being important to the performance of the team was operational information. They relied heavily on the OPM charts. Whenever, they were first a team, they had meetings with resource people (mid-management) to decide what information was important to the team. They decide what info they need and request it from those resource people. They had to learn about the info. There is a very open info system at TI and it is easily accessible. However, they revealed that
the greatest barrier was too much irrelevant info. Biggest problem was that at first management didn't know how much info to give them. At first, management would give them a whole bunch of info that they didn't know what to do with. Then after they kind of digested that, management would give them a whole bunch of new info. Now, they know what they need, ask for it, and get it. The report this summarized info to their management. (The team functions as a filter between information resource people and management).

78. What information was most crucial to the team performing at a high level?

-0-

105. Does the team suggest in any way that it has or was receiving feedback? Describe?

ch2 Yes, they do biweekly reports and they have starpoint meetings. They get good feedback on what they are doing right and what they are having problems on. Note: They didn't seem afraid of reporting problems like Precision team. They said if they had a legitimate explanation-they did-that there would be no heat.

deb Yes, OPM was the most important as a perpetual measure and monitor, military pilots provided feedback for overall performance. Teaming for excellence (TFE) aware validates high performance. However, some teams rely on their management sponsor to compile report and present for award. They felt the team should do this as a learning process so they would be personally involved in continuous improvement.

107. Does the team receive feedback from internal or outside customers?

-0-

109. Do team members receive feedback from each other?

-0-

RO Pull out any pertinent information from the researchers' summary.

Put this under study question #3 about information roles and strategies for getting info.
36. (If this is important) What things does your team do to gain this kind of information?

Observation

54. How important is it to the team that it keep certain information to itself. This might include, for example, facts that could hurt the team's image or product. Please explain.

55. (If information kept within team) How important is this to the team's high performance?

56. (If information kept within team) What kinds of things does the team do to keep this kind of information from going outside the team? Are any of the persons on the team assigned the specific task of making sure that such information is kept within the team? Who are they?

STUDY QUESTION #2:

HOW DOES THE TEAM DECIDE WHAT INFORMATION IS NEEDED BY THE TEAM?

16. Do one or a few team members dominate team decision-making or does everyone have a say in the decisions made by the team? What effect does this have on the team's performance?

1 Everyone has a say
2 Everybody talks
6 Everybody has a say
dey1 No one dominated
ch2 Some talk more than others, but don't appear to influence each other
deb Everyone had a say
STUDY QUESTION #3:

HOW DO SELF-MANAGED TEAMS GET THE INFORMATION NEEDED TO PERFORM THEIR JOB TASKS?

6.15 Where were the places and who were the people from which the team got the information it needed? Please briefly consider each of the following: management, customers, suppliers, others outside the organization (e.g., technicians), persons/teams inside the organization.

dey1 Don’t know

chl Looked like they compiled data themselves

6.16 Which persons on the team were responsible for getting information for the team?

dey1 Don’t know

chl Star point presented their area data at the meeting

Other notes related to information from data set:

They get information from the resource department related to their performance. This department is made of person who used to be supervisors.

Management provides good feedback.

They said a resource person can be a crutch for some teams. . . teams have to manage themselves.

re. Peer evaluation: The team members must be honest and willing to “spill guts.”

re. Goals: Increased communications with others outside of team to do what is needed to obtain goals.

re. Methods for determining procedures: Cell meetings and brainstorming, trial and error.

When making a decision, the team considers foremost its performance goals. They were very data and goal oriented.
39. and 54. Obs. How important is it to the team that it keep certain information to itself. This might include, for example, facts that could hurt the team's image or product. Please explain.

1 None whatsoever
6 Nothing kept to itself
dey1 Don't know
dey2 No
ch2 No
deb No, in fact the complimented the open information system. They said that secretive information is counter productive.

7.1 What are the major factors that affect the team's efficiency/coordination?

dey1 Working well together, motivation, homogeneity, and pride
ch1 High skills, communication, high commitment to team concept
dey2 Very well
ch2 As indicated before, they seem to have excellent interpersonal relationships. Everybody appears to be comfortable with each other.
deb Better than I've experienced with any other team (mutual respect, no hidden agendas, and no excuses.)

7.2 How would you rate each of the following: commitment, communication, trust among team members, creativity/innovation, interpersonal skills. Please provide a brief statement about your evaluation of each--what caused each to be at the level you perceive, and what affect has each had on each of the intermediate factors (motivation, effort, knowledge, skill, use of appropriate strategies)?

dey1 Commitment--To team members, high, to man., high, seem to enjoy what they make and take pride in the product, want to continue to receive man. positive reinforcement.
Communication--Homogeneity of group, six men, all seem to be knowledgeable and respect one another.
Trust--Seem to relate well to one another and trust that each is working hard so that they are willing to offer help if own work is slack--but this is only a guess, they feel management (Crockett) wants to support them in whatever the team thinks is best. Otherwise I'm not sure whether they trust management.
Creativity/Innovation--They appear to be looking for ways to improve such as moving a machine up to their shop
Interpersonal skills--Skills seemed to be good.
C-high, com-high, trust-looked good, creativity-okay, interpersonal skills-very good. They said they were all very informal and loose. They seemed to get along well in the meeting.

Teaming Process-external (boundary management)

32. Are there persons outside your team who assist your team or are otherwise important to your team in getting the work done (other than management)?
   PROBE: Who are these persons? How are they related to the team?

1 Methods and Tooling, get other team members to help them out. Also, QC (have to formally enter scrap reports), Maintenance, Computer guy (real valuable).
2 Methods and Tooling, master scheduler, maintenance department for machine problems
4 4-5 people can pick up to help do jobs when there is extra work. Plus all resource teams help out.
6 Yes, Crockett. Also Methods and Tooling. Schedules - master scheduler handles external contractor, not the team scheduler.

32.1 Are there persons outside the team but with the same organization who assist the team or are otherwise important to the team in getting the work done (other than management)?

dey1 Yes, the engineer

32.2 Are there persons outside the organization who assist the team or are otherwise important to the team in getting the work done (including the external customer)?

dey1 Don’t know
ch1 Yes vendors/suppliers. They mentions some problems they had with Syracuse supplier and lemon ave suppliers that were giving them products that turned out to be defective when they processed it. They got together with the suppliers to fix this.
ch2 Yes, they said that they all have an excellent relationship with management. They have an ideal relationship with Crockett. He’s hands off with them most of the time. He does provide good feedback to them about what they are doing right, and he’s fair about problem areas they have.

deb Yes, purchasing was mentioned as important in getting the parts to the team. Also, the team talked about their customers, pilots of the Gulf War, who cam and toured the plant. They gave the team feedback on the performance of
the Harm missile. This recognition and feedback were important to the team.

34. (If there are important persons) What kinds of things do your team do to gain and maintain support form these persons?
PROBE: Are any of the persons on your team assigned the specific task of developing and maintaining food relationship with these persons? (Who are they?)

1 Put them up for bonuses
2 Meet with them, provide feedback to them, award for peers—recognition and money.
4 Put some people in for bonuses
6 Nominated them for bonuses—everyone helps contact them

STUDY QUESTION #4:

WHAT FACTORS “ENHANCE OR HINDER” EFFORTS BY SELF-MANAGED TEAMS TO GET INFORMATION NEEDED BY THE TEM TO PERFORM TASKS?

6.17 How would you rate the team’s “level of information available”: (1) has all information needed to perform at the highest levels, (2) lacks some of the information, or (3) lacks a lot of information needed. Please explain. Who or what was responsible for the lack of (or sufficiency of) information?

dey1 Don’t know
ch1 One I will say

6.18 How did the amount of information available affect the team’s performance? Motivation? Effort? Use of appropriate strategies? Knowledge and skill? Boundary management? Please address each briefly/

dey1 There were able to see where improvement was most needed and could then focus on how to improve. Team could place efforts where needed.
Subsequently, knew who they wanted to contact to make improvements.

ch1 At least performance data performance charts

81. Did the team seem to have all the information it needed?

dey2 Yes
ch2 Yes, this has to do with the data follow they access to. They also mentioned that data access is getting even easier with some new software coming online soon. This will allow them to download their data with less effort—and as David said, will remove effort as an excuse for this aspect of teaming.

de b Yes, if they didn’t they knew where to get it. It was interesting that the team had matured to the point to where they knew when they needed or reach out for additional information. One team member added that they knew when to question certain information and had no qualms in doing so.

STUDY QUESTION #5:

ARE THERE DIFFERENCES IN INFORMATION-SEEKING BEHAVIOR AND COMMUNICATION ACTIVITIES OF HIGH-PERFORMING TEAMS VERSUS LOW-PERFORMING SELF-MANAGED TEAMS?
PERFORMANCE OF SELF-MANAGED WORK TEAMS:

A REPORT PREPARED FOR TI'S N/C PRECISION TEAM

by

Dale E. Yeatts, Ph.D.
Cloyd Hyten, Ph.D.
Debra Barnes, R.A.
William Alexander, R.A.
PERFORMANCE OF SELF-MANAGED WORK TEAMS:
A REPORT PREPARED FOR TI'S
N/C PRECISION TEAM

This report begins with a brief overview of the factors reported in the literature to be most important to a team's performance. The existence of these factors within the N/C Precision Team is considered during this overview. This is then followed by a discussion of several specific topics that emerged from our interviews with the N/C Precision team members, including use of the Oregon Productivity Matrix (OPM), peer evaluations, bonuses, and team involvement in teaming activities. While we are providing you with a review of what consultants and researchers have reported and with what you have reported to us, you have the most direct knowledge about what makes a team work best. We are interested in meeting with the N/C Precision Team (NCP) to discuss this report. Please let us know if NCP would like to meet.

Overview of Factors Affecting Team Performance

High team performance is generally thought to involve customer satisfaction, cost effectiveness, the ability of the team to continue working together in the future, and the ability of the team to meet the team members' needs. A growing number of research studies are indicating that high team performance is the result of at least four groups of factors: the work process, teaming process, the environment within and outside the organization, and team design (see Figure 1). Each is reviewed below.

Team Performance. Overall, the N/C Precision team appears to be performing at a high level. Cost effectiveness is evident from improvements that have been made in the amount of work performed per team member. The large majority of team members indicated that personal needs are being met by the team. However, it was clear that personal needs and satisfaction of some team members would be better met in a more traditionally managed environment or with changes made to various aspects of the team such as the peer appraisal system and use of the OPM. Team members generally agreed that the team could continue working together at a high level in the future. While we have not yet spoken with a sample of the team's customers, TI managers have indicated that customers are routinely satisfied with the team's work.

Work process factors include the "procedures" followed for doing the work, the "effort" placed directly on doing the work, the "knowledge and skill" of the team members, and the "materials and equipment" used by the team. The work process of the NCP team appears to be at a high level. In-person interviews and observations indicated that most team members are highly knowledgeable and skilled and typically have the materials and equipment needed to perform at a high level. This is also indicated by the team's self-
assessment, where it scored itself higher than did other teams outside TI completing the self-assessment on these factors (see Table 1 attached). Similar conclusions are reached with regard to the effort placed on the work and the procedures used for doing the work. It should be noted that the team scored somewhat lower on motivation than did other teams (see Table 1), although the score is still high (3.7 of a 5.0 scale).

The teaming process includes the relationship that exists between team members and also between the team and persons and organizations outside the team. Relationships among NCP team members are varied. With a team this size, one can expect such variation. Comparisons with other SMWTs suggests that the team is at about the norm (see Table 1). This was also concluded from observations and in-person interviews. Typical observations were that the team’s meetings “overlap nicely with shift 1 and 2 meeting together and then shift 2 and 3 meeting together.” It was also noted that some factions exist within the team. While this is not the most desirable situation, it is to be expected with a team this size. Perhaps occasionally holding a team meeting with all members present (rather than by shifts) would help members to better understand others on the team.

It is important to the team’s performance that it also have good relationships with persons outside the team and this appears to be the case. Typical examples are getting together with suppliers to correct problems, and support from methods and tooling. Some lack of support from engineering was noted.

The environment surrounding the team includes factors within the organization such as the reward, information, and education systems, and management support, as well as factors outside the organization such as the economic climate. Within TI, the information and education systems appear to be working well for this team, as indicated by in-person interviews and by comparing self-assessments of available information and training to that of other teams outside TI.

Personal recognition, fairness of pay, and whether team members receive valuable rewards for high performance were perceived to be somewhat lower (see Table 1). In particular, those on the third shift perceived these to be relatively low (3.0, 2.9, and 2.3) as compared to the first shift (4.2, 3.7, and 3.8), although still higher than teams outside TI. This was also noted during in-person interviews. Several team members noted that a high performing team member was not rewarded for his/her efforts with a bonus while another team member whose performance was lower received a large bonus. It was also generally felt that the third shift employees received less because they were less visible. A discussion of the bonus is provided in some detail below.

The team demonstrated a clear understanding of its goals and was challenged to look for ways to improve. The team’s self-assessment of its creativity (4.2 on a five point scale)
was particularly high (see Table 1). This was also expressed during in-person interviews and observed at team meetings.

The team’s perception of management support was found to be about the norm when compared to teams outside TI (see Table 1). In-person interviews revealed, as is often found in SMWTs, that some team members were much more positive about management than others. For example, one member stated that “I’ve never seen management step in and make decisions for the team that were supposed to be made by the team”, while another team member’s perception was that “basically all of the main decisions are made by management ... they override some of our decisions.” When asked what kinds of things management can do to help the team, the most common response was “give us freedom to do what we think is best” and “help us get what we need”. There was also a general sense that giving the team positive reinforcement, particularly during the OPM review, helps the team’s morale. When asked what kinds of things management can do to hinder the team, responses included “dictating” and “not supporting team decisions”.

When considering the environment outside TI, the team is troubled. The team is concerned that eventually there will not be any work. This uncertainty is having negative effects on the team members and can be expected to increasingly take away from the team’s “effort” on the task as they become preoccupied with this.

The team’s design includes the team’s methods for identifying the best work procedures, assignment of tasks, composition of the teams, and team size. The methods used for identifying “best procedures” appear to be highly effective, with valuable discussion and brainstorming occurring during team meetings when needed, as well as the creation of “sub-teams” to address important issues. The assignment of tasks appears to have evolved to a point where the third shift spends the large majority of its time “on the machines” while the first shift takes on the large majority of “teaming” activities as well as spending time on the machines. This seems to be working well and should continue to work well as long as each shift is satisfied with its roles and respects those being performed by the other. This relationship is discussed in more detail below (Individual Team Involvement). Related to the assignment of tasks is skill variety which appears to be somewhat lacking (see Table 1). Additional variety could be expected to improve “effort” as well as “knowledge and skill” within the team.

The team’s size is around 15 members (or larger) which is typically larger than desirable. However, about 3/4 of the team would like to see it larger and 1/4 would like to see it smaller (see Table 1). Generally, a smaller size would allow for more “teaming” activities per team member which might be beneficial. A smaller size could also be expected to improve the “teaming process”, such as by resulting in fewer or no factions within the team. Improved “teaming” can be expected to have positive affects on “effort” and subsequently performance. Also, a smaller team generally results in each team member
being more accountable for her or his work. And, there is more incentive among team
members to help a lower performing member since the improvement of any single
individual has more impact on the team’s overall performance. A reason for not reducing
the team’s size is the current high performance level of the team and the desire to, as one
person put it, “avoid ruining a good thing.”

The composition of the team appears to support the teaming process.

Conclusions. The N/C Precision team is performing at a high level. Its characteristics
with regard to work process, teaming process, environment and design would lead us to
expect this to be the case. Several major issues that were raised are discussed below.

Topics That Emerged During In-Person Interviewing

While interviewing persons in the N/C Precision team (12 persons) four topics emerged
and are presented below.

Oregon Productivity Matrix (OPM). The OPM provides the team with an opportunity
to clarify its primary goals, weight them by importance, monitor the team’s performance
related to each goal, identify areas for improvement, and measure the team’s continuous
improvement over time. These are essential to high team performance as indicated by past
research and our own experiences. However, as with any measurement device, the OPM
opens up the opportunity for problems that can ultimately have negative effects on team
performance. Two areas of concern among NC Precision (NCP) team members are how
goals are set and how the OPM figures are used by management.

A general sense among team members is that management does not want to accept
anything less than a 12% improvement on OPM figures every 6 months. However, this is
perceived by team members to be unrealistic in some cases. In particular, it was
emphasized by some that the actual percentage improvement can not be constant given
that a learning curve allows for large improvements initially but smaller levels of
improvement as knowledge is increased, equipment improved and procedures fine tuned—
that is, performance is approaching “asymptote”. Some team members reported the result
of this is that some team members encourage others to avoid dramatic performance
improvements because such spikes set the next cycle’s goals impossibly high. In other
words, the team informally develops a strategy of controlling its improvement so that
gradual progress is the norm. This prevents the team from making big gains when
possible. One solution to this problem is to not look for “linear” improvement over time
since it is easier to make big improvements early, but harder later. In academic jargon a
“negatively accelerating hyperbola” more than a “straight line” describes the path of
performance improvement. With this in mind, and a knowledge of the kind of job at hand,
the percentages for improvement could be adjusted to allow for a lower percentage improvement once performance has begun to stabilize.

The OPM provides teams the opportunity to identify where improvements can be made. Team members should respond to the OPM figures by looking for ways to improve those areas that seem to leave the most opportunity for improvement. However, teams that use the OPM sometimes feel that it is being used, not only to identify opportunities for improvement, but also to criticize the team for sub-par performance. TI is not immune to such perceptions. In some cases, it was reported that team members spend a large portion of their time trying to figure out what to tell management so they won’t “get in trouble.” In these cases the OPM was perceived as a tool for management to examine why improvements are necessary rather than how improvements might be obtained. It was reported that even a dramatic improvement brings management scrutiny and investigation, presumably because there is a need to know why such high performance wasn’t occurring before. This suggests that special effort is needed to alleviate such fears. For example, management, in its discussions of the OPM with the team (or starpoints), may choose to make a more conscious effort to regularly identify positive results as well as areas needing improvement. If the OPM performance figures receive “green” as well as “red” lines to highlight levels of performance, perhaps the “green” lines could receive special attention as well as the “red” lines. It is important to note that some pressure and scrutiny from management about team performance is normal and needed. The difficulty is obtaining a balance between providing such scrutiny and allowing employees to work without being distracted by fear of reactions from management.

Peer Evaluations. TI has recently formalized the Peer Evaluation procedure by providing a 5 step guide entitled Personal Development Appraisal Process. As outside observers, this form appears particularly reasonable. Perhaps its strongest virtue is that it requires team members to be clear on its team’s goals and how team members can help the team best in reaching these goals. As one manager put it “the goals must drive the appraisal” and we strongly agree with this view based on our past observations of other “less high” performing teams. A second strength of the peer evaluation (PE) is that it allows team members to see how others view their work and to share with others how they perceive their own work. One team member commented that when all three shifts were together during the PE it allowed team members to see what was happening on other shifts and to better understand the problems that other shifts have.

So, we strongly endorse the 5 step guide. However, in order for the PE to have its best affect, team members must take the PE seriously, be honest in their evaluations, and take seriously the “suggestions for improvement” received from others. Ideally, team members would want to see their team be the “very best” it can be and approach the PE with this in mind. In a very “sensitive and caring” way team members would share their views on
“opportunities for improvement” and be open to what others perceive as “opportunities for improvement”. In this way team members would identify ways of improving their performance and ultimately the team’s performance.

While it might appear reasonable to expect this from team members, in-person interviews suggested that some team members perceive high “costs” associated with the PE and, consequently, these persons are unlikely to provide the effort needed to make it work unless they feel the benefits clearly outweigh the costs. The costs perceived to be associated with the PE include: (1) time needed to evaluate each team member, (2) time needed to formulate evaluations that are “sensitive and caring”, (3) a perception of cost associated with sharing one’s views that, no matter how sensitively they are put, might ultimately be viewed as a criticism of a team member and produce hard feelings, and (4) the possibility of receiving a poor PE.

It was suggested by some that team members will accept these costs as they begin to see that helping each other perform at a higher level (particularly helping low performers) will have the benefit of improving the team’s overall performance and ultimately increasing the team’s bonus money. This rationale makes the most sense where the team is relatively small (say 6 or fewer members) and the improvement of any single person will have a noticeable effect on the team’s overall performance, and makes less sense where the team is relatively large (say 15 or more persons) and the improvement of any single individual will have a less noticeable effect.

Linking the PE to individual bonuses could also be expected to cause team members to put the needed effort into the PE. However, there are a number of problems associated with this approach that would need to be overcome. In particular, some team members may choose not to be honest with others in fear of preventing them from getting a bonus, in fear of retribution, or in hopes of keeping them from getting a bonus. These are good reasons to avoid linking the PE to pay. On the other hand, it should be noted that the link between the PE and pay has been used at the University of North Texas with apparent success—while some faculty members did appear to “use” the PE for their own interests rather than being completely honest, overall, the PE appeared to work as intended with faculty members honestly evaluating the performance of their peers. In this case, the PE required individual comments to be given and received anonymously which may have helped to reduce, somewhat, fears of retribution.

It is also important to note that the PE will be most useful if those who are most familiar with a team member’s work have input during the PE process for that individual. For this reason, we suggest that doing the PE by shift should be given careful re-consideration. This approach will not allow team members to see how other shifts perceive things or allow some of those who know best how a person works to have input during the PE.
Alternatives would be to do it all together as done in the past or to create smaller sub-groups with each group having some persons from each shift on it.

**Raise/Bonus Money.** Raises and Bonus money provide the opportunity to reward those teams and individuals that have performed at a high level. They can be a motivator for high performance to the extent that they are perceived to be linked to performance. The difficulty is making it clear to team members that it is high performance that is being rewarded. Rewarding individuals becomes particularly difficult in the case of self-managed teams since management generally has a wider span of control--that is, more persons "under" him or her. Consequently, management is less familiar with the performance of the individuals. TI is not immune to this problem. Many team members reported confusion over the "criteria" used for determining individual bonuses. Questions were raised as to why most first shift team members got raises/bonuses while few if any second and third shift team members got them. With a lack of clear "criteria" for how raises/bonuses are determined team members are coming up with their own best guesses. Some suggested that team members get rewarded for making themselves "visible" to management, others suggested that rewards come by saying the things management wants to hear. Some felt that because a team member's work schedule makes them less visible to management they were undervalued. Still others suggested that doing "teaming" activities provides more reward than actually "running the machines."

It is reasonable to assume that some, if not a lot, of the confusion over how team members get bonuses or raises is because there are several different pools of money for team bonuses and merit pay adjustments. This confusion is only increased whenever there are routine changes to the systems as is occurring at TI. No doubt a re-emphasis and clarification of the criteria used for determining raises and the different bonus systems would help. Unfortunately, the current TI system is rather complex. (For example, as we understand it, all teams in the cost center may receive bonuses for meeting business goals on JC's OPM. Individual teams are also eligible for team bonuses if they do well on their team OPMs and the teaming for excellence criteria, and management feels that team development is acceptable. In addition, merit pay or wage adjustments for individuals are partly based on market comparisons and partly on management's judgment about the individual worker.)

As noted above, to the extent that raises and bonuses are based on management's judgment of individual workers, problems can be expected. In the present case, management is forced to make judgments about upwards of 50 people with relatively little data. Consequently, it is unavoidable that some mis-judgements will be made. As one team member believed "one of my team members who is extremely good got nothing and another who is a good "bull shitter", but does little work, got a lot." Consequently, it's not surprising that some reported wishing to have a say in who gets bonuses and who gets
raises. On the other hand, others reported that since they got a bonus they were happy with the system the way it is.

In our view, it makes most sense to let the team members determine how bonuses will be distributed. Management simply cannot be expected to have consistent information on all team members given the large span of control. Likewise, team members are most knowledgeable about the performance of individual team members. Of course, for teams to effectively distribute bonuses, they must be given sufficient time to make decisions on who gets what. Further, teams can be encouraged to develop a system for figuring out how to distribute bonus money. Letting the team distribute bonus money makes most sense for “mature” teams. However, perhaps letting all teams try it, even if they fail at first, would be best. Finally, guidelines that identify those factors that should be considered when distributing bonuses would be beneficial.

Individual Team Involvement. Ideally, it might be thought that all team members should be equally involved in teaming activities or at least moderately involved. On the N/C Precision team, it was found that more than a few team members simply do not particularly like the team concept. They would much prefer to do their machinist activities and let others do the “teaming” activities. Much of the dislike of “teaming” seems to stem from the new emphasis on teaming activities which, in their view, is overshadowing the traditional, historical emphasis on actually running parts on the machines. These persons typically feel that, what they are best at (machinist), is receiving less emphasis and is less valued in this new system. Similarly, many of these same persons are uncomfortable with the social skills required to get along with and confront their teammates when there is a problem. Some frankly admitted that working under a supervisor was easier in that the supervisor handled discipline problems and served as the focus for blame when workers felt mistreated by management.

The question then becomes how should this situation be resolved. Does everyone on a team, especially a large team like NCP, have to be fully involved in team duties? In the case of NCP, it appears that the team members have developed a solution. What seems to have evolved, gradually and with much emotional turmoil, is a kind of agreement or understanding that some team members will specialize in teaming duties while others, who wish to, will concentrate on running parts. A good degree of respect appears to have subsequently developed among all team members. While this may not be ideal, it appears to be a stable solution to the problem as long as it truly is an understanding among team members, and as long as team members are not “punished” for being less involved in teaming activities. However, such a solution might not work for a smaller team where the distribution of teaming activities would need to include all team members more fully.
APPENDIX F

SUMMARY OF DATA FOR PAVEWAY II

(ASSEMBLY AND TESTING) TEAM
PAVEWAY I (ASSEMBLY AND TESTING) TEAM

Summary of Data

Vickie Wilkerson = V Star point: Coordinator/Communicator (with people outside the
team, with other teams, sets up meetings, tells team about problems
from the outside)
When did you join the team - 5 years ago
How long have you been with TI - 14 years
Number of team members = 11
Shift: 1

Linda Simpson = L Star point: Production (Attends production meetings every
morning at 7:45-8:45 with production star points from other teams
on Paveway II project to see how the teams are doing, what parts
we have, and discuss in problems with people or parts)
When did you join the team - 6 months ago (came from an
experienced cell team at Lewisville plant)
How long have you been with TI: 6 years
Shift - 1 (We are trying to make it all 1 shift)

M1 - Barry Johnson (Manager's Interviews) is on the design for cost team of the Paveway
Manufacturing Operations since August 1994. They support Paveway Operations with
cost data. There are 12 managers total on his side of operations. Is currently on the
design for teaming shop team and the integrated products team. The first deals with
improving the internal teams and the latter to external factors such as purchases and
materials.

M2 - Bill Crockett (Manager's Interviews) we had quality circles or effectiveness teams in
early 80s then moved to teams. We assigned star pints at suggestion of consultant. We
brought together all the star points for one area such as scheduling and taught them all
how to do it then we brought together all persons from another and taught them how to
do it. This helped the teams to start working on their own. Bill has been there since the
beginning of teams. They started with Quality Circles and Effectiveness Teams in the
early 1980s. Then they went to voluntary cell teams. Half were on the team and half
weren't. It was a real struggle. In 1988 they decided that teaming would be mandatory.
In 1990 Teams 2000 started with Barry Johnson starting up the star points system.
Starpoints currently have notebooks and instruction manuals.

Observation of team meeting #1 = dy1
Observation of team meeting #1=ch1
Observation of team meeting #2=dy (Note: The team doesn't try to produce more than 10 units per day because otherwise they would start stock piling the units. Instead the work towards freeing up some of their team members so that they can then help other teams that need it.

Observation of team meeting #2=db (This was a regular Thursday meeting.

**History/background** (note: questions 1-3 are only for first few interviewed until facts are clear)

Let me start by saying your answers will be kept strictly confidential.

1. **Could you please give us a background of the team? When was it first formed, how was it put together, and how were team members prepared for working on the team?**

   When I first joined the team we had a traditional supervisor, the team had no opportunity for input, and we didn't attend team meetings. We now have 1 meeting a week, on Monday morning to plan the work schedule. The supervisor still had a major part. However, the supervisor slowly weaned the team. Instead of telling us the numbers, he began to give the responsibility to someone on the line. Linda Simpson, production star, goes to production meetings everyday. She finds out the production expectations of our team: how many boards, what problems the other shifts and vendors are having that would effect our team's production, and broadcasts to the whole team status of contracts through the year 97/98.

**Characteristics of the work/tasks**

2. **What is the team's primary task or tasks?**

   When I first joined the team we had a traditional supervisor, the team had no opportunity for input, and we didn't attend team meetings. We now have 1 meeting a week, on Monday morning to plan the work schedule. The supervisor still had a major part. However, the supervisor slowly weaned the team. Instead of telling us the numbers, he began to give the responsibility to someone on the line. Linda Simpson, production star, goes to production meetings everyday. She finds out the production expectations of our team: how many boards, what problems the other shifts and vendors are having that would effect our team's production, and broadcasts to the whole team status of contracts through the year 97/98.

3. **Who are the team's customers and suppliers?**
Suppliers: Touchup Team

Suppliers are the Touchup Team. We depend upon them to fill their Kan Ban to stay on schedule. In the past, they just kept building some boards no matter what. Now work is suppose to be structured so they build only what we need. We don't want to stockpile inventory.

Performance

Performance: Quantity, Quality, Timeliness

4. How do you know when the team is performing at a high level with regard to the quantity, quality, and timeliness of the work completed?

PROBE: What measures are used for each?

Quantity: They use an availability chart (DLS system) showing hours per unit. They record the minutes it takes to do something, and it charts progress over a 6-week period.

Quality: Defects per unit (DPU) are charged to the responsible team. A defect could be missing hardware, forgot to torque something, etc.

Mary Taylor handles performance measures. During the Thursday meeting, she presents hours per unit and long-term measures. This information is illustrated on our bulletin board. We don't have many defects...some in soldering.

Quantity: We use the kan ban as a measurement of the number of units to be produced to keep everything in line so that when people come in at 7 am, they have something to do. The team decided how many line replacement units that they need setting in a certain place in order to start a up a day. For example, we need 10 detectors and 10 computers at the end of the day so someone can start testing those the next day.

We use a whip model which shows where the parts are suppose to be each day. We are not to produce over 10 parts so once 10 parts are done we have to move somewhere else to help others catch up. We go to the board shop or handle some different problem. Our goal is to get out 10 a day. To meet a long-term schedule, we break the contract down by what we have to produce each day to meet the contract terms. We are allowed to exceed 10 if we are planning for leave time. The reason for the limit of 10 is that we operate on just-in-time inventory—it costs
to have surplus setting around. Also, if a design feature is found, you have to disassemble all the inventory units in order to correct the problem.

In order to meet our contract, we are bumping up production to 16 a day to meet the MERPS schedule. We are behind right now because of the redesign of the control. While they were redesigning the control, my team helped Paveway III to catch up, which also provided us an opportunity to cross train.

We won't get additional people in order to catch up. We will work overtime until June 15 to meet the contract deadline. We have 48 units in surplus. 4 people are building detectors to test the computers. That leaves 2 people building the computers so the detector people go help the board shop make their boards. Control is a slow start process. The engineers have redesigned the valves for the computers, which will make them simpler to assemble. August 15, we will start back on schedule with a redesign of the parts.

Main goals: quality, cycle time, and cost.

Quality. We want good quality units in the safest way to get it out with the less money. Catch-ball goals are based on 12-13 hours per unit (HPU) per system. We want to cut that down to 8 hours per system. Cycle time - we want to get our critical path down to 10 days, build 10 units a day, stay on schedule, and go help other teams. We plan our production by quarter to see how much we have to do each day in order to be on schedule in the next quarter. Right now, we're not on schedule so they can't realistically plot our production right now. Mary Taylor keeps up with hours per unit (HPU), which is high right now because of lack of the control part. TI has never lost a contract. We will make this one by June 15 cutoff but we have never called it this close before. We have graphs comparing the goals to the baseline on our bulletin board which show quality, hours per unit, and cycle time. (Copies of these were given to Dale) Steve Stevenson is our cost center manager and he meets with our team to explain continuous improvement processes. Quality Control (Judy) looks at 2 units a day which is everything we have done that day. TQC is where everyone checks their own work.

4.6 Would you rate the team's performance as exceptional, above average, average, below average, or extremely poor? Why would your rate them this way? Who are you comparing them to when making this judgment?

Dy1 exceptional—all the team members seem to be supporting each other and focused on continuous improvement. Other teams I have seen GSA teams.

Ch1 NO WAY TO TELL. I HAVE NO BASIS FOR COMPARISON.
Exceptional because they have the technical and socio skills to operate as an effective, mature team. I'm comparing them to a standards that I perceive would be a good team.

Performance: Capability to Continue

5. When thinking about the team’s ability to continue as a team in the future, are there conditions within the team that could eventually cause the team to break down or perform poorly, unless something is changed? Yes, No, or Possibly?

Dyl no

ch1 DIDN'T SEE ANY. DID NOTE THAT 1 MALE ON TEAM ACTED COMPLETELY UNINVOLVED. HE MAY BE A PROBLEM REGARDING THE CAPABILITY TO CONTINUE IF HE HASN'T BOUGHT IN TO THE TEAM CONCEPT.

V No, but if there was..our team would handle it.

Dy no

No, I believe this team would handle any situation that arises

STUDY QUESTION #1:

WHAT KINDS OF INFORMATION ARE NEEDED BY SELF-MANAGED TEAMS NEED TO PERFORM THEIR JOB TASKS.

Pg. 1, No.5. Managers and co-workers often let me know how well they think I am performing.

Relation to competitors, market, new technologies

35. How important is it to your team’s performance that team members collect information about competitors, the market, or new technologies? PROBE: Please explain.

Dyl Important to understand problem of suppliers so can improve cycle time and performance

ch1 DON'T KNOW
Organizational Factors—Within Organization

Information

39.5  What information is crucial to the team’s success?

Dyl  Maybe what supplies had come in

ch1  OFFHAND I WOULD SAY 2 THINGS, INFO ABOUT UPCOMING JOB SO THEY COULD PLAN WORK, AND 2ND, PERFORMANCE DATA FOR FEEDBACK CONTROL.

Dy  how the supplier is doing and who on the team will be missing so they can plan to fill in for the person

db  Production expectations and accurate blueprints.

Feedback

105.  Does the team receive feedback from management? What is the nature of the feedback and how is it useful?

Dyl  It seemed as if they had support from management that man. Understood the problems they were having. Encouraging. Gives them desire to show man. That man. Is right in supporting them.

Ch1  NOT CLEAR WHETHER THEY DO OR WHAT NATURE IS

Db  This wasn’t discussed in the meeting. However, when the engineers arrived one remarked this is a good team.

107.  Does the team receive feedback from internal or outside customers? What is the nature of the feedback and how is it useful?

dyl  Don’t know

ch1  NOT CLEAR

db  They discussed feedback from the production star points meeting, which include internal customers. They adjust their work for just-in-time inventory based upon these production meetings.
109. Do team members receive feedback from each other? What is the nature of the feedback and how is it useful?

dy1 During the meeting when someone was unsure of something or said something wrong others provided the information in what appeared to be a constructive way. It’s constructive.

Ch1 THEY MENTIONED A PEER APPRAISAL SYSTEM, BUT DIDN’T GO INTO DETAIL ON IT.

db During the meeting members would offer to help each other and would offer suggestions for what might work better.

STUDY QUESTION #2:

HOW DOES THE TEAM DECIDE WHAT INFORMATION IS NEEDED BY THE TEAM?

STUDY QUESTION #3:

HOW DO SELF-MANAGED GET THE INFORMATION NEEDED TO PERFORM THEIR JOB TASKS?

4.7 Which three factors (ranked if possible) would you say had the most positive impact on the team’s performance. Please explain each.

Dy1 Communication—the team members were able to understand each other, provide constructive recommendations, clarify points without hurting feelings

Knowledge—members seem to understand their work

Critical thinking—team members were identifying was of improving boundary management—team members demonstrated that they contact outside suppliers and voice concerns about products then follow-up by giving them in-person feedback

Dy Collaborative attitude, knowledge and skill, key leaders on team, able to/working on identifying good strategies

db Teamwork = 1 for most positive impact because they are ready, willing, and able to do whatever is needed to succeed as a team for continuous improvement.
Knowledge and skill = 2, these team members all had a clear idea of what their job and responsibilities are and they had the expertise to fulfill those duties.
Management support = 3, this team has confidence in their ability to be a good team and management supports them and believes in them too.

7.2 How would you rate each of the following: commitment, communication, trust among team members, creativity/innovation, interpersonal skills. Please provide a brief statement about your evaluation of each—what has caused each to be at the level you perceive, and, what affect has each had on each of the intermediate factors (motivation, effort, knowledge, skill, use of appropriate strategies)?

Dy1 Commitment high. Seem to support TI and committed to each other (homo. Of group).
Communication high as noted above
trust high among co-workers and seem to be for management as well. Even though team had problems due to suppliers they felt management was behind them and understood their problems
creativity--didn’t notice any
interpersonal skills high

ch1 COMMITMENT- WITH EXCEPTION OF 1 QUIET WOMAN AND THE QUIET MAN, MOST SEEMED COMMITTED AND INVOLVED

COMMUNICATION WAS GOOD

TRUST- DON’T KNOW.

CREATIVITY- OK

INTERPERSONAL SKILLS- APPEARED GOOD

Db Commitment - very high (they are so committed to meet the deadline, that they volunteer to work overtime and wouldn’t even slow down to be interviewed)’ communication - very high (in the meeting the interaction seemed to flow and when a problem arose, a team member would take the responsibility to handle it; trust among team members - very high (when one was attending team meetings, the other team member didn’t complain but would cover for the missing team member; creativity - very high (the engineers attended the meeting and explained the new design and a pert chart for production and the team members offered many insightful suggestions for both; interpersonal skills - very high (this provides the foundation for them to work so well together.
32.1 Are there persons outside the team but within the same organization who assist the team or are otherwise important to the team in getting the work done (other than management)?

Dyl yes suppliers

cyl POSSIBLY TEAM CHAMPION, BUT HEARD VERY LITTLE ABOUT THIS PERSON AND WHAT THEY DO.

L yes, our team has a lot of those people. The people on the parts team help us with wires, etc. Phil Southerland - cycle time person helps us a lot with work processes and he asked good questions

Dy the team had two engineers come and show the team what is coming down the pike in a few months. this will help the team get some idea of what they will need to do.

the team receives 10 units each day and then completes the 10 units each day. If the supplier doesn’t get 10 to them then they can’t meet their goal. this requires some of the team members to help the other team when necessary

Db Bob Cunningham, engineer, had asked to be on their next team meeting agenda re. The redesign on the detector line. Also, they wanted to invite Bryan Anderson and Barry Hutchison to the meeting so the team could find out what’s going on, what the plans are for the new computer, and to give them 1-2 weeks to prepare before letting the team know what changes are being made to the design.

32.2 Are there persons outside the organization who assist the team or are otherwise important to the team in getting the work done (including external customers)?

Dyl Don’t know

cyl YES, EXTERNAL PARTS VENDORS, SUPPLIERS.

db They had received some bad parts from GlenAire and discussed finding some backup vendors for those particular parts.

33.3 (If there are important others) What kinds of things does the team do to gain and maintain support from them?
They went to suppliers and discussed concerns but suppliers aren’t listening so they have devised a way of helping supplier see that a delay in cycle time is due to them. Currently cycle time is reported as a whole for both the team’s and supplier’s time. In future two different cycle times will be reported.

THEY MENTIONED THAT THEY GOT THEM TO DELIVER SUPPLIES DIRECTLY TO TEAM INSTEAD OF TO CENTRAL RECEIVING.

We’ve never had a problem getting support.

The communicator for the team sends messages to resource people (management, engineers) to attend meetings, etc.

They emphasized in the meeting that it was important to get to the right people immediately when there was a problem.

(If there are important persons) What kinds of things does your team do to gain and maintain support from these persons? PROBE: Are any of the persons on your team assigned the specific task of developing and maintaining good relationships with these persons? (Who are they?)

Don’t know

The communicator is assigned the task of sending messages to outside people and the production star point meets with other Paveway II star points every morning to make sure problems in production are handled and to see how they will affect Assembly and Testing.

Need to keep info from outside persons

How important is it to the team’s performance that the team keep certain information to itself? This might include, for example, facts that could hurt the team’s image or product.

Doesn’t seem to be useful to team.

Everyone on the floor knows about everything. For example, we have quality soldering variances, which means we can pass parts with a certain variance but we are suppose to document it in writing and on the computer. This is a new procedure. We’re not suppose to fix it but we do it anyway so we don’t have to document the variance. Management doesn’t want us to do this but everyone on the floor does.
they do sometimes make corrections that are not actually necessary but they have always done it and want it better than actually required

6.15 “Where were the places” and “who were the people” from which the team got the information it needed? Please briefly consider each of the following: management, customers, suppliers, others outside the organization (e.g., technicians), persons/teams inside the organization.

Dyl Supplier is only one that came up and they are inside TI

chl I'M NOT SURE WHERE THEY GOT THE DATA FROM.

Dy supplier and team members

db Management - expectations from customer contracts; Suppliers - touchup team; Engineers and other resource people within the organization

6.16 Which persons on the team were responsible for getting information for the team?

Dyl Don’t know

cly STARPOINTS WERE RESPONSIBLE I THINK.

6.17 How would you rate the team’s “level of information available”: (1) has all the information needed to perform at the highest levels, (2) lacks some information, or (3) lacks a lot of information needed. Please explain. Who or what was responsible for the lack of (or sufficiency of) information.

Dyl Seem to have info. Needed to determine the problems they were having

chl I HAS ALL (OR MOST) OF INFO IT NEEDS.

Dy 1

db (2) lacks some information - didn’t have accurate blueprints or contract stipulation from management
breakdown in communication seemed to be the problem

STUDY QUESTION #4:

WHAT FACTORS "ENHANCE OR HINDER" EFFORTS BY SELF-MANAGED TEAMS TO GET INFORMATION NEEDED BY THE TEAM TO PERFORM TASKS?

Dy1 Helped them to identify problems and take corrective action. Motivated them to react to information and correct problems so more effort could be placed on the job. Don’t see that it affects strategies used. Increased knowledge of how suppliers were working. Caused contact with outside groups.

Ch1 I THINK THE PERFORMANCE DATA WAS CRITICAL TO THEIR JOB

Db Motivation - team was frustrated that they didn’t have the right information. Effort - they seemed to keep a high level of effort though. Use of appropriate strategies - this suffered most because they would have a different strategy if they had the information needed. Knowledge and skill - without the right information, they weren’t knowledgeable to adapt the appropriate strategies. Boundary management - without the information, they wouldn’t know who to contact outside the team for help.

STUDY QUESTION #5:

ARE THERE DIFFERENCES IN INFORMATION-SEEKING BEHAVIOR AND COMMUNICATION ACTIVITIES OF HIGH-PERFORMING TEAMS VERSUS LOW-PERFORMING SELF-MANAGED TEAMS?

Stages of Development

49. Team Development

M1: when a team is first developing it needs strong leadership. If it doesn’t have this one solution is to provide training to the team leader to help him/her develop,

when the team is at a stage where team members are arguing and disagreeing have them get in a room and tell two things good about each person on the team

it helped to bring all the star points for a particular task together and make sure they knew exactly what to do. then they could present to their team information related to their star point at each team meeting. this caused the other team members to take notice particularly when the star point identified for the team problems the team was having and began asking who had contributed to the problem. for example the “quality” star point may ask about a quality problem the
team is having, some on the team members may question the judgement of the quality star point team member but then this person shows them the data they have been taught how to use, this encourages the team members to then check into what the data are so they can know what the star point is talking about. in this way cross-training occurs and all the team members begin to learn the various starpoints responsibilities. it also increases the confidence of the star points.

49.1 Which best describes the team’s level of development:

a. Just getting started
b. Currently struggling with how it can best get its tasks accomplished
c. Effective working procedures have been developed and team members are becoming clear on what their responsibilities are,
d. Team members are clear on their responsibilities and most of their time is spent on performing the team’s tasks

Please explain.

Dyl It appeared that “d” would be appropriate. The team members all seem to understand their tasks and were looking for new ways to improve their time per unit.

Chl FROM THE LIMITED FIRST-TIME OBSERVATION, I WOULD SAY d. THEY SPENT MOST OF THEIR TIME PRESENTING DATA AND DISCUSSING PROBLEMS & SOLUTIONS.

Dy D, all the team members are clear on what their responsibilities are with regard to the team and all seem dedicated to doing it

db d. All the team members on this team are clear on their responsibilities. When something comes up in a team meeting that is in their area, the responsible team member jumps in and responds or commits to handle the situation. They work well together and manage an effective team meeting to coordinate the work. For example, when one team member is falling behind production, the others help her. Also, each team member accepts overtime to stay up with the needed production so they don’t slow down the rest of the team.
APPENDIX G

SUMMARY OF DATA FOR N/C PRECISION TEAM AND
REPORT PREPARED BY NSF RESEARCH TEAM
Precision Team
Summary of Data
Case #018 - David Sullivan
Case #019 - Rick Edgar
Case #020 - Linda Jones
Case #023 - Jimmy Willis
Case #024 - Mark Powell
Case #025 - Don Nelson
Case #027 - Tony Powell
Case #028 - George Holland-dy, ch
Case #029 - Bobby Neely
Case #030 - Sheila Parrott
Case #CP - Clifford Peercy
Case #LM - Leroy Mettice

M1 - Barry Johnson (Manager's Interviews) Is on the Design for Cost Team of the Paveway Manufacturing Operations since August 1994. They support Paveway Operations with cost data. There are 12 managers total on his side of operations. Is currently on the design for teaming shop team and the integrated products team. The first deals with improving the internal teams and the latter to external factors such as purchases and materials.

M2 - Bill Crockett (Manager’s Interviews) we had quality circles or effectiveness teams in early 80's then moved to teams. we assigned star points at suggestion of consultant. We brought together all the star points for one area such as scheduling and taught them all how to do it then we brought together all persons from another and taught them how to do it. This helped the teams to start working on their own. Bill has been there since the beginning of teams. They started with Quality Circles and Effectiveness Teams in the early 1980s. Then they went to voluntary cell teams. Half were on the team and half weren't. It was a real struggle. In 1988 they decided that teaming would be mandatory. In 1990 Teams 2000 started with Barry Johnson starting up the starpoints system. Starpoints currently have notebooks and instruction manuals.

dey1 - Dale Yeatts (obs of mtg 1)
ch1 - Cloyd Hyten (obs of mtg 1)
dey2 - Dale Yeatts (obs of mtg 2)
deb - (obs of mtg 2)

Note: According to the data I input from the self-administered surveys, I am missing interviews for the following members of this Precision Team: Dewayne DeBerry and Bill Holle. Dale said DeBerry didn't give an interview and that one of George Holland's is actually Bill Holle's interview. I don't know which one. There were 2 respondents who didn't sign their name to the survey so that would account for Clifford Peercy and Leroy Mettice.
History/background  (note: questions 1-3 are only for first few interviewed until facts are clear)

Let me start by saying your answers will be kept strictly confidential.

1. Could you please give us a background of your team? When was it first formed, how was it put together, and how were team members prepared for working on the team?

V024: Formed about 91. 3 machines have gone to 7 machines, and new people. Supervisor used to give them data. Now they compile the data. Much more responsibility now, and they enjoy it.

V028.a: the team was formed around 89 or 90. George joined the team in Nov. 94. The present team is strong because there are a lot of “doers” on the team. They also have a good knowledge of machinery. George has an associates degree in tool and dye making.
Need personalities that can work together plus ability to communicate, if can’t do this then rocky road
need a feeling of a small family

V028.b: They have an outside/inside structure. Some of the team members do high precision stuff inside a temp-controlled room. On team 2 years. Was at Denison first, then came to Sherman.

V029: Bobby is scheduler.

Characteristics of the work/tasks

2. What is your team’s primary task or tasks?

V028.a: To machine parts

V028.b: Numerically controlled milling.
vertical milling

77.5 How would you describe the job characteristics with regard to skill variety? Task identity (can see how her/his work fits into big picture)? Task significance? Meaningfulness? Responsibility in hands of team members? Autonomy?
Dey1: Definitely variety although on any given day may do the same thing quite a bit. Sometimes have no idea how task fits into big picture. Have to make a part and don't know what it goes into because it is top secret. Generally feel all their work is sigh. Has to do with weapons all seem to feel responsible. If make mistake it will get brought up in team meeting when they are reviewing defects and looking for reasons. Indiv. Autonomy may not be that high since team makes decisions as did sup. In past

ch1: A little variety. All important, meaningful jobs. A high degree of responsibility and autonomy.

Dey2: Variety is there, some jobs can get complex as materials require different qualities of tools to prevent breaking tools. Seem to have task identify, sign., etc.

Deb: There didn't seem to be a lot of skill variety. The precision team operates certain machines to make parts. They were very well aware of how their work fit into the paveaway project. This was apparent when they discussed dry tapping the holes vs. using oil. They found their job meaningful and understood their impact upon the rest of the organization. The team is responsible for their work and they operate with a lot of autonomy.

3. Who do you see as your team's customers and suppliers?

V028.a: Customers=there are 6 internal from other areas of the shop, paveaway assembly, harm, projects at the McKinney site. External includes a re-drilling corporation.

Performance

Performance: Quantity, Quality, Timeliness

4. How do you know when your team is performing at a high level with regard to the quantity, quality, and timeliness of the work completed?

(V82--I respondent is very clear on measures, 2 somewhat clear, 3 no idea)

PROBE: What measures are used for each?

V028.a: 1--reports, some inform us; other info is not needed, it is to specific, "routinized" it is difficult to leaf through all parts numbers for example to find yours we use computers
Vo28.b: On the floor you know on a day to day basis. He’s pulling data off the computer, so he knows where data comes from and what it is.

Note: On OPM they change baselines every 6 mos. They set it too high at first, then it got better, but NOW they don’t wanna run real good because it would set impossible baselines—so they stay moderately good. When they balked at the demands for better baselines in the team meeting, they meant that they didn’t wanna do it, not that couldn’t do it. BOTTOM LINE—there’s a problem setting baselines with the OPM!

Vo29: quality star point will show us charts on how we’re doing for example

Vo23: they have a customer satisfaction survey instrument we can get

4.5 How would you rate your team’s overall performance on a scale from 1 to 10 with 1 being the best?

(V83–1 thru 10)

Vo24: A 3

Vo28.a: teaming in general, gold metal team, we are a higher standard than most TI teams

Vo28.b: A 3. Need to learn to communicate better. Some people dislike each other. Some people just tagging along.

Vo29: 3 pull together when need to
dey1: exceptional. The team has identified ways of reducing costs per unit. They handle all sup. Responsibilities including hiring new persons for their team. Comparing them to all other teams that I have seen.

Ch1: If I recall, their productivity was good. Their discussion of Cost (HPU) indicated that there were problems in this area that needed immediate attention. Some of that was that the goal levels may be unrealistic because their baselines were set improperly on the OPM. Their discussion of quality problems highlighted a 5-6 defect and scrap reports. Some of the downstream problems may not be their fault; these were due to the process and weren’t charged to them.

I don’t know about an overall rating. I don’t have a standard to compare against other than the Harm Fin/Wing team. The NC Precision Team appears to be less proficient than them, but again that’s comparing a large team against a very small team.
Dey2: exceptional, they keep close tabs on their performance in multiple areas and set goals then when not reaching these they look for why, compared to teams in other orgs.

Deb: I would rate this team above average. Even though the OPM chart showed some below average productivity for certain parts, I believe this was caused by low quantity part orders, which are beyond the team's control. Their group process was above average as they worked to correct a problem of individuals on the team who continue to work excessive overtime. Each individual was encouraged to participate in the group process and individual contributions were valued by the team. The team seemed to have a good mix of knowledge, expertise, problem solving and teaming skills. They had received an award for high performance and the team seemed to actively pursue continuous improvement in production through training opportunities. I am comparing this team to themselves--by that I mean high performance is attained by continuous improvement, which this team strives for.

Performance: Capability to Continue

5. When thinking about your team's ability to continue in the future, are there conditions within your team that could eventually cause the team to break down or perform poorly, unless something is changed? Yes, No, or Possibly?

(V84—1 yes, 2 possibly, 3 no)

V018: I don't see it. Lot of personality conflicts ongoing, but none that are threat.

V019: 1, people are jumping on each other "cut throat" we are always worried that we may get laid off why should I work on this teaming stuff if I may get laid off tomorrow.
japan is more suited to teams with their "family" emphasis

V020: 3

V023: 2—communication, it's related to layoffs, people start worrying more about #1 themselves than about the "team"

V024: Difference of opinions/attitudes. No time bombs though.

V025: Morale. Lot depends on future of TI DSEG. Constant rumors about downsizing scares everyone.
V028.a: 3—we have to be careful with who we take onto the team. Man has someone who needs to be placed and so wants team to take them. We need to get the right person because of the type of work. We need to know computer programing and math. This will result in team perf. Dropping if you have to train him it is time consuming

V028.b: 2. Friction between people and communication problems. On the day shift 3–4 people do all the team stuff, everybody else is just running machines. 3rd shift is especially resented cause not doing team stuff. They are just running machines.

V029: 3 no ticking time bombs, problem with attitudes and personalities

V030: The uncertain job future since defense work is declining

V027: no, we know each other and what to expect

CP: Money. The issue of raises versus bonuses and the fact that they have no say-so over it. Squabbling over that.

Dey1: Only if everyone started having the attitude of the one person noted above

ch1: Possibly. There did seem to be some interpersonal friction (some comments were made about people not in the meeting that indicated some chronic bad relations - though these did not seem to be severe- more like chronic annoyances).

Dey2: No

deb: I think there were some strong personalities on the team, who could affect the team’s ability to perform optimally. At times, one of the team members seemed flippant, maybe for attention, but this could affect the other team members who are discussing issues seriously. Then again, it seemed like to other team members made allowances for this person and continued with the progress of the meeting. This was only 1 observation. Continuous observations would be required to see if this kind of response would eventually affect team performance.
STUDY QUESTION #1:

WHAT KINDS OF INFORMATION ARE NEEDED BY SELF-MANAGED TEAMS NEED TO PERFORM THEIR JOB TASKS.

Relation to competitors, market, new technologies

35. How important is it to your team's performance that team members collect information about competitors, the market, or new technologies?
   PROBE: Please explain.

v018: New technologies. Benchmarking other teams. They go talk to others.

v025: Benchmark against other TI Plants- Even went to Saturn Plant in Tenn

v027: don't know, we do bench marking, bill holly is our team resource for this

ch1: not at all

dey2: It is important that the team keep alert of new jobs that their team might choose to do or take over from another team. If they can't handle a job very well they might loose that job which would then make it more difficult to keep up their cost per unit since they would be producing fewer different things forcing them to produce more of the things they have left to produce

deb: Competitors - It seemed that the team's competitors were other teams within the organization who could bid for their work. In fact, on some of the parts where the team wasn't performing to base-line, someone suggested that another team may take those. Suppliers - The team discussed verifying the number of parts that come from the warehouse. New Technologies - Training and benchmarking were important items for this team.

Organizational Factors—Within Organization

Information

6.14. What information was most crucial to the team performing at a high level?

Dey1: Available machines throughout facility that team may make use of. Feedback about defects so could find solutions discussions of what work and what doesn't
177

ch1: work load, schedule, performance data

dey2: OPM—how they are doing
feedback on defects or other problems that have gone out

deb: Their OPM feedback with the exception that they wanted a more realistic baseline that considered quantity variables.

Feedback

28. Do you receive feedback from management?
(V112--2 yes, 1 somewhat, 0 no)
PROBE: What is the nature of the feedback and how is it useful?

v018: Long-range feedback about planning [actually this is feed forward].
Recognition for team performance, based on the OPM. JC (Crockett’s boss) has OPM and they gotta make it look good. Bonus money for his OPM and how well it looks. One of the things about this is that they have to prevent screwing up other teams by bottlenecking them (for instance by sending them a lot of completed product when that will throw their cycle time way off).

v020: when there are problems you get called to his office. we caused another team to have a high cycle time by giving them too much product. we didn’t realize this would happen and now that we know we are not giving them too much each day

v025: Crockett different than old mgr. (Mike Turner- a lot friendlier). Crockett is aloof. Doesn’t fraternize with the troops. He does interact with them when the OPM dips. [me- Crockett use aversive control in handling OPM?]

v027: don’t know, we use meetings to have it passed to us but first shift gets more

dey1: yes

ch1: yes, comments and notices of improvement

dey2: both positive and negative depending on particular perf. indicators looking at

deb: Yes, OPM charts. It is useful but the team feels some are unrealistic. Other information is available; however, it is considered too detailed and not used. Personal meetings with Dewayne and the manager are considered as explanatory to management and not useful as feedback to the team.
106. What is the nature of the feedback and how is it useful?

Deyl: The learn defects so can look for solutions

29. Do you receive feedback from internal or outside customers?
(V113--2 yes, 1 somewhat, 0 no)

PROBE: What is the nature of the feedback and how is it useful?

V018: Yes. They made up a form and fax it their customers (and to upper mgt) to get input.

V020: we have a customer survey. we’ll call them and ask how we are doing we’ll get calls about problems

V025: Yes.

V027: there are not a lot of customer dealings but first shift gets more, use team meetings

dey1: yes

chl: yes, internal, when quality problems

dey2: yes see above

deb: The team receives feedback from internal customers in the way of rejected parts. This feedback is useful so the team can make adjustments to production.

108. What is the nature of the feedback and how is it useful?

dey1: same as for man.

30. Do you receive feedback from your teammates?
(V114--2 yes, 1 somewhat, 0 no)

PROBE: What is the nature of the feedback and how is it useful?

V020: peer reviews, two years ago the whole team got together, this year each shift will get together separately

V025: Peer Evaluations- Doesn’t think they should be tied to money!! Others don’t have enough experience to evaluate under those circumstances. New PE
system. Most mature enough to handle it, some not. He doesn’t like it. It could get political. He doesn’t see any obvious solution to this though.

Dey1: yes

ch1: yes, during peer appraisals, not useful

dey2: yes, pos and neg helps them improve and see shortcomings

deb: Yes. The team is very open to communicating with each other. They discuss problems in an unthreatening, unaccusatory way. They use a constructive process. They discuss operations verbally in their meetings with input from everyone.

110. What is the nature of the feedback and how is it useful?

dey1: teach each other what works

STUDY QUESTION #2:

HOW DOES THE TEAM DECIDE WHAT INFORMATION IS NEEDED BY THE TEAM?

STUDY QUESTION #3:

HOW DO SELF-MANAGED GET THE INFORMATION NEEDED TO PERFORM THEIR JOB TASKS?

Teaming Process—External (Boundary Management)

Persons Outside Team

32. Are there persons outside your team who assist your team or are otherwise important to your team in getting the work done (other than management)?

PROBE: Who are these persons? How are they related to the team?


V018: M&T, Programming guys assist. He feels they can come right to him and cut out the bureaucracy.
v020: yes M&T machine and tooling although we have a M&T person on our team (Bill Holly)
computer related help
a cost man helps us


v027: M&T, Bill Holly can contract with outside customers. He says he could get us more work if they would let him. In one case we put 50K into a job he got and found out we couldn't do it because the machine needed wasn't available. This wasn't too good for him

dey1: not clear

ch1: machines and tooling

dey2: Schedulers, other experts who can assist in how to do a job, customers help them see problems they are having, there are several persons who move machines around for the team and these persons seem to be particularly important to the team

deb: Yes, during the meeting, team members were asked to volunteer to make contact with persons outside the team who they felt they had a special connection to. These people were either resources, other teams, or internal customers to the Precision team.

33. (If there are important persons) What happens when your team lacks support from these persons?

v018: It hurts performance.

Dey1: not clear

ch1: no

dey2: customers help them see problems they are having

34. (If there are important persons) What kinds of things does your team do to gain and maintain support from these persons?

PROBE: Are any of the persons on your team assigned the specific task of developing and maintaining good relationships with these persons? (Who are they?)
Sometimes ask, if no reply will go to their boss.

Depend on resource folks, M&T, Master scheduler.

we try to get job done in time or under time

no

they can put up internal persons for awards

No, certain team members work with man. More than others and so these persons would be more responsible

Need to keep information from outside persons

How important is it to your team's performance that your team keep certain information to itself. This might include, for example, facts that could hurt the team's image or product.

Some stuff might affect their reputation.

we have to play mind games. during a recent tour by Kodak three team members showed them around. don’t really tell them the truth “tell lies to visitors”

David is smart. he knows how to “pencil wip” the OPM numbers

can’t think of anything

In some cases we control the speed at which people work. a new person came in and started working to fast this was going to cause a big change in our weekly record keeping. management would begin to ask why there was a major change in the performance and it would suggested that we were performing to slow before. the person was told to slow down to prevent this problem so management would not starting asking questions.

Handled a discipline problem with a teammate by themselves (poor attendance).

No need to go outside.

Some people cheat (?)
I don’t know, we let out of our team that there was a lot of bickering regarding (camera episode I think or maybe it was over bonus and who would get what) and so no one wanted to join our team.

Feels personal stuff is nobody else’ business.

Hidden info. team will drop its number of units per hour so can stretch out the work for more days if the team doesn’t see any more work on the horizon. team usually sees a 3 week window as well as a 5-6 month window. Management has tried to compensate by saying that extra team members will be sent to help out other teams that need it. the problem is team members don’t want to be sent to other teams.

not sure

don’t know

Not so much important to perf. But to keeping man. On their side and in a round about way to their perf. Since if they start to get on man. Bad side he may start taking work away from the team and eventually the team could dissolve.

(If information kept within team) What kinds of things does your team do to keep this kind of information from going outside the team?

PROBE: Are any of the persons on your team assigned the specific task of making sure that such information is kept within the team? (Who are they?)

Keep mouth shut.

Keep it quiet.

Discuss what should go out and what shouldn’t. Those in contact with man.

“Where were the places” and ”who were the people” from which the team got the information it needed? Please briefly consider each of the following: management, customers, suppliers, others outside the organization (e.g., technicians), persons/teams inside the organization.

Not sure. I guess from customers who received the defective parts. From man. Regarding available machines as well as from other persons in the plant.
ch1: scheduler, plus data off the computer

dey2: Management, the computer seems to keep track since they punch in all that they do so they can get info from it. Customers provided feedback. Went to suppliers when had problems with materials

deb: The team referred several policy questions to management. Linda would assume responsibility for getting most of the information needed by the team. Team members volunteered to contact customers, suppliers, and members of other teams for information.

6.16 Which persons on the team were responsible for getting information for the team?

Dey1: Tool and machine person--responsible for making sure the team has all the tools and equipment needed each day. Manager, gives info about possible persons to bring onto team if they want to add one.

ch1: every star point got their own data

dey2: cost star point, scheduler, coordinator

deb: Linda was responsible for getting information from management. Dewayne was responsible for collecting information about performance. Other team members volunteered to collect information based upon their personal contacts.

STUDY QUESTION #4:

WHAT FACTORS "ENHANCE OR HINDER" EFFORTS BY SELF-MANAGED TEAMS TO GET INFORMATION NEEDED BY THE TEAM TO PERFORM TASKS?

62. How would you rate each of the following: commitment, communication, trust among team members, creativity, interpersonal skills. Please provide a brief statement about your evaluation of each—what has caused each to be at the level you perceive, and, what affect has each had on each of the intermediate factors (motivation, effort, knowledge, skill, use of appropriate strategies)?

Dey1: Commitment--high everyone wanting to improve and do well. Take pride in team
communication—willingness to disagree if it meant getting the facts correct
trust—that others would not tell man. If they wanted to complain although this
is harder to be sure of
creativity—high with new ways of doing things and finding new jobs to take
over from other teams
interpersonal skill—high since they can disagree friendly and find solutions
everything seemed to be less for the third shift which seemed to be tired (4
people).

Ch1: Commitment- High for 1-2 shift. Less so for 3rd
Communication- Could be better
Trust- Of management they are still a little suspicious. Among themselves
reasonable.
Creativity- couldn’t tell
Interpersonal skills- Good, but not excellent.

Dey2: Commitment, high they care about their team and job
comm. High willingness to disagree and stand by conviction but back down if
out voted so to speak
trust, seems to be high the team seems to be working as a unit trying to please
man.
Creativity, high team is looking for ways to improve strategy so can improve
per. And subsequently get a bonus

deb: On a scale of 1-5 (5 being the highest)
Commitment - 4 because they are committed to the goals of the organization
and the team; however, individuals have selfishly used overtime.
Communication - 5 This team communicated very openly to the benefit of the
team because it was constructive communication.
Trust - 5 This team was a unit and they shared successes and failures equally.
Creativity - 5 They were persistent about finding ways to improve.
Interpersonal skills - 4 There was a mix on the team. Some were very quiet,
which made it difficult to determine if they were actually in agreement. Several
on the team were very skilled at interpersonal exchange and they did assume
leadership roles in the meeting. There were also a few distractions by team
members but nothing serious.

I think each of these factors have had a direct effect on the intermediate factors
(motivation, effort, and use of appropriate strategies) for this team. The levels
of motivation and effort permit the team to use their knowledge and skills in an
unthreatening environment.
Dey1: Commitment—high everyone wanting to improve and do well. Take pride in team communication—willingness to disagree if it meant getting the facts correct trust—that others would not tell man. If they wanted to complain although this is harder to be sure of creativity—high with new ways of doing things and finding new jobs to take over from other teams interpersonal skill—high since they can disagree friendly and find solutions everything seemed to be less for third shift which seemed to be tired (4 people).

Ch1: Commitment- High for 1-2 shift. Less so for 3rd Communication- Could be better Trust- Of management they are still a little suspicious. Among themselves reasonable. Creativity- couldn’t tell Interpersonal skills- Good, but not excellent.

Dey2: Commitment, high they care about their team and job comm. High willingness to disagree and stand by conviction but back down if out voted so to speak trust, seems to be high the team seems to be working as a unit trying to please man. Creativity, high team is looking for ways to improve strategy so can improve per. And subsequently get a bonus

deb: On a scale of 1-5 (5 being the highest) Commitment - 4 because they are committed to the goals of the organization and the team; however, individuals have selfishly used overtime. Communication - 5 This team communicated very openly to the benefit of the team because it was constructive communication. Trust - 5 This team was a unit and they shared successes and failures equally. Creativity - 5 They were persistent about finding ways to improve. Interpersonal skills - 4 There was a mix on the team. Some were very quiet, which made it difficult to determine if they were actually in agreement. Several on the team were very skilled at interpersonal exchange and they did assume leadership roles in the meeting. There were also a few distractions by team members but nothing serious.

I think each of these factors have had a direct effect on the intermediate factors (motivation, effort, and use of appropriate strategies) for this team. The levels
of motivation and effort permit the team to use their knowledge and skills in an unthreatening environment.

63. Overall, what affect has the combined influence of these factors had on the team's performance? Please explain. On the intermediate factors? Please explain.

Dey1: Positive influence

ch1: Don't think they are communicating completely openly.

Dey2: positive

deb: Don't think they are communicating completely openly.

**How would you rate the team's “level of information available”:** (1) has all the information needed to perform at the highest levels, (2) lacks some information, or (3) lacks a lot of information needed. Please explain. Who or what was responsible for the lack of (or sufficiency of) information.

Dey1: Seems to have all information needed--finding new machines

ch1: 1

dey2: 1

deb: (1) It seemed that great efforts were made to provide the team with the information it needs to perform at a high level. Team meetings were emphasized. Training teaching members how to get the most out of a meeting was encouraged. If there was a question, the resource person immediately responded with information or a commitment to get the information for the team. The combined team was responsible for the sufficiency of information.


Dey1: Bring on a new machine which allows them to run an extra machine while still running their other machines. This results in high team rating, increased pride, changing their strategies so they could run more machines info about defects helped to improve defect ratio, increased k&s
The team needed enough information to make a decision but seemed to lose interest (motivation) with too much information. For example, the chemical explanation about water and oil atoms and how they attach in the order added was not considered critical information for making a decision about how to mix the solution.

Also, Dewayne expressed that other software charts were available to monitor work processes. However, he said he didn't use them because they had too much detail and were too hard to follow. In studying the OPM charts, Dewayne said he would like to have more historical information for comparison over longer periods of time. A resource person advised that the information was available. The team did not think the OPM base-line was realistic, but if they had more data, they could make better comparisons about performance, which would effect their effort and use of appropriate strategies.

**STUDY QUESTION #5:**

**ARE THERE DIFFERENCES IN INFORMATION-SEEKING BEHAVIOR AND COMMUNICATION ACTIVITIES OF HIGH-PERFORMING TEAMS VERSUS LOW-PERFORMING SELF-MANAGED TEAMS?**

**Stages of Development**

49. **Team Development**

M1: when a team is first developing it needs strong leadership. If it doesn’t have this one solution is to provide training to the team leader to help him/her develop,

when the team is at a stage where team members are arguing and disagreeing have them get in a room and tell two things good about each person on the team

it helped to bring all the star points for a particular task together and make sure they knew exactly what to do. then they could present to their team information related to their star point at each team meeting. this caused the other team members to take notice particularly when the star point identified for the team problems the team was having and began asking who had contributed to the problem. for example the “quality” star point may ask about a quality problem the team is having, some on the team members may question the judgement of the quality star point team member but then this person shows
them the data they have been taught how to use, this encourages the team members to then check into what the data are so they can know what the star point is talking about. In this way cross-training occurs and all the team members begin to learn the various star points responsibilities. It also increases the confidence of the star points.

49.1 Which best describes the team's level of development:
   a. just getting started,
   b. currently struggling with how it can best get its tasks accomplished
   c. effective working procedures have been developed and team members are becoming clear on what there responsibilities are,
   d. team members are clear on their responsibilities and most of their time is spent on performing the team's tasks.

Please explain.

Dey1: D. The team members are clear on their responsibilities they continually look at their defects, cost per unit, etc. and look for places to improve. The team has been very innovative in finding ways to reduce these.

Ch1: D. I think they are fairly high level. Meetings are focused on productivity measures and problem solving.

Dey2: D. Team clear on resp. Have star points for all important functions team members have such as coordinator, scheduling, safety, training

deb: d. In observing the team meeting, it was apparent that the team was well organized and they were clear about what their responsibilities are. Several made presentations about their area of responsibility as they worked through the agenda. The team is structured so that they all perform certain duties as well as general areas of responsibility for the team, i.e., safety, training, quality control, performance feedback, etc.
PERFORMANCE OF SELF-MANAGED WORK TEAMS:

A REPORT PREPARED FOR TI'S N/C PRECISION TEAM

by

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PERFORMANCE OF SELF-MANAGED WORK TEAMS:

A REPORT PREPARED FOR TI'S
N/C PRECISION TEAM

This report begins with a brief overview of the factors reported in the literature to be most important to a team's performance. The existence of these factors within the N/C Precision Team is considered during this overview. This is then followed by a discussion of several specific topics that emerged from our interviews with the NC Precision team members, including use of the Oregon Productivity Matrix (OPM), peer evaluations, bonuses, and team involvement in teaming activities. While we are providing you with a review of what consultants and researchers have reported and with what you have reported to us, you have the most direct knowledge about what makes a team work best. We are interested in meeting with the N/C Precision Team (NCP) to discuss this report. Please let us know if NCP would like to meet.

Overview of Factors Affecting Team Performance

High team performance is generally thought to involve customer satisfaction, cost effectiveness, the ability of the team to continue working together in the future, and the ability of the team to meet the team members' needs. A growing number of research studies are indicating that high team performance is the result of at least four groups of factors: the work process, teaming process, the environment within and outside the organization, and team design (see Figure 1). Each is reviewed below.

Team Performance. Overall, the N/C Precision team appears to be performing at a high level. Cost effectiveness is evident from improvements that have been made in the amount of work performed per team member. The large majority of team members indicated that personal needs are being met by the team. However, it was clear that personal needs and satisfaction of some team members would be better met in a more traditionally managed environment or with changes made to various aspects of the team such as the peer appraisal system and use of the OPM. Team members generally agreed that the team could continue working together at a high level in the future. While we have not yet spoken with a sample of the team's customers, TI managers have indicated that customers are routinely satisfied with the team's work.

Work process factors include the "procedures" followed for doing the work, the "effort" placed directly on doing the work, the "knowledge and skill" of the team members, and the "materials and equipment" used by the team. The work process of the NCP team appears to be at a high level. In-person interviews and observations indicated that most team members are highly knowledgeable and skilled and typically have the materials and equipment needed to perform at a high level. This is also indicated by the team's self-
assessment, where it scored itself higher than did other teams outside TI completing the self-assessment on these factors (see Table 1 attached). Similar conclusions are reached with regard to the effort placed on the work and the procedures used for doing the work. It should be noted that the team scored somewhat lower on motivation than did other teams (see Table 1), although the score is still high (3.7 of a 5.0 scale).

The **teaming process** includes the relationship that exists between team members and also between the team and persons and organizations outside the team. Relationships among NCP team members are varied. With a team this size, one can expect such variation. Comparisons with other SMWTs suggests that the team is at about the norm (see Table 1). This was also concluded from observations and in-person interviews. Typical observations were that the team's meetings "overlap nicely with shift 1 and 2 meeting together and then shift 2 and 3 meeting together." It was also noted that some factions exist within the team. While this is not the most desirable situation, it is to be expected with a team this size. Perhaps occasionally holding a team meeting with all members present (rather than by shifts) would help members to better understand others on the team.

It is important to the team's performance that it also have good relationships with persons outside the team and this appears to be the case. Typical examples are getting together with suppliers to correct problems, and support from methods and tooling. Some lack of support from engineering was noted.

The **environment surrounding the team** includes factors within the organization such as the reward, information, and education systems, and management support, as well as factors outside the organization such as the economic climate. Within TI, the information and education systems appear to be working well for this team, as indicated by in-person interviews and by comparing self-assessments of available information and training to that of other teams outside TI.

Personal recognition, fairness of pay, and whether team members receive valuable rewards for high performance were perceived to be somewhat lower (see Table 1). In particular, those on the third shift perceived these to be relatively low (3.0, 2.9, and 2.3) as compared to the first shift (4.2, 3.7, and 3.8), although still higher than teams outside TI. This was also noted during in-person interviews. Several team members noted that a high performing team member was not rewarded for his/her efforts with a bonus while another team member whose performance was lower received a large bonus. It was also generally felt that the third shift employees received less because they were less visible. A discussion of the bonus is provided in some detail below.

The team demonstrated a clear understanding of its goals and was challenged to look for ways to improve. The team's self-assessment of its creativity (4.2 on a five point scale)
was particularly high (see Table 1). This was also expressed during in-person interviews and observed at team meetings.

The team’s perception of management support was found to be about the norm when compared to teams outside TI (see Table 1). In-person interviews revealed, as is often found in SMWTs, that some team members were much more positive about management than others. For example, one member stated that “I’ve never seen management step in and make decisions for the team that were supposed to be made by the team”, while another team member’s perception was that “basically all of the main decisions are made by management...they override some of our decisions.” When asked what kinds of things management can do to help the team, the most common response was “give us freedom to do what we think is best” and “help us get what we need”. There was also a general sense that giving the team positive reinforcement, particularly during the OPM review, helps the team’s morale. When asked what kinds of things management can do to hinder the team, responses included “dictating” and “not supporting team decisions”.

When considering the environment outside TI, the team is troubled. The team is concerned that eventually there will not be any work. This uncertainty is having negative effects on the team members and can be expected to increasingly take away from the team’s “effort” on the task as they become preoccupied with this.

The team’s design includes the team’s methods for identifying the best work procedures, assignment of tasks, composition of the teams, and team size. The methods used for identifying “best procedures” appear to be highly effective, with valuable discussion and brainstorming occurring during team meetings when needed, as well as the creation of “sub-teams” to address important issues. The assignment of tasks appears to have evolved to a point where the third shift spends the large majority of its time “on the machines” while the first shift takes on the large majority of “teaming” activities as well as spending time on the machines. This seems to be working well and should continue to work well as long as each shift is satisfied with its roles and respects those being performed by the other. This relationship is discussed in more detail below (Individual Team Involvement). Related to the assignment of tasks is skill variety which appears to be somewhat lacking (see Table 1). Additional variety could be expected to improve “effort” as well as “knowledge and skill” within the team.

The team’s size is around 15 members (or larger) which is typically larger than desirable. However, about 3/4 of the team would like to see it larger and 1/4 would like to see it smaller (see Table 1). Generally, a smaller size would allow for more “teaming” activities per team member which might be beneficial. A smaller size could also be expected to improve the “teaming process”, such as by resulting in fewer or no factions within the team. Improved “teaming” can be expected to have positive affects on “effort” and subsequently performance. Also, a smaller team generally results in each team member
being more accountable for her or his work. And, there is more incentive among team members to help a lower performing member since the improvement of any single individual has more impact on the team's overall performance. A reason for not reducing the team's size is the current high performance level of the team and the desire to, as one person put it, "avoid ruining a good thing."

The composition of the team appears to support the teaming process.

Conclusions. The N/C Precision team is performing at a high level. Its characteristics with regard to work process, teaming process, environment and design would lead us to expect this to be the case. Several major issues that were raised are discussed below.

Topics That Emerged During In-Person Interviewing

While interviewing persons in the N/C Precision team (12 persons) four topics emerged and are presented below.

Oregon Productivity Matrix (OPM). The OPM provides the team with an opportunity to clarify its primary goals, weight them by importance, monitor the team's performance related to each goal, identify areas for improvement, and measure the team's continuous improvement over time. These are essential to high team performance as indicated by past research and our own experiences. However, as with any measurement device, the OPM opens up the opportunity for problems that can ultimately have negative effects on team performance. Two areas of concern among NC Precision (NCP) team members are how goals are set and how the OPM figures are used by management.

A general sense among team members is that management does not want to accept anything less than a 12% improvement on OPM figures every 6 months. However, this is perceived by team members to be unrealistic in some cases. In particular, it was emphasized by some that the actual percentage improvement can not be constant given that a learning curve allows for large improvements initially but smaller levels of improvement as knowledge is increased, equipment improved and procedures fine tuned—that is, performance is approaching "asymptote". Some team members reported the result of this is that some team members encourage others to avoid dramatic performance improvements because such spikes set the next cycle's goals impossibly high. In other words, the team informally develops a strategy of controlling its improvement so that gradual progress is the norm. This prevents the team from making big gains when possible. One solution to this problem is to not look for "linear" improvement over time since it is easier to make big improvements early, but harder later. In academic jargon a "negatively accelerating hyperbola" more than a "straight line" describes the path of performance improvement. With this in mind, and a knowledge of the kind of job at hand,
the percentages for improvement could be adjusted to allow for a lower percentage improvement once performance has begun to stabilize.

The OPM provides teams the opportunity to identify where improvements can be made. Team members should respond to the OPM figures by looking for ways to improve those areas that seem to leave the most opportunity for improvement. However, teams that use the OPM sometimes feel that it is being used, not only to identify opportunities for improvement, but also to criticize the team for sub-par performance. TI is not immune to such perceptions. In some cases, it was reported that team members spend a large portion of their time trying to figure out what to tell management so they won’t “get in trouble.” In these cases the OPM was perceived as a tool for management to examine why improvements are necessary rather than how improvements might be obtained. It was reported that even a dramatic improvement brings management scrutiny and investigation, presumably because there is a need to know why such high performance wasn’t occurring before. This suggests that special effort is needed to alleviate such fears. For example, management, in its discussions of the OPM with the team (or starpoints), may choose to make a more conscious effort to regularly identify positive results as well as areas needing improvement. If the OPM performance figures receive “green” as well as “red” lines to highlight levels of performance, perhaps the “green” lines could receive special attention as well as the “red” lines. It is important to note that some pressure and scrutiny from management about team performance is normal and needed. The difficulty is obtaining a balance between providing such scrutiny and allowing employees to work without being distracted by fear of reactions from management.

**Peer Evaluations.** TI has recently formalized the Peer Evaluation procedure by providing a 5 step guide entitled Personal Development Appraisal Process. As outside observers, this form appears particularly reasonable. Perhaps its strongest virtue is that it requires team members to be clear on its team’s goals and how team members can help the team best in reaching these goals. As one manager put it “the goals must drive the appraisal” and we strongly agree with this view based on our past observations of other “less high” performing teams. A second strength of the peer evaluation (PE) is that it allows team members to see how others view there work and to share with others how they perceive their own work. One team member commented that when all three shifts were together during the PE it allowed team members to see what was happening on other shifts and to better understand the problems that other shifts have.

So, we strongly endorse the 5 step guide. However, in order for the PE to have its best affect, team members must take the PE seriously, be honest in their evaluations, and take seriously the “suggestions for improvement” received from others. Ideally, team members would want to see their team be the “very best” it can be and approach the PE with this in mind. In a very “sensitive and caring” way team members would share their views on
“opportunities for improvement” and be open to what others perceive as “opportunities for improvement”. In this way team members would identify ways of improving their performance and ultimately the team’s performance.

While it might appear reasonable to expect this from team members, in-person interviews suggested that some team members perceive high “costs” associated with the PE and, consequently, these persons are unlikely to provide the effort needed to make it work unless they feel the benefits clearly outweigh the costs. The costs perceived to be associated with the PE include: (1) time needed to evaluate each team member, (2) time needed to formulate evaluations that are “sensitive and caring”, (3) a perception of cost associated with sharing one’s views that, no matter how sensitively they are put, might ultimately be viewed as a criticism of a team member and produce hard feelings, and (4) the possibility of receiving a poor PE.

It was suggested by some that team members will accept these costs as they begin to see that helping each other perform at a higher level (particularly helping low performers) will have the benefit of improving the team’s overall performance and ultimately increasing the team’s bonus money. This rationale makes the most sense where the team is relatively small (say 6 or fewer members) and the improvement of any single person will have a noticeable effect on the team’s overall performance, and makes less sense where the team is relatively large (say 15 or more persons) and the improvement of any single individual will have a less noticeable effect.

Linking the PE to individual bonuses could also be expected to cause team members to put the needed effort into the PE. However, there are a number of problems associated with this approach that would need to be overcome. In particular, some team members may choose not to be honest with others in fear of preventing them from getting a bonus, in fear of retribution, or in hopes of keeping them from getting a bonus. These are good reasons to avoid linking the PE to pay. On the other hand, it should be noted that the link between the PE and pay has been used at the University of North Texas with apparent success—while some faculty members did appear to “use” the PE for their own interests rather than being completely honest, overall, the PE appeared to work as intended with faculty members honestly evaluating the performance of their peers. In this case, the PE required individual comments to be given and received anonymously which may have helped to reduce, somewhat, fears of retribution.

It is also important to note that the PE will be most useful if those who are most familiar with a team member’s work have input during the PE process for that individual. For this reason, we suggest that doing the PE by shift should be given careful re-consideration. This approach will not allow team members to see how other shifts perceive things or allow some of those who know best how a person works to have input during the PE.
Alternatives would be to do it all together as done in the past or to create smaller sub-groups with each group having some persons from each shift on it.

**Raise/Bonus Money.** Raises and Bonus money provide the opportunity to reward those teams and individuals that have performed at a high level. They can be a motivator for high performance to the extent that they are perceived to be linked to performance. The difficulty is making it clear to team members that it is high performance that is being rewarded. Rewarding individuals becomes particularly difficult in the case of self-managed teams since management generally has a wider span of control—that is, more persons “under” him or her. Consequently, management is less familiar with the performance of the individuals. TI is not immune to this problem. Many team members reported confusion over the “criteria” used for determining individual bonuses. Questions were raised as to why most first shift team members got raises/bonuses while few if any second and third shift team members got them. With a lack of clear “criteria” for how raises/bonuses are determined team members are coming up with their own best guesses. Some suggested that team members get rewarded for making themselves “visible” to management, others suggested that rewards come by saying the things management wants to hear. Some felt that because their work schedule makes them less visible to management they were undervalued. Still others suggested that doing “teaming” activities provides more reward than actually “running the machines.”

It is reasonable to assume that some, if not a lot, of the confusion over how team members get bonuses or raises is because there are several different pools of money for team bonuses and merit pay adjustments. This confusion is only increased whenever there are routine changes to the systems as is occurring at TI. No doubt a re-emphasis and clarification of the criteria used for determining raises and the different bonus systems would help. Unfortunately, the current TI system is rather complex. (For example, as we understand it, all teams in the cost center may receive bonuses for meeting business goals on JC’s OPM. Individual teams are also eligible for team bonuses if they do well on their team OPMs and the teaming for excellence criteria, and management feels that team development is acceptable. In addition, merit pay or wage adjustments for individuals are partly based on market comparisons and partly on management’s judgment about the individual worker.)

As noted above, to the extent that raises and bonuses are based on management’s judgement of individual workers, problems can be expected. In the present case, management is forced to make judgments about upwards of 50 people with relatively little data. Consequently, it is unavoidable that some mis-judgements will be made. As one team member believed “one of my team members who is extremely good got nothing and another who is a good “bull shitter”, but does little work, got a lot.” Consequently, it’s not surprising that some reported wishing to have a say in who gets bonuses and who gets
raises. On the other hand, others reported that since they got a bonus they were happy with the system the way it is.

In our view, it makes most sense to let the team members determine how bonuses will be distributed. Management simply cannot be expected to have consistent information on all team members given the large span of control. Likewise, team members are most knowledgeable about the performance of individual team members. Of course, for teams to effectively distribute bonuses, they must be given sufficient time to make decisions on who gets what. Further, teams can be encouraged to develop a system for figuring out how to distribute bonus money. Letting the team distribute bonus money makes most sense for “mature” teams. However, perhaps letting all teams try it, even if they fail at first, would be best. Finally, guidelines that identify those factors that should be considered when distributing bonuses would be beneficial.

Individual Team Involvement. Ideally, it might be thought that all team members should be equally involved in teaming activities or at least moderately involved. On the N/C Precision team, it was found that more than a few team members simply do not particularly like the team concept. They would much prefer to do their machinist activities and let others do the “teaming” activities. Much of the dislike of “teaming” seems to stem from the new emphasis on teaming activities which, in their view, is overshadowing the traditional, historical emphasis on actually running parts on the machines. These persons typically feel that, what they are best at (machinist), is receiving less emphasis and is less valued in this new system. Similarly, many of these same persons are uncomfortable with the social skills required to get along with and confront their teammates when there is a problem. Some frankly admitted that working under a supervisor was easier in that the supervisor handled discipline problems and served as the focus for blame when workers felt mistreated by management.

The question then becomes how should this situation be resolved. Does everyone on a team, especially a large team like NCP, have to be fully involved in team duties? In the case of NCP, it appears that the team members have developed a solution. What seems to have evolved, gradually and with much emotional turmoil, is a kind of agreement or understanding that some team members will specialize in teaming duties while others, who wish to, will concentrate on running parts. A good degree of respect appears to have subsequently developed among all team members. While this may not be ideal, it appears to be a stable solution to the problem as long as it truly is an understanding among team members, and as long as team members are not “punished” for being less involved in teaming activities. However, such a solution might not work for a smaller team where the distribution of teaming activities would need to include all team members more fully.
APPENDIX H

SUMMARY OF DATA FOR PAVEWAY I

(TOUCHUP) TEAM
PAVEWAY I TEAM (Touchup)
ALL DATA COLLECTED

Dawn Steward = D
Star point: Backup for Safety
When did you join the team: on the team for 10 years
How long have you been with TI: 14 years and 5 months
How many people on the team: 3 on 2nd shift for a total of 13 people with the technician. Sandra is out with carpal tunnel syndrome because of a lot of wrist action to do the job.
Shift: 1

Jurl Dean Patrick = J
When did you join the team: has been on team for 6 months, this is her 1st soldering job
How long have you been with TI: 10 years, came from Control Line Team, which is also under Sean
Shift: 1

Marion Hawkins = M
Star point: Cycle Time
When did you join the team: October 1994
How long have you been with TI: 7 years
Shift: permanent on 2nd shift, currently on temporary shift (She is on 2nd shift to finish up jobs and do clean up.
She came to this interview directly from a meeting with Sean re team problems and shared the following: we have to find a new way of doing the work, don't take statements personally, and consider the principle and if someone comments on the work ask if they have any suggestions for how to do it better.

M1 - Barry Johnson (Manager's Interviews) Is on the Design for Cost Team of the Paveway Manufacturing Operations since August 1994. They support Paveway Operations with cost data. There are 12 managers total on his side of operations. Is currently on the design for teaming shop team and the integrated products team. The first deals with improving the internal teams and the latter to external factors such as purchases and materials.

M2 - Bill Crockett (Manager's Interviews) we had quality circles or effectiveness teams in early 80's then moved to teams. we assigned star points at suggestion of consultant. We brought together all the star points for one area such as scheduling and taught them all how to do it then we brought together all persons from another and taught them how to do it. This helped the teams to start working on their own. Bill has been there since the beginning of teams. They started with Quality Circles and Effectiveness Teams in the early 1980s. Then they went to voluntary cell teams. Half were on the team and half
weren't. It was a real struggle. In 1988 they decided that teaming would be mandatory. In 1990 Teams 2000 started with Barry Johnson starting up the starpoints system. Starpoints currently have notebooks and instruction manuals.

Observation of meeting #1 = ch1
Observation of meeting #2 = db2 (special mtg. Called by Sean because of team problems)

History/background (note: questions 1-3 are only for first few interviewed until facts are clear)

Let me start by saying your answers will be kept strictly confidential.

1. Could you please give us a background of the team? When was it first formed, how was it put together, and how were team members prepared for working on the team?

D Team developed when Harm team was shut down, then everything was transferred over to Paveway. Our team started with brainstorming (like quality circles). We still don't have a lot of control for decision-making. It will come.

Team coordinator position is voluntary. If several volunteer, the position is rotated (everyone just gets in line for the role). The coordinator represents the team. Our current primary coordinator is Sandra and Gloria is the backup.

J I heard that Touchup was a bad team. I was arbitrarily moved by management from the Control Line team to the Touchup team about 6 months ago. The Touchup team has 5 people on leave.

Characteristics of the work/tasks

2. What is the team's primary task or tasks?

D Working on government contracts for Paveway. This team does the printing and wiring of boards.

J Our team does a system of boards. They work exclusively with the boards. They add things to the boards, then test them.
3. **Who are the team's customers and suppliers?**

D Team's customer is the encap team, which is internal. Encap team encapsulates the boards (dips, etc.) and sets them on the shelf for use.

J Their suppliers are stuff people, auto insert, and flow solder. The supplier does not test the boards. They send the boards to the Touchup team to inspect before putting on a test set.

Their customers are encap team who wash, mask, and dip the boards in a special coating.

M Supplier: receives boards from flow solder.

**Performance**

**Performance: Quantity, Quality, Timeliness**

4. How do you know when the team is performing at a high level with regard to the quantity, quality, and timeliness of the work completed?

**PROBE:** What measures are used for each?

D Quantity: Our goal is on-time delivery based upon the number of units we get out everyday. This is called kan ban attainment and it is documented on a chart sheet. Kan ban is based upon unit number per day. If we are short on units completed that day, we have to add a written explanation at the bottom of the kan ban chart to give management a picture. There is a production meeting held every day, which is attended by all team production star points. We use a pull through system as a goal for producing the quantity needed. Kan ban is daily and is based upon what can be done, what is needed, and what is done. Long-term goals are cumulative daily goals. For example, 12 units are required a day; therefore, 60 are required by the end of the week.

Quality: Sandra is the primary recap person. We receive defects from the other side. The inspection operator fills out a chart showing the defect code, number, and location. These charts are used to compile defects per unit (DPU) and sigma levels, which are included on the back of the AWO. They use continuous improvement which is looking for ways to improve the process.

The operator who passed it on usually repairs the board. If the problem is electrical, they assume responsibility for repair to reinforce continuous
We inspect and stamp our own boards. Sample defects can be missing ports and solder defects. There is a visual and an electrical test of the boards. Quality is audited by the DPRO (government officers) and documented to quality control. It doesn't count as a mistake until it leaves the operator. Example of solder defects to be documented that could cause a test set to fail is soldering 2 transistors.

Our goal is to stay up with catch ball and to keep up with all star points.

Quantity: We are not a good team. Steve Stevenson is our plant manager. We use kanban attainment to measure quantity and our goal is to produce 12 units of 7 different boards a day.

Quality: Defects per unit (DPU) are logged on the computer. We test visually inspect the boards before sending them to be electrical testing. We only get to look at them for 2 minutes. A wrong value of a transistor can be missed easily with visual testing and if sent on to the electrical test the board could blow. We can catch solder defects and solder bridges visually.

NOTE RECOMMENDATION: Check expensive parts first using a priority checklist and track the number of defects of expensive components.

The team is tracking defect codes and parts. The team also receives training for quality improvement. In training, they are given 10 boards with errors to see if they are consistent with error detection. This is an attempt to standardize error detection.

Quantity: We have a scheduled quantity of boards to do everyday. The nominal quantity is 12 plus whatever they take must be replaced. There is a system for improvement—it's more about continuous improvement. They have plans to do some long-term planning and looking at 6 week productivity. How can we improve? Also, cycle time on boards will be color coded on charts to determine why some boards take longer and how we can improve on cycle time for those boards.

Quality: When we find defects, we fill out charts. Our job includes finding other people's mistakes. People who are behind can look on the computer to identify defects. Defects can be tracked to help us look for ways to prevent defects. We touchup other teams' work.

What do you see as the strengths and weaknesses of the team?
4.5 How would you rate the team's overall performance?

4.6 Would you rate the team's performance as exceptional, above average, average, below average, or extremely poor? Why would you rate them this way? Who are you comparing them to when making this judgment?

Ch1 AT THIS POINT, NO WAY TO COMPARE EXACTLY. HOWEVER, THEIR MEETING DID LOOK LESS SMOOTH THAN THE HARM F/W TEAM. PART OF THIS MAY HAVE BEEN DUE TO THE FACT THAT THE MEETING ROOM WAS ON THE SHOP FLOOR AND ROOFLESS (THEREFORE NOISY, WITH MANY AUDITORY DISTRACTIONS).

4.7 Which three factors (ranked if possible) would you say had the most positive impact on the team's performance. Please explain each.

Ch1 DON'T KNOW

Performance: Capability to Continue

5. When thinking about the team's ability to continue as a team in the future, are there conditions within the team that could eventually cause the team to break down or perform poorly, unless something is changed? Yes, No, or Possibly?

Ch1 SOME TEAM MEMBERS MENTIONED THAT THEY WERE LOSING PERSONNEL (LEAVES?) AND THEY WOULD NEED MORE PEOPLE. THE FACILITATOR SAID THAT THERE WERE SOME TEAM MEMBERS THAT WERE PRETTY NEGATIVE ABOUT EVERYTHING, AND THAT MIGHT AFFECT THE TEAM ADVERSELY.

D Management goes to individual team members instead of sharing information with the whole team. Sean talks to the coordinator instead of the backup. This effects the ability to build team trust. Sean doesn't think.

It takes too long for management to respond with help for the team when the team has asked for their help. Because the team has to carry weak team members until management makes a decision and solves the problem.

There are weak links in our team. Each operator fills out a daily report showing units completed that day. This way we can identify the weak links. Team members should never say I can't. What they are really saying is that they
won't. Team members should trade off work that they do better and be willing to help each other.

J Management goes to individual team members instead of sharing information with the whole team. Sean talks to the coordinator instead of the backup. This effects the ability to build team trust. Sean doesn't think.

It takes too long for management to respond with help for the team when the team has asked for their help. Because the team has to carry weak team members until management makes a decision and solves the problem.

There are weak links in our team. Each operator fills out a daily report showing units completed that day. This way we can identify the weak links. Team members should never say I can't. What they are really saying is that they won't. Team members should trade off work that they do better and be willing to help each other.

M no

STUDY QUESTION #1:

WHAT KINDS OF INFORMATION DO SELF-MANAGED TEAMS NEED TO PERFORM THEIR JOB TASKS.

Pg. 1, No.5. Managers and co-workers often let me know how well they think I am performing.

Relation to competitors, market, new technologies

35. How important is it to your team’s performance that team members collect information about competitors, the market, or new technologies? PROBE: Please explain.

Ch1 DON'T KNOW

Organizational Factors—Within Organization

Information

39.5 What information is crucial to the team’s success?

CH1 NOT CLEAR
STUDY QUESTION #2:

HOW DOES THE TEAM DECIDE WHAT INFORMATION IS NEEDED BY THE TEAM?

18. Do team members tend to avoid making suggestions that might conflict with those already made by another team member?

M yes. Our team is divided so we don't listen to suggestions. They let the loud people have the authority so some of us just don't make a suggestion because we are criticized when we do. Jay is our facilitator but Jay is quiet too.

19. How important is it that everyone agree before making a team decision?

Ch1 DID NOTICE THAT SEVERAL TIMES THE LEADER ASKED FOR CONSENSUS

M The team has the responsibility to decide how to change the work processes. The team has the authority to make decisions--We're just not flowing. Management says we must come to a consensus, but we can't. For example, we couldn't come to a consensus whether or not to work a 4 day workweek so we could have Memorial Day off. The majority (7) wanted off and the minority (3) said no and wouldn't concede. It's very important for a team to be able to come to consensus but our team only agrees by default.

STUDY QUESTION #3:

HOW DO SELF-MANAGED GET THE INFORMATION NEEDED TO PERFORM THEIR JOB TASKS?

Teaming Process--External (Boundary Management)

Persons Outside Team

32.1 Are there persons outside the team but within the same organization who assist the team or are otherwise important to the team in getting the work done (other than management)?

Ch1 WELL, THE FACILITATOR WAS LEADING THE MEETING, SO SHE MUST BE VERY IMPORTANT.

Need to keep info from outside persons
39. How important is it to the team's performance that the team keep certain information to itself? This might include, for example, facts that could hurt the team's image or product.

Chl NOT CLEAR

17. When making a team decision, do the team members with the most knowledge about the issue have the most influence on the decision made?

M Some of the quiet team members have great ideas but don't project them. I am quiet and I get very frustrated.

STUDY QUESTION #4:

WHAT FACTORS "ENHANCE OR HINDER" EFFORTS BY SELF-MANAGED TEAMS TO GET INFORMATION NEEDED BY THE TEAM TO PERFORM TASKS?

7.2 How would you rate each of the following: commitment, communication, trust among team members, creativity/innovation, interpersonal skills. Please provide a brief statement about your evaluation of each—what has caused each to be at the level you perceive, and, what affect has each had on each of the intermediate factors (motivation, effort, knowledge, skill, use of appropriate strategies)?

Chl COMMITMENT LOOKED SUSPECT. COMMUNICATION WAS OK. DON'T KNOW ABOUT THE OTHERS.

D Management goes to individual team members instead of sharing information with the whole team. Sean talks to the coordinator instead of the backup. This effects the ability to build team trust. Sean doesn't think.

6.17 How would you rate the team's "level of information available": (1) has all the information needed to perform at the highest levels, (2) lacks some information, or (3) lacks a lot of information needed. Please explain. Who or what was responsible for the lack of (or sufficiency of) information.

Chl AS SAID BEFORE, LACKED INFO ABOUT SOME BASIC ITEMS ON CATCHBALL CHART.

6.18 How did the amount of information available affect the team's performance? Motivation? Effort? Use of appropriate strategies?
Knowledge and skill? Boundary management? Please address each briefly.

Probe: holds regular team meetings
No formal meetings. I talked to Sean and now he is going to hold meetings with our team everyday.

M Probe: holds regular team meetings
We hold meetings, do a lot of talking; however, no minutes are taken and nothing is decided. We have someone assigned on the team to take minutes but they don't. So one day at a team meeting I was taking notes but was told to stop because that was not my job—it was the note taker's job. I want to be on a good team.

STUDY QUESTION #5:

ARE THERE DIFFERENCES IN INFORMATION-SEEKING BEHAVIOR AND COMMUNICATION ACTIVITIES OF HIGH-PERFORMING TEAMS VERSUS LOW-PERFORMING SELF-MANAGED TEAMS?

Stages of Development

49. Team Development

M1: when a team is first developing it needs strong leadership. if it doesn't have this one solution is to provide training to the team leader to help him/her develop, when the team is at a stage where team members are arguing and disagreeing have them get in a room and tell two things good about each person on the team it helped to bring all the star points for a particular task together and make sure they knew exactly what to do then they could present to their team information related to their star point at each team meeting this caused the other team members to take notice particularly when the star point identified for the team problems the team was having and began asking who had contributed to the problem for example the "quality" star point may ask about a quality problem the team is having, some on the team members may question the judgement of the quality star point team member but then this person shows them the data they have been taught how to use, this encourages the team members to then check into what the data are so they can know what the star point is talking about in this way cross-training occurs and all the team
members begin to learn the various starpoints responsibilities. It also increases the confidence of the star points.

49.1 Which best describes the team's level of development:
   
a. Just getting started
b. Currently struggling with how it can best get its tasks accomplished
c. Effective working procedures have been developed and team members are becoming clear on what their responsibilities are,
d. Team members are clear on their responsibilities and most of their time is spent on performing the team's tasks

Please explain.

Ch1 EITHER A OR B. THE FACILITATOR DESCRIBED THEM AS "NOT A VERY MATURE TEAM". SHE WAS GOING OVER AND EXPLAINING THE "CATCHBALL" DATA SHEET TO THEM TO MAKE SURE EVERYONE UNDERSTOOD IT.

9. Finally, if you could discuss one issue in an open way, involving the whole team in the discussion, what would that issue be?

J Everything is changing too fast.
Our team cannot come to agreement.
Our team membership has changed (1 is not TQC so she can't check her own boards and another 1 is restricted).
We have 5 people on leave--our team needs help.
You need to talk to Brenda. She's been out for 6 weeks.

Note to Dale & Cloyd: Jurl Dean requested a new survey to fill out because she was too new to respond to the initial survey and wants to give new responses.

People have to understand that a person with only 6 months' experience can't keep up with a person with 15 years' experience. She (Dawn) thinks I don't care because I can't keep up. I am getting better and have continuous improvement. I do try, however, currently I have to use overtime to keep up. You can see that I am improving, it just takes time to become quick. I didn't document my work at first but now I am documenting my improvement.

M I came to Touchup from the Control Team. The Control Team used to be as bad as this team but they worked through it and now they are a good team. Some of the people on the Control Team who worked through the process that you might want to talk to are Iona Ellis, Gail Grant, and Opal Southerland.
There is separation in the team. We need to listen for better ways to do work. I like change but not everyone does.

9.3 How do you handle team overhead and have you found that some star points require more overhead time than others?

48. Finally, if you could change one thing in order to help your team reach its productivity, quality, and/or scheduling goals, what would it be?

M I would improve our communication, cooperation, build team trust (oneness in being a team and being together). The bonus procedure is contradictory to feeling like a team because it is awarded to individuals instead of to teams. There is an attitude that the ones who get bonuses are better at backstabbing and brown-nosing. 2 out of 12 on our team got a bonus. Before I came to the Touchup Team I got bonuses but now I don't get bonuses. I want to be recognized individually for my efforts. Management moved 2 strong people to Touchup.
REFERENCES


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