

Effective Project Leadership in Complex Self-Directed Team Environments

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Abstract Project performance is not determined merely by the type of management tools and processes used, but depends largely on *the way in which these tools are integrated with the work process and the project team* to support the activities toward scope, quality, time and cost objectives. Based on field research of best-in-class practices, the paper discusses leadership style effectiveness, including the criteria for using management tools and techniques effectively in team-centered work environments. The paper concludes that project performance is strongly influenced by leadership style and the integration of the management tools with the team and the project management process.

A New Business Environment

For several decades, the complexities of our business environment and its projects have steadily increased, both in work and organizational dimensions, requiring strong multidisciplinary job skills, evolving solutions, innovation, cross-functional teamwork and decision-making, intricate multi-company alliances and highly complex forms of work integration (Barner, 1997; Marshall, 1994). Project success relies to a considerable extent on member-generated performance norms and work processes, rather than supervision, policies and procedures (Zenger, 1989). Further, self-directed teams are gradually replacing the traditional, more hierarchically structured project team (Engel, 1997; Fisher, 1993; Shonk, 1996), and have become an important vehicle for orchestrating and managing these projects. In addition, companies are investing heavily in new project management tools and techniques (Rigby, 1995; Thamhain, 1997), ranging from computer software for sophisticated schedule and budget tracking to intricate organizational process designs, such as concurrent engineering and stage-gate protocols (Thamhain, 1996).

While this shift to more sophisticated tools and processes is the result of changing business cultures, project complexities, technological capabilities, and market structures, it also requires radical departures from traditional management philosophy and operating practices on organization, motivation, leadership and project control (Gupta & Wilemon, 1996; Shaw & Randolph, 1991). As a result, traditional management tools and processes, designed largely for top-down control and centralized command and communications, are no longer sufficient for generating satisfactory results. The new project management tools that evolved are often more integrated with the business process and offer more sophisticated capabilities for project tracking and control in an environment that is not only different in culture, but also has to deal with a broad spectrum of contemporary challenges, such as time-to-market, accelerating technologies, innovation, resource limitations, technical complexities, project metrics, operational dynamics, risk, and uncertainty (Trichy & Ulrich, 1984; Thamhain, 1997). Yet, many managers find that these modern tools also requires new skills and a more sophisticated management style. All of this has a profound impact on the way project leaders must manage and lead. The methods of communication, decision making, soliciting commitment, and risk sharing are shifting constantly away from a centralized, autocratic management style to a team-centered, more self-directed form of project control. Equally important, project control has radically departed from its narrow

focus of satisfying schedule and budget constraints to a much broader and more balanced managerial approach which focuses on the effective search for solutions to complex problems. This requires trade-offs among many parameters, such as creativity, change-orientation, quality *and* traditional schedule and budget constraints (Hatfield, 1995). Control also relies on team members' accountability and commitment toward the project objectives (Shonk, 1996; Trichy & Ulrich, 1984). Responding to the challenges of today's project undertakings and the limitations of traditional controls, a large number of new concepts, tools, and techniques evolved, promising more effective alternatives and enhancements to traditional forms of project control. Moreover, managerial focus has shifted from the mechanics of controlling projects according to established schedules and budgets, to the challenges of integrating project management tools effectively with the project team. Success for today's projects often depends on innovative solutions to complex problems, and flexible change-oriented implementation of the project plan. Field studies consistently show that traditional methods with their strict focus on schedule/budget tracking and control are often useless and can be even counterproductive to overall project performance (Cash & Fox, 1992; Hatfield, 1995, Thamhain, 1996).

An Increased Focus on Team Building

Teamwork is not a new idea. The basic concepts of organizing and managing teams go back in history to biblical times and teamwork has long been considered an effective device to enhance organizational effectiveness. Since the discovery of the importance of social phenomena in the classic Hawthorne studies by Roethlingsberger and Dickinson (1939), management theorists and practitioners have tried to enhance group identity and cohesion in the workplace (Dyer, 1977). In fact, much of the human relations movement that occurred in the decades following Hawthorne is based on a group concept. McGregor's (1960) theory Y, for example, spells out the criteria for an effective work group, and Likert (1961) called his highest form of management the participating group or system 4. However, the process of team building becomes more complex and requires more specialized management skills as bureaucratic hierarchies decline and teams operate more as cross-functional networks. In these organizations, horizontally oriented work teams became increasingly important to effective project management (Fisher, 1993; Marshall, 1995; Shonk, 1996). These teams became the conduit for transferring information, technology, and work concepts across functional lines quickly, predictably, and within given resource restraints.

Typical examples of such contemporary teams range from dedicated venture groups, often called *skunk works*, to product development teams, process action teams, and focus groups. These team concepts are being applied to different forms of project activities in areas of products, services, acquisition efforts, political election campaigns, and foreign assistance programs. For these kinds of highly multifunctional and nonlinear processes, researchers stress the need for strong integration and orchestration of cross-functional activities, linking the various work groups into a unified project team that focuses energy and integrates all subtasks toward desired results. Further, the life cycle of these teams often spans across the complete project, not just the phase of primary engagement. For example, the primary mission of the product development team may focus on the engineering phase, but the team also supports activities ranging from recognition of

an opportunity, to feasibility analysis, bid proposals, licensing, subcontracting, transferring technology to manufacturing, distribution and field service. While these realities hold for most team efforts in today's work environment, they are especially pronounced for efforts which are associated with risk, uncertainty, creativity, and team diversity such as high-technology and/or multinational projects. These are also the work environments that first departed from traditional hierarchical team structures and tried more self-directed and network-based concepts (Fisher, 1993; Ouchi, 1993).

Scope, Objective and Method

This paper reports part of an ongoing field study into best-in-class project management practices, investigating the way project leaders use modern management tools and techniques in complex, mostly technology-intensive project situations, involving by-and-large self-directed teams. The objective of this study is to define effective methods and criteria for integrating modern project management tools and techniques within the work process of today's team-centered organization. The study was conducted over the last two years and includes surveys of over 400 project professionals. Specifically, the study includes data from 186 engineers, scientists, and technicians, 23 supervisors, 138 project team leaders, 28 project managers, 10 directors of R&D, 9 directors of marketing, and 10 general management executives. Together, the data covered over 180 projects in the area of product/service developments with budgets averaging \$1,200,000 each. The host companies are large technology-based multinational companies of the "Fortune-1000" category. Data were collected between 1994 and 1997 by questionnaires and two qualitative methods: *participant observation* and *in-depth retrospective interviewing*. The purpose of this combined data collection method was to cast the broadest possible information-gathering net to identify the tools, techniques and practices used for managing technical projects today, and to gain insight into applications, methods and effectiveness.

Barriers to Effective Team Performance

Work groups, such as project teams, are subject to all of the phenomena known as group dynamics. They are highly visible and focused, and often take on a special significance and status commensurate with expectations of performance. Although these groups bring significant energy and perspective to a task, the possibilities of malfunctions are great. A myth is that the assembly of talented and committed individuals automatically results in synergy and renders such a team impervious to many of the barriers commonly found in a project team environment. These barriers are quite natural and predictable, however they must be managed. Understanding these barriers, their potential causes and influencing factors, is an important prerequisite for managing teams effectively toward desired innovative results. Content analysis of the survey data, from the three sources (1) interviews, (2) questionnaires and (3) observations, was used to identify the most common barriers to innovative team performance. Measures of project performance included (1) the ability to adapt to changing situations, (2) adhere to established schedules, (3) produce quality results, and (4) to perform within established resource limitations. The criticality of these four parameters to overall project success was given by managers in the above order. The principal barriers to project performance are summarized below in four major categories:

1. Different Points of View. The purpose of a project team is to harness divergent skills and talents to integrate innovative concepts toward established objectives. Having drawn upon varying talents, laboratories or perhaps even different support organizations, there is the strong likelihood that team members will naturally see the world from their own unique point of view. There is tendency to stereotype and devalue "other" views. Such tendencies are heightened when the engineering project involves support groups from the broader organization, such as manufacturing, marketing and legal, with different work cultures, norms, values, needs and interests. Further, these barriers are often particularly strong in highly technical project situations where members speak their own codes and languages.

2. Role Conflict. Project or matrix-based organizations are not only the product of ambiguity; they create ambiguity as well. Team members must often act in multiple roles and report to different leaders, possibly creating conflicting loyalties. Team members with such multiple accountabilities often do not know which constituency to satisfy. Especially in self-directed team environments, the "home" group or department has a set of expectations that might be at variance with the project team organization. For example, a department may be run in a very mechanistic, hierarchical fashion while the project team may be more democratic, participatory and self-managed. Team members might also experience time conflicts due to multiple task assignments which overlay and compete with traditional job responsibilities. The pull from these conflicting forces can either be exhilarating or a source of considerable tension for individual team members.

3. Power Struggles. Conflict can also occur vertically as different authority levels are often represented on the team. Individuals who occupy powerful positions elsewhere in the organization might exercise that influence in the group. Often such attempts to impose ideas or to exert leadership over the group are met with resistance, especially in self-directed groups that operate with a minimum of hierarchical structure, command and control. An example of such power struggles occurred in an R&D-oriented *process action team*. The team was set up as a collaborative employee-management group to resolve a stubborn technology transfer problem. The membership of this group was changed half way through the assignment to include more senior managers. When the managers came aboard, they continued in the role of "manager" rather than "team member". Subsequently, the weekly meetings became more like typical staff meetings rather than creative problem solving sessions. Eventually the barrier was removed when the more senior team members recognized their impeding behavior and became less assertive, at the expense of "self-directed" team performance. While some struggle for power is inevitable in a diverse group, it must be managed to minimize potentially destructive consequences.

4. Group Think. This common group phenomenon refers to the tendency for a highly cohesive team to develop a sense of detachment and elitism. It can particularly afflict groups that work on special highly visible projects. In an effort to maintain cohesion, the group creates illusions of invulnerability and unanimity. It affects particularly decision-making and creativity. There is a reluctance to examine different points of view as these are seen as dangerous to the group's existence. As a result, group members may censor their opinions as the group rationalizes the inherent quality and morality of its decisions.

Influences of Work Environment on Team Performance

Managers are pointing at the removal of these barriers as crucial for building a work environment that is conducive to high project team performance. These conditions seem to affect motivation and commitment of individual team members, cross-functional communications, command, control, and decision-making, as well as alliances with support organizations, and ultimately, overall project performance. However, more rigorous statistical tests must be performed before conclusions can be drawn on the affects of certain conditions of the team environment. Additional investigations of the work environment show indeed that those conditions, which are conducive to a *professionally stimulating work environment*, also lead to (1) a high ability to cope with changes, (2) favorable time-to-market performance, (3) quality work, (4) effective resource utilization, and ultimately (5) high levels of innovative team performance. Specifically, Exhibit 1 reports the eleven most significant correlation of organizational variables and team performance measures.

Exhibit 1.

The Strongest Drivers Toward Effective Team Performance (Kendall's Tau Rank-Order Correlation)

CHARACTERISTICS OF WORK ENVIRONMENT *	PROJECT TEAM PERFORMANCE AS MEASURED BY #				
	Ability to Change τ_1	Time-to-Mkt Performance τ_2	Project Quality τ_3	Resource Effectiveness τ_4	Overall Project Performance τ_5
Interesting, Stimulating Work	.32	.38	.43	.36	.41
Recognition & Accomplishment	.39	.42	.40	.41	.39
Conflict & Problem Resolution	.30	.27	.35	.33	.37
Clear Understanding of Market	.46	.37	.25	.24	.36
Clear Underst of Org Interfaces	.42	.22	.21	.22	.35
Direction & Leadership	.40	.37	.34	.32	.33
Good Communications, Trust	.33	.33	.31	.28	.30
Job Skills & Expertise	.21	.28	.30	.24	.28
Low Interpersonal Conflict	.28	.25	.26	.26	.27
Involvement in Project Planning	.33	.41	.28	.38	.25
Project Management Tools	.31	.42	.26	.37	.22

*As perceived by project team members on a five-point scale (1) strongly disagree, (2) disagree, (3) neutral, (4) agree, and (5) strongly agree.

As perceived by senior management on a four-point scale (1) poor, (2) marginal, (3) good, and (4) excellent.

Statistical Significance: $p=.10$ ($\tau > .20$), $p=.05$ ($\tau > .31$), $p=.01$ ($\tau > .36$)

The presence and strength of these organizational variables were measured on a five-point scale as a perception of project team members, while project team performance was measured as a perception of senior management on a four-point scale as discussed in the method section of this paper¹. Kendall's Tau rank-order correlation coefficients were computed to measure the association between organizational variables and team performance. As indicated by the strong positive correlation shown in Exhibit 1, factors which fulfill professional esteem needs seem to have a particularly strong influence on project effectiveness and performance. The three most significant associations are: (1) professionally stimulating and challenging work environments [$\tau=.41$], (2) recognition of accomplishments [$\tau=.39$], and (3) the ability to resolve conflict and problems [$\tau=.37$]. All of these factors, correlating favorably to innovative team performance, appear to deal effectively with the integration of the personal goals and needs of team member with the project and organizational goals. In this context, these more subtle factors seem to become catalysts for cross-functional communications, information sharing, and ultimate integration of the project team with focus on desired results. The other factors in the Table with strongly favorable correlation relate to job knowledge, skills, management, and business process. All associations are significant at $p=.1$ or better. The implications and lessons learned from the broader context of this field study are summarized below.

Criteria of Effective Team Management

The rich experiences of the 180 project teams and their leaders reveal vital lessons and perspectives for effective team management and project performance. This section summarizes what we have learned from the field study regarding the critical factors that drive project team performance. The common lines which run through all of these criteria involve primarily leadership, support systems, and professional the work environment. The discussions are grouped into ten categories as shown below.

1. Project Assignment Must be Clear. Although the overall task assignment, its scope, and objectives might have been discussed with the team members during the initial sign-on to the project, it takes additional effort and involvement for the team members to feel comfortable with the assignment. The thorough understanding of the task requirements comes usually with the intense personal involvement of the project team. Such involvement can be enhanced by assigning specific members to an action-oriented task that requires team involvement and creates visibility, such as a requirements analysis, an interface specification, or producibility study. In addition, any committee-type activity, presentation, or data gathering will help to involve especially new team members and facilitate integration. It also will enable people to better understand their specific tasks and roles in the overall team effort. Further, the overall project objectives and their importance to the organization should be clear to all personnel who get involved with the project. Senior management can help develop a "priority image" and communicate the basic project parameters and management guidelines.

2. Assistance in Problem Solving. Team members look toward their leaders within their project

¹ The specific measures and evaluation procedures are discussed in more detail in the *Method Section* of this paper.

organization as well as the externally for assistance in solving technical organizational, or people problems. Team leaders are facilitators who should see problems at their early stages and deal with them effectively by bringing in resources, changing the work process, or showing how to solve a particular problem, conflict, contingency, or other undesirable situation.

3. Provide a Proper Team Environment. Team members must feel professionally comfortable. Anxieties, lacking trust and confidence, are serious barriers to team performance. New team members should be properly introduced to the group and their roles, strengths, and criticality to the project explained. Providing opportunities for early results allows the leader to give recognition for professional accomplishments which will stimulate the individual's desire for the project work and build confidence, trust, and credibility within the group.

4. Project Leadership. The project manager or team leader affects the group dynamics, and ultimately innovation and technology transfer, through his or her own actions and leadership. This includes managing the project definition and its integration, the team organization, interface development, cross-functional problem identifications and search for solutions. Further, proper leadership can create an environment of high concern for the people and the work, foster personal motivation and enthusiasm for the project and a willingness to establish open, effective communication channels. these actions promote member involvement, commitment, and decision-making which are crucial for self-directed team processes to function effectively.

5. Team Organization Should Be Clear. Especially for project teams with a self-directed orientation, group structures often are very "organic" and inconsistent with formal chain-of-command principles. However, individual task responsibility, accountability, and organizational interface relations should be clearly explained to all team members. A simple work breakdown structure or task matrix, together with some discussion, can facilitate a clear understanding of the team structure, even with a highly unconventional format.

6. Cross-functional Interface Personnel Defined. Since innovation is usually classified as successful only when applied to specific business needs, technology transfer depends critically on the ability to hand-over developments to the "next" function. The transfer points must be clearly identified and the interfacing personnel from both functions must understand the conditions critically and be committed to the transfer. Typical tools for clearly defining interface personnel and their specific responsibilities are (1) interface personnel rosters, (2) interface maps showing the respective inputs and outputs to and from various department, and (3) regular review meetings. In addition, successful innovation often requires the integration of components and subsystems from outside sources. These components often become an integrated part of the new development, and their supplier must come full project team members and business partners to optimize the overall product development.

7. Early Feasibility Assessment of Work in Progress. Professionals in all project groups stated that cross-functional feasibility of work in progress must be assessed on an ongoing basis throughout the R&D development cycle. Joint planning efforts seem to be especially important during the idea generation and product or service definition phase. That is, all functional groups in the technology transfer chain should assess the feasibility of a new concept under development within their own

functional unit. These feasibility assessments and their feedback to the R&D team are seen as very important to effective team work and are often absolutely essential to stimulating innovation that is transferable and has potential payoff in the marketplace.

8. Senior Management Support and Leadership. Top-down leadership, effective direction, and support are perceived as very important conditions for successful functioning of self-directed R&D teams. Management can influence the climate and team process, facilitate communications and cross-functional alliances. While it is the ultimate responsibility of the team leader to provide the appropriate communication tools, techniques, and systems, senior management can help in establishing these systems and encourage their effective use.

9. Minimum Changes. Technical projects are subjected to frequent changes which originate in the market, technology, and socioeconomic environment. These changes affect established design concepts, specifications, and ultimately the technology transfer. Team members perceive changes, especially in the design and producibility of a new product, as highly detrimental to innovative performance and the technology transfer process because they affect the technical performance, quality, resource requirements, and timing. In order to minimize the negative consequences, R&D team members suggest that unavoidable changes should be discussed with team, and ideally an optimum compromise solution worked out jointly among the affected work groups.

10. Team Representation at Senior Management. Technical project teams often feel isolated in their work environment. Team leaders should provide an effective link to other functional support groups and upper management, creating visibility for the ongoing project activities and recognition for their accomplishments. Such representation can be very stimulating to team members, fulfilling their needs for information sharing, encouragement, pride, and recognition. These are the conditions necessary for refueling commitment and stimulating innovative behavior.

Summary of Lessons from the Field

The increasing complexities of today's project environment, both internally and externally, prompt enormous managerial challenges for directing, coordinating and controlling project teamwork. Especially with the expansion of self-directed team concepts, additional managerial tools and skills are required to handle the burgeoning dynamics and infrastructure. The effective implementation and use of project management tools and techniques can be a critical determinant in the success of any project, especially for complex and technology-based undertakings. Successful application of these management controls involves a intricate set of variables. The tools must be consistent with the work process and be an integrated part of the existing control and reward system. Most importantly, managers must pay attention to human factors. To enhance cooperation with and effective use of project management controls, project leaders must foster a work environment where people find the work challenging, leading to recognition and professional growth. Such a professionally stimulating environment seems to lower anxieties over managerial controls, communications barriers and conflict, and enhances the desire of personnel to cooperate and to succeed. It also seems to enhance organizational awareness of the surrounding business environment and the ability to prepare and respond to these challenges effectively by using modern project management techniques.

To be effective, leaders must recognize (1) the potential barriers to the cooperation with project management methods, and (2) the early warning signs of team problems as shown in Table 2. They must also know when in the life cycle of the project these challenges are most likely to occur. Project leaders can take preventive actions early in the project life cycle and foster a work environment that is conducive to team building as an ongoing process. Further, the new business realities force managers to focus on cross-boundary relations, delegation and commitment, in addition to establishing the more traditional and formal project control systems.

The effective team leader is usually a social architect who understands the interaction of organizational and behavioral variables and can foster a climate of active participation and minimal dysfunctional conflict. This requires carefully developed skills in leadership, administration, organization, and technical expertise. It further requires the project leader's ability to involve top management, to ensure organizational visibility, resource availability and overall support for the new project throughout its life cycle. Moreover, project leaders and their management must understand the interaction of organizational and behavioral variables, so they can facilitate a climate of active participation, minimal dysfunctional conflict, and effective communication. They must also foster an ambiance conducive to change, commitment and self-direction. Four major conditions must be present for building effective project teams: (1) professionally stimulating work environment, (2) good project leadership, (3) qualified personnel, and (4) stable work environment. Building effective project teams involves the whole spectrum of management skills and company resources, and is the shared responsibility between functional managers and the project leader. By understanding the criteria and organizational dynamics that drive people toward effective team performance, managers can examine and fine-tune the project tracking and control system, and their leadership style. They can also build alliances with support organizations and upper management to assure organizational visibility, priority, resource availability, and overall support for the multifunctional activities of the project throughout its life cycle. These are some of the important criteria for managerial controls to work in a multifunctional project environment.

Exhibit 2.
Early Warning Signs of Problems with
Effective Project Team Performance

- Project perceived as unimportant
- Unclear task/project goals and objectives
- Excessive conflict among team member
- Unclear mission and business objectives
- Unclear requirements
- Perceived technical uncertainty and risks
- Low motivation, apathy, low team spirit
- Little team involvement during project planning
- Low degree of mutual trust and respect
- Disinterested, uninvolved management
- Lack of Leadership credibility
- Poor communications among team members
- Poor communications with support groups
- Problems in attracting and holding team members
- Unclear role definition, role conflict, power struggle
- Indecision
- No agreement on project plans
- Surprises, contingencies, subtle problems
- Lack of performance feedback
- Professional skill obsolescence
- Perception of inadequate rewards and incentives
- Poor recognition and visibility of accomplishments
- Little work challenge (professional not stimulating)
- Perceived problems
- Fear of failure, potential penalty
- Fear of evaluation
- Mistrust, collusion, protectionism
- Excessive documentation
- Excessive requests for directions
- Complaints about insufficient resources
- Strong resistance to change

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