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Abstract: We focus on the issues of designing special project teams in organizations. Proper team design increases the probability of meeting the goals and objectives of the project, facilitates flexible authority/responsibility patterns in the organization and develops a climate conducive to innovation.

FORMATION AND DISSOLUTION OF
SPECIAL PROJECT TEAMS

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and R. Ritter

EMP - P8804

CONTENTS

Introduction

ORGANIZATIONAL ENVIRONMENT

Russ Ritter

Overview

Corporate imperatives

Team-based Structures

Communication

Getting it together: Coordination/cooperation/collaboration/consensus

Environment for reward

Survey findings

Measuring and altering the "environment"

STRATEGIC NATURE OF PROJECT TEAM

Morgan Hanscom

Project selection systems, problems and cautions

Factors leading to a special project team

TEAM FORMATION DYNAMICS

Tim Erdman

Leadership attributes,

Personality

Communication and negotiation skills

Technical expertise

Perceived authority

Organizational knowledge, ability to cross boundaries

Members Attributes

Technical skills versus personality

Motivating factors to support project leader

Formal controls

Project budget and planning

Policy for selecting members, who is responsible

Cooperation and coalition building

Perceived accuracy of communication

Participation in long-range planning

Location, where will the work be done

TEAM DISSOLUTION

Bill Carter

Plan/budget to keep team members skills current

Means of project closure

Influence of project manager over next job assignments

APPENDIXES

Bibliography

Checklist

Survey details

Introduction

You are an experienced manager who recognizes a strategic need for the company, and perceive a problem trying to accomplish the goal within existing departments or matrixed project management. You believe a small project team might be effective in accomplishing this goal.

You are just completing a successful design effort, and find yourself in front of the boss to discuss your next assignment. He says he has a "unique" challenge and is about to recommend you head up a special team.

If you are in a successful technology environment, one of the above scenes may be familiar to you. The wide-spread acceptance of achieving innovation in technology organizations through small project teams make it very likely you will experience one of the above scenarios if you have not already initiated or participated on such a team.

The subject of this paper is formation and dissolution of special project teams. It focuses on the issues important to managers and project leaders required to design such a team in their organization. The successful design results in better chance of meeting the targeted goals and objectives of the mission. It also opens a possibility for a new organizational pattern while building an experience base using people motivated to continue the process of innovating.

Terms used throughout this paper include the following:

1) Special:

A need which includes organizational innovation. While much of our research and survey findings applies to *any* project team, we focus on teams required to operate (to some extent) outside routine patterns. This definition is intended to exclude teams such as Apollo (NASA mission) which use formalized matrix management. It is also intended to avoid the highly informal or short-lived cross-functional contacts or "two-meeting task forces" formed to solve a non-strategic problem. The "what we do every day" subset of lateral relationships don't typically create *organizational* innovation; they aren't "special". Both these extremes lie outside our definition of special team.

2) Project: The team is formed to create a tangible product. Focus is on a team with a temporary mission.

3) Formation and dissolution: We limit our topic to the "boundary" states of the team's existence. (Figure 1) Management of interim mission milestones is outside the scope of this paper, as are details about project plans and implementation of mission objectives. We are concerned with strategy (formulation) rather than tactics or implementation

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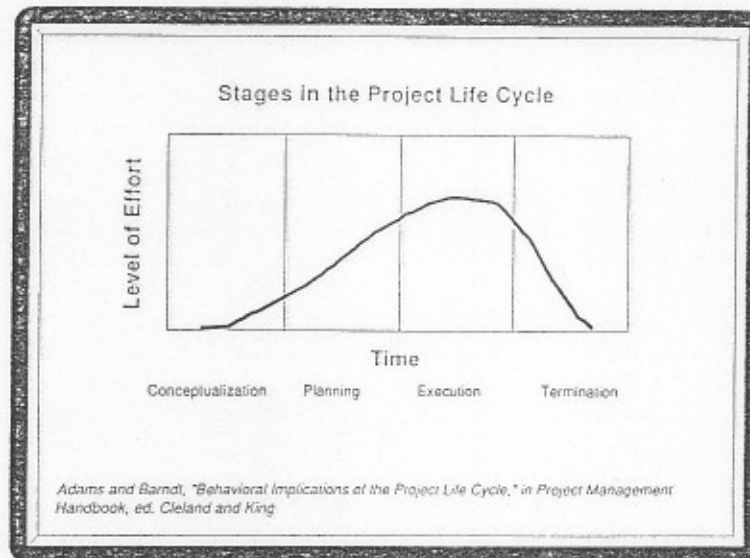


Figure 1, Project Life Cycle

SECTION 1

ORGANIZATIONAL ENVIRONMENT

Overview:

In this section the organizational factors and environment that influence success of project teams are reviewed. Recognizing a "macro" environmental factor favorable to project success is presumably an advantage to the project leader who can better exploit it. Similarly, recognizing an unfavorable indicator should motivate the project leader and manager(s) to plan ways of altering the corporate structure or the perceptions and design of the team which are (more likely) within scope of influence.

Description of corporate structural or "cultural" factors that favor the project team approach is often synonymous with factors favoring innovation. According to Cleland/King (1975): "The basic organizational concept of the project team approach is that an "organization" has been created to innovate." Amabile (1988) describes project teams as one stage along a model of organizational innovation. This requirement for "innovation" is intrinsic to our definition of special project team. We believe factors contributing to innovation in a company in most cases also favor success of project teams.

Basic Organizational Imperatives

Our starting point for describing what factors in the organization contribute to success of an innovation team are the structural imperatives, those most powerful influences behind making the structure what it is. Using a model described by Miller (1987), the key influences shaping the organizational configuration are:

- 1) environmental, 2) structural, 3) leadership, and 4) strategic.

Awareness of both the configuration imperatives and factors which favor innovation provides possibility for overcoming bureaucratic or organizational obstacles. Knowing where the "environmental base" resides in a company is another approach to understanding what are the basis of power, and can provide the key to unlocking resources or making changes critical to a team's success.

Environmental Imperative

The environmental imperative argues that organizations must adapt to their environment. The fundamental nature of the organization is built upon the need to "look like" their competitor, and that significant deviation away from industry norms leads to failure.

In this imperative, if the nature of the corporate "environment" is rapid change and innovation, then the likelihood of structures supporting innovation is high. Studies made by Burns and Stalker (1961) on electronic firms argued that the firms "had" to adopt a configuration of experienced-based authority, intensive collaboration, and flexibility among other common denominators in order to survive in their rapidly changing environment.

If the environmental imperative dominates, one implication is that a successful project team could be modelled after a similar successful competitor's team. The strategy for assigning resources should include competitors' activity or apparent technical "edge" as a factor motivating project funding. Similarly, a recent hire from a competitor may be a good candidate for membership or leadership on a team whose mission has elements common to that competitor's successful project.

Structural Imperative

This imperative is also referred to as bureaucratic, and success is often measured in terms of "efficiency" through specialization (Weber 1947, Fayol 1949, Galbraith, 1952). It is typified by firms that face very stable markets or are monopolies. They try to buffer themselves from the environment and maintain monopolistic power by government lobbying, forming trade cartels, or otherwise restricting operations to regulated industries. That this style of organization is better suited to administer large organizations focused on efficiency and specialized labor than to create and nurture innovation is reported in numerous research in the past 30 years. (eg. Drucker 1985, Hlavacek and Thompson 1973, Shannon 1980). While Galbraith (1952) claimed large firms account for a disproportionate share of innovation due

(he assumed) to R&D efficiencies, Mansfield et.al. (1977) and Kamien & Schwertz (1982) largely disproved that hypothesis through empirical findings. In short, the "bureaucracy" is not favorable to innovation.

The implications for management that recognizes themselves in a structurally-driven organization is that innovative project teams can be expected to meet extensive resistance. The need for forming must be critical, and must obtain significant high-level management commitment. Industry upheavals, deregulation, and economic decline are the nature of motivator for innovation in this type of industry.

The nature of issues which overcome bureaucracy are such that "teams" would generally be either larger (divisions) or specialized enough to fit under one functional manager. One way to introduce innovation with minimal resistance is to isolate from standard operating units such as in a separate "division". Where innovation is routinely required in a large and structured environment, the principle means of achieving it is to set up a separate business". Drucker (1985) describes the best known practitioners of this principle to be Proctor and Gamble, Johnson & Johnson, and 3M, who are also not coincidentally recognized by Peters (1982) as demonstrating corporate excellence. These large and highly structured but innovative companies are sometimes thought to be driven by the "strategic" imperative described below, rather than by the "structural" described here.

Another option for developing teams within this structure is in implementing project ideas sponsored by middle management, such as a department head or director. Such a project would best be scaled for implementation within the expertise and domain of that manager's functional organization. Attempts to reach beyond immediate functional turf can be expected to require excessive management intervention to maintain momentum in the face of resistance.

Leadership Imperative

This theory emphasizes the influence that a chief executive officer (CEO) has on his or her organization. The CEO's ambitions, personality, and fantasies are the driving influence on the company environment. It is evidenced most clearly in young growing firms where an owner/manager is in charge, often the founding CEO. Success in early stages often lends itself to increasing and consolidating the CEO's power in a company. Ironically, this power consolidation is often detrimental to the companies growth, since the entrepreneurship of the founding CEO may not contribute to developing the structure needed to manage and sustain growth.

This imperative is typified by focused niche strategies, informal and simple structures, common pervasive corporate culture, intuitive decision making, and risk taking.

One implication of leadership imperative on project team operation is the importance of actual or perceived formal authority attributed to the project leader. Is the project perceived of importance to the CEO, or to the coalition closest to the CEO? A project manager in a "leadership" environment can enhance his chance of success by particular attention to sponsorship.

Strategic Imperative:

Continuing with Miller's model, the last imperative considered is the "strategic" imperative. Here it is claimed that structure follows strategy, and while environment clearly influences structure, the company in the long run picks its environment. The strategic imperative is said to be most evident in a firm with a powerful planning department (Mintzberg 1973). Analytical decision making is favored, with formal codified and widely distributed strategic plans. Structure is also heavily influenced by market niche selection. This imperative applies to an organization that has an element of maturity, is more likely found in larger firms that have been through economic decline, have grown rapidly, or otherwise have been through circumstances that are beyond political control by a founding CEO.

Where strategy reflects "manufacturing cost leader" the outward appearance of such a company might look identical to the bureaucratic or "structured" imperative. Where strategy is not so much for "efficiency" as for innovation, the emphasis may be on diversification and portfolio management. Another example of innovation-oriented strategy is marketing state-of-the-art products directed at customers who demand novelty rather than low-cost solutions.

Implications of being in a company driven by the strategic imperative is a requirement to map team's mission explicitly into corporate strategy. The team's mission must be perceived in the strategic (as opposed to the competition's, the bureaucracy's, or the CEO's) mainstream for its leader to build coalitions, give team members a sense of potency, and otherwise develop power and obtain resources and cooperation for the project's success.

There are combinations and hybrids of these imperatives mentioned in Miller's model. He describes these as being typically experienced during corporate structural transition, as in economic downturn, or following rapid growth. We will look at "hybrids" again in the review below of what we found at companies we surveyed.

Having investigated the apparent power or drivers behind the structure, we need to ask ourselves if the project aligns with or is contrary to the "gale winds". Knowing whether your assigned project is the brainstorm of your department head when the company is CEO or Planning Board driven will indicate whether and how to aim for visibility (vs low profile) and sponsorship. Given a some signposts for how to develop the team's authority, we next turn our attention to the structures themselves.

STRUCTURE

Team based designs

The effectiveness of matrix management over more rigid functional or project based in organizations requiring innovation is widely reported (eg: Shannon 1980, Cleland and King 1975, Cleland and Kocaoglu, Drucker 1974). The power struggles, and administrative disadvantages of full matrix implementation have also been studied (Robey 1982). Our interest is in research comparing designs using cross-functional teams, and what design best supports the small project team.

J. R. Galbraith in *Designing Complex Organizations* (1973) diagrams a continuum of lateral relationships with seven nodes or descriptions: informal direct contact, liaison, task forces, teams, integrator, managerial linking role, and matrix. (See figure 2) D. Robey (1982) simplified this to four groups: liaison roles, teams, integrator, and the matrix. Characteristics common to both studies, and applicable to our perspective are the increasing formality of lateral relations along this continuum. With increasing formality comes increasing overhead cost, which appears to be justified (at least empirically) only in the face of increased task uncertainty and complexity.

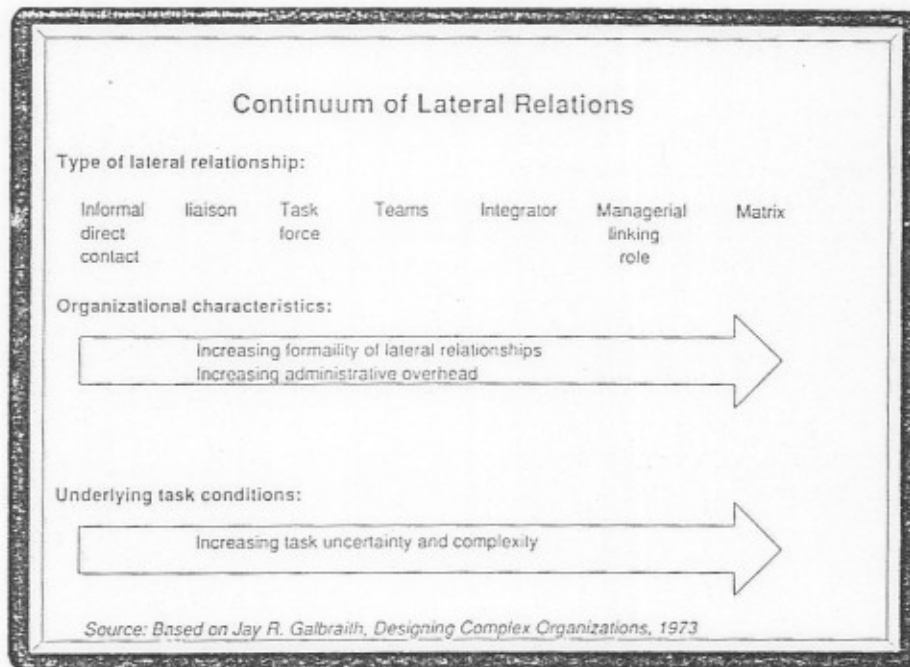


Figure 2. Continuum of lateral relationships

Prior to the mid-1970's, much of the research demonstrating effectiveness of formal matrix structure is based on complex military, construction, and/or aerospace projects. The Galbraith/Robey model explains how matrix would be successful in these environments but inappropriate for smaller scale tasks. The later research indicates that the best environment for teams (our definition spans Galbraith's task force through integrator models) lies in the mid-point of increasing formality along the "lateral relation continuum".

In summary, they say the "team" approach as best suited to handle a task ranked as average uncertainty and complexity in an organization characterized as having some but not "high" formality of lateral relations. We apply the same correlation and surmise that the environment most successful for teams includes tasks of "middling" uncertainty and complexity, and an organization less formal than full matrix.

Team Leadership Structure

Who should direct the work of the team? Later in this paper we describe the leadership role in team formation dynamics including the micro-perspective (leader characteristics, personality, etc.) Here we briefly consider the organizational structure under which the team leader is selected. The approaches described below are not distinguished as being more or less favorable to predict team success (our research didn't clarify that), but do describe options frequently used and available to the team designer(s).

The most common approaches to select team leader are: 1) pick someone from the highest-status department, 2) pick the leader from the department most likely to be affected, 3) shift leadership from one department to another as dictated by the project life cycle, or 4) bring someone from outside the functional specialized groups to assume leadership as an "integrator". In some companies there is a predominant approach. Unless other structural or strategic factors suggest taking a "different" tack, taking the predominant approach minimizes organizational resistance.

COMMUNICATION

The predominant factor influencing success of innovation and project teams would appear from the research to be communication (Cleland and Kocaoglu, Milton 1976, Kanter 1988, Brenner and Sigband 1973, Slevin and Pinto 1987). In Glaser's "Innovation Index" (1976, reported in Cleland and Kocaoglu p. 133), communication was weighted as important as technical skills, twice as important as "top management interest", and four times as important as "competitive factors."

The model we used for investigating effectiveness of organizational communication in the companies surveyed comes from Brenner and Sigband (1973), and it includes

assessment of three key factors of communication: speed, accuracy, and the need for manager to have extensive amounts of information immediately available.

For innovation and team efforts, the first two, speed and accuracy, can be considered "absolute factors", more is better as far as cultural ambience to horizontal communication. Perception that extensive amounts of information needed to be immediately available was also directly proportional to team playing and horizontal communications... up to a point. Once a threshold is crossed for "immediately available" need of information, infrastructures are built to create "cockpit control" (our interpretation, not Brenner's). An example is the finance manager who maintains close association with MIS or accesses electronic data bases instead of contacting peers in other departments for information.

Number of organizational levels

The communication benefits for "squat" hierarchies, or reducing the number of levels between the mission or strategy-makers and implementors are discussed in Davis (1951) and Shannon (1980). The counterpoint of this concept is "span of control", that is, how many people report to each manager. In general, the research seems to favor minimizing the layers between top management and implementors, while at the same time recommend a narrow span of control or small team approach to tasks with significant degree of risk or uncertainty (Robey 1982). These contradictory requirements favor small or highly divisional companies for innovation. A large and centralized organization can not by definition (and simple physics) accomplish both narrow span of control and a squat hierarchy.

We surveyed the organizational levels (number of levels to the CEO) with the expected result being to find a direct relationship between corporate size and flatness of the hierarchy, the smaller resulting in more "squat" hierarchies.

GETTING IT TOGETHER

Coordination, cooperation, collaboration, consensus

In Amabile's model of creativity and innovation in organizations (1988), she found the various organizational characteristics that promoted creativity included "a corporate climate marked by cooperation and collaboration across levels and divisions." In all of the research we found relating to innovation and teamwork, some or all of these "C" words were prescribed for success. While some approaches to achieving collaboration and cooperation stress tactics and personal leadership characteristics, the psychological approach, we are interested in 1) recognition of the environment, and 2) strategy, the "what do you do to form the team" enabled to build cooperation and lateral relationships.

Indicators of team-building structures include participatory management, processes that require joint effort, and focus on building cooperation during team formation. Specific factors we surveyed included participation in long-range planning, process for interviewing candidates to join the company, and process for assigning members to project teams.

To the extent that these processes require participation and joint effort, they suggest a corporate environment for accomplishing missions with teamwork. In short, getting it together.

ENVIRONMENT FOR REWARD

Amabile (1988) includes in her description of organizational characteristics that positively influence creativity "an atmosphere where innovation is prized and failure is not fatal."

Does the climate favor team skills over other factors? Do people experience recognition for their work on teams, or the opposite? Do the perceived factors for promotion include "team player", or is competitiveness encouraged? Are people allowed to innovate and take work assignments by project or other lateral approach, or do tasks normally get assigned from their boss?

Any discussion of the corporate climate would be incomplete without a look at the turnover rate, and especially critical for technology-based companies is engineering turnover rate. A recent research brief by Black and Company (1988) mentions a favorable turnover rate at highly successful and innovative Mentor Graphics at 4% while many of its competitors are seeing up to 30%. Factors for turnover are so complex that few general or engineering management texts even refer to strategies to deal with it. Turnover rate provides the project leader odds of the project completing with all of its key players. It suggests degree of weight needed on factors such as setting up and requiring formal system for documentation of interim work.

We asked people what "percentage of their tasks are given by direct manager". Alternate sources of task assignment are primarily self derived or laterally derived, both indicators of a climate favoring creativity, innovation, and team participation.

Where team leaders can have the most impact on their "local" environment for reward is in the area of tactical management we don't address in this paper (such as recognition at each milestone, etc.) However, later we will discuss the impact a project manager can have in team dissolution, where the "results" of success must be extended to the team participants for long-term corporate health.

Survey Findings

The authors surveyed two dozen people (mostly project, first, and second level engineering managers) in three local electronics companies. Information derived from such a limited survey can not be considered authoritative, but from this sample we checked for indications favorable to innovative team management.

The first nine questions in our survey dealt directly with the organizational environment. They were intended to provide information about structural imperative, vertical hierarchy, communication, extent of participatory management, existing team involvement, and environment for reward. See the appendix for the question details.

*You need
a transition too*

The standout findings were the following:

Corporate Imperatives: This question gave us ambiguous results. The survey showed two of the three companies with apparent "Leadership"-based structures, with some alternate perception as "environmental." We based this question on Miller (1987) who described research placing electronics companies in the "environmental" category. However, both company A and C are small and have owner or founder CEOs in charge, which means the model appears to be supported here. Company B contributed the greatest ambiguity, with samples in every category. We might contend that different managers in Company C have a different perception about what drives their structure - competitors, efficiencies and bureaucracy, CEO visions, or strategic planning staff. Another possibility is suggested by the "hybrid" description in Miller's model, a sign of a corporation going through major transitions (due to 1982 economic downturn?) where different imperatives are present with no individual one dominating. Possibly the model or derived question is ambiguous.

Communication speed, accuracy, and need were all rated quite high (average about 3.5 on a 5 point scale) by the managers surveyed. The differences in available tools (electronic mail was not available in one company) would have expected us to see a range of answers distinguishing one company from another. The common ground of "electronics", plus limited definition of question (what is "fast"?) resulted in the almost uniform perception in all three companies.

Use of project teams in these companies was high. The great majority (over 80%) of managers are currently on at least one project team, with an individual participating on three teams being typical. Since the sample was biased by intended selection of at least two project managers in each company, little can be made of this statistic other than to note that line managers in each company also participated on project teams.

Task assignment was an indicator strongly favoring innovation and teamwork at each of these companies. Over half perceived less than 10% of their task assignments coming from their direct manager, all but one claimed less than 50% of task assignments came from direct manager.

Indicators of participative management showed mixed results. Participation in long-range planning was surprisingly low. In retrospect, we believe the wording of the question to have contributed to this "poor" (indicator not favoring team/innovation) score. In summary, only two managers, less than 10% perceived long-range planning as extending to their subordinates. Use of team interviewing was uniformly applied in two of the three companies, with the third company using everything from "hiring manager only" to teams, most typical being the hiring manager "with support from a few key"...people.

Corporate turnover (perceived) ranged from an average of around 7% to under 3%. The surprise here was that perceptions of corporate turnover within a company by the surveyed managers ranged widely. In general managers saw turnover within their departments as being lower than the corporate average, but it was clear that the corporate turnover rate was not "common knowledge" by the managers. These statistics are easily derived by personnel staff without intrusive surveys. Since they are

a useful barometer of corporate climate and management success, a broader exposure of this information to mid- and lower level management might be indicated.

Measuring and altering the environment

Implications of factors on team success and guidelines for specific action have been suggested above and in the earlier sections. But how do we measure overall environmental "health" given the kind of factors the authors sampled? And assuming the desire to be an agent of change, how to present the findings in a way that indicates a clear set of priorities and course for action? We discuss and present possibilities and suggest one seldom reported measurement method below.

Metrics used for measuring environmental health can be similar to those used for project selection as suggested by Shannon, Cleland, Kocaoglu and others. Most common approach includes simple ranking or rating methods. Values are presented into the picture by weight factors, assigned either subjectively or by research such as Graser's (1976). Industry-wide sampling can be used to convert numbers such as turnover rate into weighted values on a scale of "low" or good to the "high" or unacceptable for which corrective action is indicated (see unpublished PSU paper by Dittmer et. al., 1988). Such measurements are rarely made other than by a proactive human resources department, or by an outside management consultant. They have all the drawbacks of mathematical models pointed out by Gee (1971) and others, which is expanded on in the following section. Given these caviats, we would like to demonstrate a couple of simple tools available to consolidate measurement data into management reports.

Where industry wide data is available, a comparison of specific factors using scatter or multiple data set bar charts can be an effective way to present certain issues. Especially where management is motivated by competitive factors, industry cross-sectioning can be an effective way to illustrate a request for resources or changes. Unweighted factors such as turnover can be clearly presented this way. Capital justifications for CAD or electronic mail systems might include competitive analysis. A sample is given below of multi-company comparison. The data is not significant, just used here to provide a presentation format and illustrate a point.

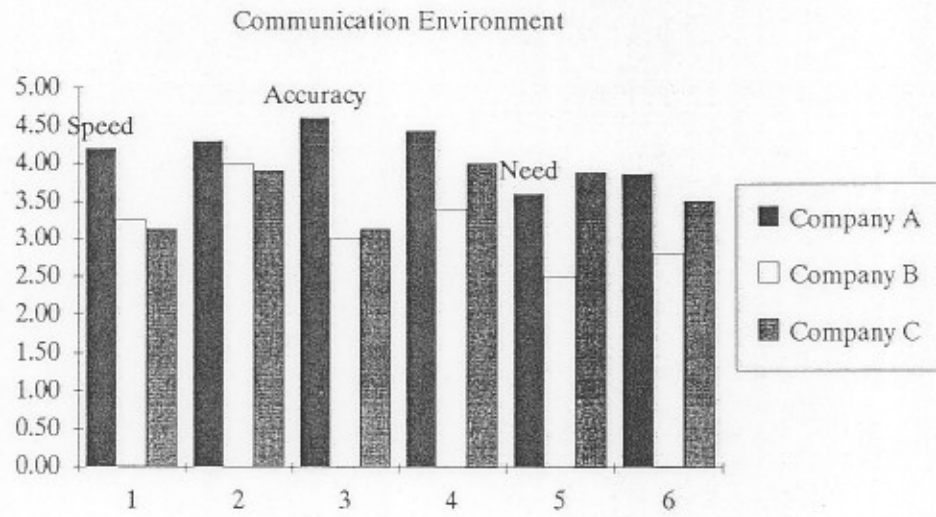


Figure 3 Competitive or multiple data set comparison

"Bundling" information: Vector graphs

Note that multiple bar graph or scatter chart presentation allows very few factors to be effectively represented in one graph. Another way to combine many factors into one "overview" is to use a vector graph. These have been used to map such global things as "corporate quality" (GTE 1988) and can effectively present up to several dozen measurements on one chart.

The basis of the chart are "absolute" (good to bad) scaled measurements. Each measurement is a single important factor, sometimes derived from combining multiple measurements. The factor is represented by a vector starting from the center point of a circle and moving along a "spoke" toward the outside of the circle, the outer limit of the circle being "optimum" for each factor. To be most effective, the factors are loosely grouped or categorized in sections along the wheel. In our example below several factors indicative of communication culture are clustered. After representing the bad-to-good measurement of each factor as a vector from the center, the metrics are combined point-to-point into what will appear roughly as a wheel. A simplified version of this type of measurement is shown below using most of the environmental factors we sampled from Company A.

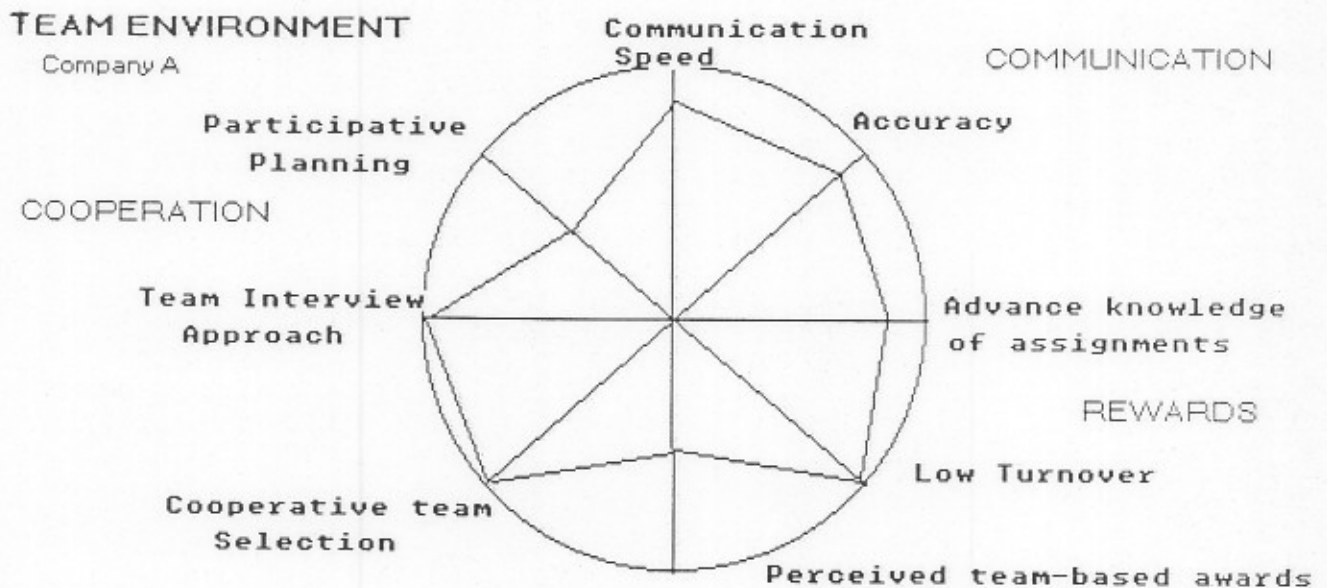


Figure 4 Vector chart of corporate team environment

Using such charts can be an effective way to get management attention. Priorities for corrective action are wherever you have a "flat tire".

Similar "vector" presentations can be made of elements that are balanced along a diagonal instead of absolute vectors on a radius. The visual representation would then have an overall goal represented as a "bull's-eye" cluster, and priorities for change being points falling outside the central area.

Environment Summary

We have looked at numerous corporate environment factors that influence the success of innovative teams. Among these are the structural imperatives or powers that drive the company to look and be configured the way it is. This gives us an indicator into what "power brokering" or authority basis we can aim for while developing a team structure.

We looked at the structure itself in terms of team based designs. By paying attention to the formality of lateral relationships and to project complexity we can estimate where the team structure belongs on a continuum of task force to "integrator" team projects.

Communication was another key denominator we found recurring in research about innovation and team success. We measured this in terms of speed, accuracy, and "need to have extensive amount of information immediately available". We looked at research recommending "squat" hierarchies to aid communication. The conflicting recommendations for narrow span of control describes a need to keep organizations small or divisionalized for the best team environment. Weight given to analysis of communication skills was suggested by an "innovation index."

In "getting it together" we studied the "team player" approaches designed into organizations. The "C" words found in research included such things as cooperation, coordination, coalition, collaboration, and consensus. Our indicators surveyed included participatory management, interviewing techniques, and method of assigning members to teams. The indicators we focused on are only a subset of those used in other research. However, we felt each of these were design factors that the manager/project leader can typically implement within his area of direct influence.

The environment for reward was then reviewed. Most of the factors we found in research under "reward" for team participation fell into the "tactics" area not covered in this paper, or offered challenges beyond the typical scope of a team manager. Awareness of such factors as corporate turnover can influence the planning of a project. The design and budgeting of other rewards (training, job security, etc) are discussed in later sections.

Finally we reviewed the survey findings. We offered a couple of tools for arranging such data in a way that presents needs to management and graphically indicates priorities for altering the corporate team climate.

Survey Tallies	Participants							Company summary	Company B				Com sum
	Company A								line				
Questions	A	C	C	C	C	A	A	4C 3A	B	B	D	C	2B
1) Org profile	3	3	2	1	3	2	1	2.14	6	4	5	10	5
2) Levels from CEO levels reporting to	1	1	1	1	1	2	2	1.29	0	3	1	1	2
3) Communication													
Company speed	5	4		4	4		4	4.20	3	4	3		3
Work group speed	5	3	4	4	5	4	5	4.29	4	5	4	3	4
Company accuracy	5	4		4	5		5	4.60	3	2	4		3
Work group accuracy	5	4	3	5	5	4	5	4.43	3	3	5	3	3
Company mgr need	3	3		5	4		3	3.60	1	3	3		3
Work group mgr need	1	4	5	5	3	4	5	3.86	2	4	2	2	4
4) Line mgr	1	1	1	0	1	1	1	6	0	1	1	0	1
Project mgr	1	0	1	1	0	0	0	3	1	0	0	1	0
Member of team	1	1	1	1	1	1	1	7	1	0	0	1	0
How many teams	1.5	2.5	2.5	2.5	1.5	7	7	3.50	10	0	0	1.5	1.5
5) Assignments from mgr													
under 10%		1		1	1	1	1	5		1	1	1	
10-25%	1		1					2					1
25-50%								0					
50-75%								0					
over 75%								0	1				
6) Long range planning													
a) CEO								0					
b) Staff, non-participant	1	1	1		1	1	1	5	1			1	1
c) you and peers				1			1	2		1	1		
d) you, peers, subord								0					
e) not sure who								0					
7) Annual turnover													
Company	3	1	6	1	1	3	3	2.57	12	6	6	1	6
Department	3	3	1	1	3	1	1	1.86	16	3		1	3
8) Interviews													
mgr only								0					
mgr + personnel								0					
mgr + specialist(s)								0					
team interviews	1	1	1	1	1	1	1	7	1	1	1	1	1
9) Factor to promote													
costs/budget								0					
schedule	1							1					
innovation/performance					1		1	2		1	1		
work well w/others		1		1				2				1	
immediate management			1					1	1				
10) Why special team?													
new market	1	2	1		1			5				1	1
schedule	2			1		2		5	2	2		1	
cost	1	1						2	1		1		
technology		1	1		1	1		4	1		1		1
customer specialize		1	1		2	1		5	1	1			2
security		1	1					2	1				1
complexity				2				2					
special skills			1					1					
other: field problem							1	1				2	
11) Involved in "special"?	1	1	1	1	1	1	1	7	1	0	1	1	1
12) # of such teams?	2	2	2	6	2	1	3	2.57	10	0	1	3	3
13) Factors that caused													
new market								0				1	1
schedule				1	1	1		3					
cost								0					1
technology								0					
customer specialize	1	1	1	1	1			5	1		1		1
security								0					
complexity			1	1				2					
special skills								0					
other: field problem					1		1	2					
14) How to select team?													
prog mgr selects				1				1				1	1
dept assigns globally		1			1	1	1	4					
write job desc, dept	1							1					
write job, joint interview			1					1	1	1	1		
15) Physical location	1	3	5	4	1	2	1	2.43	4	5	4	4	3
16) personality criteria?	3	4	4	4	2	4	1		3	4	4	3	3
17) Budget for team skills?													
Experience	4	1	2	2	4	3	5	3.00	2	3		2	2
Recommend	5	3	4	4	4	4	5	4.14	4	4	4	3	4
18) Stay to completion?	3	3	3	3	1	4	5	3.14	3	2	3	4	2
19) closing milestone?	4	4	4	4	5	5	5	4.43	4	5	3	4	4
20) Formal closing?	4	4	4	4	5	4	5	4.29	5	4	4	4	4
21) Proj mgr finds job?	5	2	5	2	1	2	0	2.43	1		5	3	3
22) Advance knowledge?	5	4	5	4	5	5	0	4.00	3		4	4	
23) Disolution considered	2	4	5	1	1	4	0	2.43					

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SECTION 2

STRATEGIC NATURE OF PROJECT TEAM

Overview

This section of the research project will discuss project specific issues and how they indicate the need for establishing a special project team. The subject matter of this report section will discuss some general problems with project selection systems. The purpose is not to discuss individual methods of project selection, there are volumes that describe methods and explain models for project selection. The specific factors which can lead to the formation of a special project team will be defined and discussed. This portion of the research project will aid a company in determining if a special project team is appropriate or not for a project under consideration.

General Problems with Project Selection Systems

There are problems with the methods and models of project selection currently in use or proposed for use. This assumption is based on the personal experiences of the research group and the results of the project survey. One of the questions asked on the survey was if the survey respondent had ever been on a special project team (question 11). 85% of the respondents said that they had been on a special project team. The next question (question 12) on the survey asked how many special project teams the people had been on, the average was 2.5 special projects per respondent. If project selection systems worked there would not be a need for special project teams. The selection system would select projects that would fit into a company's normal procedures. The high response from the survey respondents indicate that problems exist in project selection systems.

One problem is that it is assumed the selection process is black and white, either the project is acceptable or it isn't. A third option is to postpone the decision until more data is available. Most of the project selection models rely on information from experienced individuals. Generally at the time of project selection the information available is preliminary and ambiguous. For this reason experienced personnel are required to apply project selection models. These personnel make educated guesses to condense the project into a form that the model can utilize and give results that are valid for different types of projects. If a company changes the personnel it uses for project selection the results from its model will change. A problem even if the project selection team doesn't change is the confidence interval around the selection model's results. There is no discussion of the tolerances around the results from the model, these tolerances could cause the selection to be invalid.

The second problem with project selection systems is the time required to utilize them. This research project is mainly concerned with projects of a strategic nature. This kind of project will generally require the involvement of all departments within the company. If the company uses a simple project selection model it can be applied quickly. The results from a simple model must be viewed as being very subjective. The more elaborate the model the more time it will take to complete model application for project selection. If the company uses an elaborate project

selection model it will require a significant time investment by those personnel involved in the project selection process. Shannon(1980 pg 255) proposes that a rather elaborate procedure be followed for project selection. The main problem with Shannon's procedure is the time required to successfully apply the procedure. The company must decide if it is going to set aside a project selection group whose charter is to analyze potential projects. These personnel who have been removed from their functional groups can become obsolete because they are not constantly honing their skills. A company can instead form a project selection committee and assign personnel from the various functional areas. The committee members can have a conflict between their primary job responsibilities and their committee assignments due to time constraints. If this becomes the case the results of the project selection process once again becomes questionable.

The purpose of this discussion is not to suggest elimination of project selection systems but to recommend that their results be used with caution. Shannon states that project selection systems "are intended to *aid the decision maker*, not make the decision."(pg 275). The discussion has been to show that project selection systems cannot be considered black and white regarding which projects to pursue. There will be a set of projects which do not meet a company's standards for fully acceptable projects but are not definite losers either. Shannon's procedure mentioned earlier suggests regular project reviews and to cancel any projects which are not proving out. Companies do not always have the option of canceling a project that has been undertaken. Those projects which fall into a gray area between fully acceptable and fully rejectable are prime candidates for special project team assignment.

Factors Leading to Special Project Teams

It was the hypothesis of the project team that there is a limited set of factors which can lead to the formation of a special project team. When program and functional managers from Intel, Oeco and Sequent completed a survey concerning these factors they did not add to the list of project factors suggested. The survey respondents also did not eliminate any of those factors that were suggested with a total lack of response. Each manager marked only those factors which they felt could lead to the need to form a special project team. 85% of the survey respondents indicated that they had been involved in an average of 2.5 special project teams during their careers. The survey results can be applied to high technology companies and with some caution to companies in other industries.

The following is a list of the factors which can cause a company to set up a special project team. The list also shows the percentage of respondents who felt the factor justified forming a special project team.

New Technology Required	55%
Customer "Specialization" Requirements	55%
Security/Proprietary Requirements	50%
Schedule Constraints	45%
New Market Direction	35%
Cost Constraints	20%
Complexity	15%
Specialized Skills Required	10%

The project factor that is most likely to lead to the formation of a special project team was: New Technology Required. This meant the project in question would require invention or innovation for its successful completion. This factor is a type of risk and the company must decide if the potential benefits justify the costs of a special project team.

The project factor that tied as the highest factor that would lead to a special project team was; Customer "Specialization" Requirements. In this case a specific customer requires a company to proceed with a special project. The company feels that this customer is important enough to accept this special project. There is little risk in this factor other than the possibility of upsetting the customer.

The third highest response was the project factor; Security/Proprietary Requirements. This project factor can be both internally and externally caused. The need for a special project team can come from a customer, an example might be the Department of Defense requiring the project be classified. The company may form a joint venture which the participants feel should be kept secret. A company may also feel the need to keep a project a secret to prevent industrial espionage. If the company doesn't have procedures for managing one of these circumstances a special project team will be required.

The fourth highest project factor that was indicated by the survey respondents was; Schedule Constraints. If the schedule is significantly shorter than the norm for a company it should consider setting up a special project team. This is also a risk factor and a special project team can bring the visibility required to assure a chance of meeting the schedule.

The fifth ranking project factor from the survey was; New Market Direction. This is the project factor the most strategic nature, the company has for some reason decided to enter a completely new market. This project factor is also a high risk factor. If a company decides to pursue a new market direction it should be automatic to form a special project team.

The sixth ranked project factor was; Cost Constraints. This factor was considered important by 20% of the respondents. This is a risk factor in that there would be significant cost constraints on the project. If these constraints are not met then the company might not be able to market the product.

The project factor ranked seventh by the survey respondents was: Complexity. This factor is concerned with the situation where the company has the needed technology for the project but the overall project complexity is higher than normal. A company

must be prepared for the increased project resources that are required for successful completion.

The lowest ranked project factor that can lead to a special project team was; Specialized Skills Required. This project factor is defined as a company not having an employee with the necessary skills to complete the project. The company can choose to set up a special project team and hire an individual with the skills required to be a member of the team.

These Eight project factors do not occur individually all the time. Actually it is more common that some aggregation of these project factors will occur. It is critical that a company know its capabilities with respect to projects and the affects these factors have on the successful completion of its projects. Once a company has this background it can judge the total affects from these project factors and determine if a special project team is required.

The personnel within a company that are responsible for project selection need to be aware of these eight factors. When a project proposal is being reviewed if any of these factors are present individually or in aggregate the selection personnel should consider the assignment of a special project team.

SECTION 3

TEAM FORMATION DYNAMICS

Team-based designs provide a vertical focus on work through the existing structure and a lateral focus through the teams. In some team-based organizations, work is accomplished by the voluntary collaboration of team members from various functional areas. In the most advanced team-based design, the matrix organization, vertical and lateral lines both carry formal authority. Thus, an individual in the matrix may have two or more bosses, an intentional violation of the classical principal of unity of command! (Shannon 1980)

Leadership Attributes

The special project team must be lead at any given time or phase of the project by one individual, the Project Manager. He is responsible for planning, organizing, motivating, directing, and controlling of the organizational resources to be applied on a project. (Robey 1982) The project manager is a critical member of the team and can be the single most deciding factor if a project is a success or a failure. The project manager coordinates and assumes responsibility for the actions of the team members without having or using formal authority over the members.

A study was conducted by Gemmill and Thamhain within the General Electric Company concerning different forms of influence that project managers had in getting project personnel's cooperation. The four most important items were:

PROJECT MANAGER

Expertise
Work Challenge
Authority
Fund Allocation

PROJECT PERSONNEL

Expertise
Work Challenge
Future Work Assignments
Friendship

This study suggests that project managers should not rely on their formal authority or control of resources when trying to lead project personnel. They should pay closer attention to developing strong personal relationships and the potential for future interesting work assignments.(Cleland and Kocaoglu).

The project manager must work through others to get the job done. He accomplishes this with his personal qualities, communication and negotiation skills, technical knowledge, perceived authority, organizational knowledge, and formal controls.

1. Personal Qualities. The project manager must take an interpersonal approach that works with each team member. He must be flexible and constantly adjust to fit the style of the many functional departments he interfaces with and the customer. Research has shown that many successful project managers possess an interesting personality characteristic-marginally, or the tendency to consider oneself on the fringe of several groups rather than firmly entrenched in any one of them. People with marginal personalities are not joiners, do not develop strong attachments to

particular interest groups, and tend to see both sides of an argument quite easily. (Robey 1982) These are good qualities for a project manager and should be looked for in selecting him.

2. Communication and Negotiation Skills. The project manager interfaces with many functional groups, the customer, vendors, and acts in more of a liaison role. This requires good written and oral communication skills and must be able to negotiate well in order to get personal, equipment, and priority for his project when needed.

3. Technical Expertise. The project manager must have good technical knowledge and skills in the field concerning the product or task that the special project team is set up to deal with. Technical expertise is an important and necessary source of influence for the project manager who cannot depend upon formal authority. Team members will much more readily follow or take direction from the technical expert than a manager who has little understanding of the technical area.

4. Perceived Authority. Project managers have a more direct access to top management than the other team members. Because of this access, their power is increased throughout the organization. Although the project manager does not have the authority to take disciplinary action against an uncooperative team member, he can get action taken through an indirect influence process. The project manager generally has input to the team members performance reviews. All of the team members must be aware of this influence process.

5. Organizational Knowledge. The project manager must have very good understanding of how the parent organization is structured and operates. This knowledge only comes from being in the company for several years. During this time he will have learned who has control over the functional groups and who can get things done in a hurry if needed. Therefore, the chosen project manager should not be a new comer to the parent organization. New people do not get the cooperation and respect of old timers and others who have put their time in with the organization. They will be met with resentment, resistance, the Not Invented Here (NIH) or the "we don't do it that way here" attitude, and will get the general run around treatment if they do not know the parent organization and party line. Knowing the "organization" within the organization is very important in order for the project manager to succeed.

6. Formal Controls. This is usually given to the project manager in the form of a budget. With a project budget, the project manager can charge the team members time and other needed resources against the project and not the functional managers budget. This will tend to reduce the functional managers feelings that his budget is being spent on subordinates working on a project that he does not control. This forces the team members to go to the project manager for needed resources and equipment if the parent organization does not have them.

The leadership attributes, in summary, must be considered when selecting the project manager. The six areas discussed above should be considered as minimum criteria that should be met by any prospective candidates.

Members Attributes

The project manager should work with the functional managers in selecting the required team members. In response to question 14 of the survey, forty percent of the respondents said that the project manager should write a job description, then conduct a joint interview of the candidates with the functional managers. However, thirty five percent said the project manager should hand pick the team members. Including the functional managers in the selection process makes them buy into the project and support it as best they can since they had an active part in setting it up.

The project manager also needs to decide if the location of the special project team is of any consideration for success. Quick and accurate communication is crucial amongst special project team members. Should they be physically located together, stay in their functional groups, or does it not matter where they are in order to communicate quickly? In response to question 15 of the survey, forty percent of the respondents said their experience had been that the most successful method was to physically locate the special project team members together. Twenty five percent said a few members should be put together and twenty five percent said that most should be put together. No one thought that all team members should stay in their functional groups.

The team members should be chosen based on technical requirements *and* personality.

1. Technical requirements. The first step is to provide the functional managers with a description of the job requirements. This would include any special skills or training required, such as computer aided design (CAD) skills for a drafter, electromagnetic interference (EMI) design experience for an electrical engineer, etc.

2. Personality. Most special projects are very dynamic and their future changes on a daily basis. There is almost always a need to get things done yesterday. This can cause a great deal of stress on all of the team members. One of the most important attributes of a team member is the ability to get along and work well with others. This includes positive behavior, the "lets do it" attitude. A negative individual can disrupt and impede the progress of a project team. In response to question 16 of the survey, forty percent of the respondents said that personality was considered, but not as critical as technical skills when they were involved in setting up a project team. Thirty five percent said that personality was considered equally with technical skills. None of the respondents said it was not considered at all.

In summary, special project team members should be chosen jointly by the functional and project managers based on technical skills and personality. The managers should also decide if all or just some of the team members should be physically located together.

Team Training

The project and functional managers need to coordinate at the formation of the special project team time for training. This time must be planned and budgeted into

the project schedule. In response to question 17 of the survey, forty four percent of the respondents said that their experience had been that it was up to the individual to keep current during project slack time. Thirty three percent said that no time or money was budgeted by the project manager for training. However, fifty five percent recommended that occasional trade shows/training be budgeted into the project. Thirty percent said that study/training time should be mandatory in the project on a regular basis. All of the respondents recognized that training was needed to keep skill levels current, and in all but one case there was recommendation to do more than recent experience.

If the project schedule cannot allow for the individual to miss a week for training, for example, the functional manager should provide a replacement during the training period or the training time should be reschedule if possible, but the project manager should not try to stop the training and in fact should encourage it.

The team members should be allowed to attend weekly functional group meetings, if they have them, in order to stay abreast of the changes in their respective groups. This will preserve the identity the team members have with their functional groups and will aid in the exchange of information and technology.

Additional training may be required for the special project team members in order to keep them up to date on skills needed by the organization. For example, the CAD group may get a new system and all of the CAD drafters need to be retrained. Even though the special project team will continue to use the old system, the CAD drafters should be trained on the new system in order to keep their skill level the same as all other CAD drafters. The special project team members should not be made obsolete because the project does not require the new skills. It is the responsibility of both the functional and project managers to keep the team current and productive.

In summary, continued training or new skills that can be provided to the team members should be planned for and taken advantage of, if possible. The team member will then be more valuable to the team and to the organization. If the special project manager returns team members to their functional groups with improved or new skills, the functional groups would welcome it and would think highly of the project manager.

SECTION 4

DISSOLUTION OF THE SPECIAL PROJECT TEAM

By definition, a special project will eventually come to an end. Closing the project and integrating the members back into the organization is an important aspect of the project and should be planned from the onset of the special project. A key set of objectives (Kerzner & Thamhain, 1984) in closing out a special project team should be:

- 1) Effectively bring the project to a close according to agreed-on contractual requirements.
- 2) Prepare for the transition of the project into the next operating phase.
- 3) Analyze project performance with respect to time, cost, and product performance.
- 4) Transfer or sell off all resources assigned to the project, including personnel.
- 5) Identify any follow-on business that can be best pursued with the resources, personnel, and methodologies available in this special team.

Dissolution of the Project Team

The success of a special project often depends on the project manager and company management's ability to handle the personnel issues during the phaseout and transfer, or dissolution, of the project. As a project comes to a close, the team members start to look for new job assignments outside of the special project team. Unless management communicates clear and desirable future assignments and assures each team member that there will be a new job awaiting him, a great deal of anxiety and conflict will arise in the team. Team members will actively engage in job hunting both internal and external to the company. They will start foot-dragging on the current project to push out the scheduled end date. In extreme situations, the team may resort to sabotage to assure the project is not completed or to retaliate against the company management for not concerning themselves with the future of the team. Any of these activities diverts a tremendous amount of energy away from the tasks at hand and is extremely counterproductive to the special project team.

If personnel engage in job searches on their own, they may either leave the project prematurely for another company project, or worse, they may leave the company. This creates a situation for the project manager that is either difficult or impossible to resolve. First, the departure of a fellow team member strains the morale of the remaining project team and undercuts any commitments or assurances the project manager and company has made for new opportunities after completion of the current project. Secondly, the void left by the departing member will cost the project additional time and money. The project manager will have to ask for an additional resource that will only be required for the short remainder of the project. Usually company management is not very receptive to this idea and the project manager must then use his existing resources and thereby impacting the project

schedule. The third and potentially the worst scenario is that the departing team member possesses unique technical knowledge and capabilities that were gained through his work on the special project. In this scenario, no replacement is available and the project may not be able to be completed or is completed without certain performance features.

As you see, a critical success factor to a special project team is a well planned and communicated phaseout and transfer of the project, especially the personnel.

In the real business world, it is difficult to transfer personnel from the special project team back to their functional groups. A set of ideal rules for doing such would be impractical. However, we will present a guide line that should help increase organizational effectiveness in closing out the project and minimizing personnel issues (Kerzner & Thamhain, 1984).

- 1) Plan the project phaseout and dissolution with the functional managers that will be absorbing the team members back into their organizations. This planning process should occur during the formation of the special team and should continue throughout the project. Communication with the group managers is important so they are kept abreast of the special project schedule for dissolution and are aware of unique personnel issues that arose during the project.
- 2) Establish a simple project closeout procedure or checklist that identifies the project's closing tasks and milestones and indicates the responsible person. This procedure or checklist should be unique to your project and used as a communications media with the project team and the functional managers.
- 3) Treat the phaseout and transfer phase of the project like the project itself. The phaseout and dissolution should have clearly defined tasks, agreed-on responsibilities, schedules, budgets, and deliverable results.
- 4) Understand the interaction of behavioral and organizational elements so that the environment of the special project team is conducive to teamwork. During the phaseout, building and sustaining teamwork is as important as it is during the start of a project.
- 5) Boost the morale of the special project team by emphasizing the goals, accomplishments, technological developments, and business impact of the project. Emphasize any policy, procedure, or methodology changes developed by the team that can be adopted by the organization to enhance productivity and efficiency.
- 6) Secure the involvement and support of the organizations top management by emphasizing the accomplishments of the special project team and the positive impact it will have on the organization.
- 7) Identify any conflict, fatigue, shifting priorities, technical or logical problems when they start to develop and deal with them immediately. Identify and manage these problems by maintaining a regular flow of communication with the project team. It is easy to relax the schedule of regular team meetings and status meetings during this phase, but maintaining the same effective communication used during

the project is essential during the phaseout and dissolution.

8) Keep project team members informed of upcoming job opportunities. The project manager and company management should negotiate new assignments and start involving the people in their next project before the end date.

The field study conducted by Gemmill and Thamhain(1971) within the General Electric Company mentioned earlier shows that project team members considered "future work assignments" as one of the four most important reasons for supporting the project manager and the project. The frequent disregard by project managers of this element of motivation was reflected in our survey.

9) Be aware of rumors. The worst situation a project can face is an inevitable reorganization or layoff at the end of the project. If this is the situation, then it should be communicated in a professional manner. If the project team is allowed to dwell on rumors present, they will assume the worst and will become demoralized, slow down their work, or depart early.

Dissolution of the Project Manager

What do you do with your project manager upon completion of the special project? Theoretically, if we rotated our employees, and especially our engineering staff, through the project management position and then return them to their functional groups as individual contributors they should be more well-rounded individuals. They should also have a better appreciation and understanding of project management and function better in their original group as an individual contributor.

This theory sounds good but actually has very little merit. In reality, this plan of action has five detrimental effects. First, employees will not be dedicated to their project management responsibilities because this role is only temporary. A project manager in this situation will maintain close alliances with his functional group. If a situation arises that requires a decision to be made that would negatively impact his functional group, the project manager may choose not to fully support the goals of the project.

Secondly, project managers assigned on a temporary basis will make sure there will be a need for them upon return to their permanent group. They may create this need by not relinquishing responsibilities for other assignments or projects they are working on prior to the project management position. They may try to maintain responsibility for an existing assignment, knowing that no progress will be made, but assuring that the functional group still has a need for him to complete the assignment upon his return from his project management role.

Third, temporary project managers usually walk the straight and narrow path and avoid any risk. Any risky decisions are left to the project management office, other projects managers, or the replacement project manager. If a temporary project manager makes a risky decision that later has a negative impact, he may be jeopardizing his opportunity to act in this role again, something he does not wish to do.

Fourth, a project manager that has come a technical group where the rate of technological change is significant, may find himself technically obsolete. He may not be able to integrate himself back into the functional group.

The last point in the most serious problem with rotating employees through the project management role. The employee may find himself so attracted to the project management function that he does not wish to return to his functional group. If the company does not have another project manager position available and forces the employee to return to his functional group, the employee may leave for a permanent project management opportunity.

In summary, a company should place people into project management positions only if they can assure a permanent career for the employee. The top management must realize the unique resource that they have and take special precautions in the management of this resource. It may be necessary to utilize the project manager to accomplish special tasks when new project opportunities are not immediately available. Since the project manager has an in-depth understanding of the organization, the people, and the products, his talents may be wisely used when he is not managing projects to pursue new business opportunities.

Project Management in three local electronics companies.

In the survey we conducted (see appendix for survey), questions 4, 17-23 were directed at dissolution of the special project team. Prior to the survey, we drew three hypothesis regarding the dissolution of the special project team and the practices within the authors' companies (Intel, Oeco, Sequent). We used these as our null hypothesis and used the results of the survey to test our hypothesis. The null hypothesis are:

- A) Job skills obsolescence of special team members is not a concern as indicated by the time and money budgeted for such activity. (Survey question 17).
- B) The closure, or dissolution of the project does not occur according to earlier planned activities, completion of contractual milestones, or per established checklists or procedures. (Survey questions 19, 20, 23).
- C) Typically, our project managers are not concerned about team members future assignments, resulting in the team members pursuing their own job searches. (Survey questions 18, 21, 22)

The first hypothesis was tested with survey question 17. The average response was that it was up to the individual to keep his/her job skills current and that there was no time budgeted by the project manager for this activity. Only 10 percent of the responded gave an answer that would support our hypothesis. Thus indicating our null hypothesis was false. The response for the second portion of question 17 (average response = 4.0) indicated that project managers and functional managers did recognize the need for training and felt that some time should be budgeted. We can draw a summary that project managers recommend that they should budget for training but, to date, have not made much progress to do so.

The second hypothesis was tested with survey questions 19, 20 and 23. The responses to questions 19 and 20 did not support the hypothesis. It is apparent that most special project teams came to a close per some type of milestone or

procedure. The responses to question 23 did indicate that in some instances, there were no considerations for dissolving the project team during the formation but again, some consideration was made. Our second null hypothesis was proven incorrect.

The third hypothesis was tested with survey questions 18, 21, and 22. The survey indicated that some members leave the project early. This is probably due to the decreasing need for resources during the phaseout of the project. Worthy of noting was the high percentage of respondents (40%) that indicated that the project manager does not look for new opportunities for the team members. This is in complete opposition to the suggestions of Kerzner (1984). We suspect that this response came from the fact the most project team members come from function groups and it is typically the functional manager's responsibility to find new opportunities. Although the project manager does not find new opportunities for the team, most of the team know their next assignment as indicated from the results of question 22. His the exception of our hypothesis that team members look for new jobs on their own, our third hypothesis is proven correct by the survey.

APPENDIX A

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APPENDIX B

PROJECT TEAM CHECKLIST

An project management review checklist was developed and presented by Cleland and King (1975 Appendix Three) which includes questions to ask about:

authority,
 charter including disestablishment,
 priority,
 complexity,
 historical data,
 project visibility,
 project manager's rank and staff,
 communication channels,
 reporting, reviews and evaluations,
 management information systems,
 financial management,
 planning, technical direction,

and a few other miscellaneous items. We highly recommend that reference for any project team leader or manager of project team resources. In addition, we feel the following inquiries build on that work and will add to the understanding of factors leading to team success. Refer to text for considerations and guidelines about the following:

Corporate Environment for Innovation and Team Success:

1. What is the basis of corporate structure? Competitors (environment), efficiency (bureaucracy), character of CEO (leadership), or strategic planning committee?
2. How does your proposed project align with and support corporate charter?
3. Do other teams with charters of similar scope/nature use matrix, manager, integrator, or less formal team leadership?
4. Is the leader from high status department, from department most impacted by the team's charter, shifted as project progresses through phases, or a "professional" project leader from outside the functional groups altogether?
5. What is the environment for teamwork in your organization, in regards to
 - Speed and accuracy of communication,
 - Number of levels between implementors and CEO
 - Participation in long range planning.
 - Participative interviewing techniques
 - Cooperation between project and functions in selecting team members
 - Turnover rate
 - Average number of projects people are working on
6. If you recognize environmental threats to the well-being of your project, do you have convincing information and access to authority required to change that factor? If not, what can YOU do to minimize the negative environmental factors?

Strategic Nature of Project Teams

1. Be aware of the fact that the need for special project teams occurs in most companies.
2. Is the charter really unique? Are there alternatives to accomplishing the mission such as using exiting functional resources or adding resources within a team with a similar but existing charter.

3. Is more new technology required than normal to complete the project?
4. Does the customer require a special product?
5. Are there security/proprietary requirements that a special team would satisfy?
6. Is the schedule significantly tighter than normal?
7. Is the company embarking in a new market direction?
8. Are the cost constraints significantly tighter than normal?
9. Is the planned product more complex than the company usually handles in the design process?
10. Are special skills required to complete the project that are unavailable in the company?
11. Is there a significant combination of the above factors involved in the project?
12. If the answers to any of the last 9 questions is yes then the project is a candidate for having a special project team assigned. Review with company management the appropriateness of assigning a special project team.

Team Formation Dynamics:

Leadership Attributes

1. Is your special project team lead by an "integrator", a project manager?
2. Does the project manager have good interpersonal skills?
3. Is the project manager flexible in his professional style?
4. Does the project manager possess the personality characteristic of marginality?
5. Does the project manager have good oral and written communication skills?
6. Does the project manager have good negotiating skills?
7. Is the project manager a technical expert in the field concerning the product or task that he is managing?
8. Does the project manager have direct input to team member's performance reviews?
9. Does the project manager have adequate tenure with the organization to understand its structure, standard operating procedures and policies?
10. Does the project manager have a project budget?
11. Is the project manager authorized to expend funds (to a set limit) for any necessary equipment or services that the parent organization does not have?

Members Attributes

1. Does the project manager hand select the members of the special project team or does he jointly interview the candidates with the functional managers to select the team or does he get whom ever is available at the time the team is set up?
2. What recourse does the project manager have if a team member is not conducive to the project or team?
3. Will the team members be physically located together?
4. Will the special project team be isolated from the parent organization?
5. Have the technical skills of the required team members been established?
6. Does the team member interface well with other team members and the parent organization?
7. Does the team member work well under stress?
8. Does the team member demonstrate positive behavior?

Team Training

1. Has time been budgeted into the project schedule for team members training?
2. Do the team members attend weekly functional group meetings?
3. Do the team members require any special training, either individually or as a group (e.g.: are they going to be working with high voltage and thus need CPR training)?
4. Will the team members be trained on systems that the parent organization uses, even though the systems are not being used on the special project?
5. Will the team members receive any special training or skills that the parent organization does not presently have?

Team Dissolution:

1. Does the team leader assure placement of members at closure? Rate member or otherwise work with functional manager who has reassignment responsibility?
2. Recognize member contributions toward team and corporate goals

Project Team Management Survey

Answers to this questionnaire will be used as input to a paper being researched for a graduate class at Portland State University. The class is EAS 541, Engineering Management and Principles, directed by Dr. Kocaoglu. The subject of this research is Formation and Dissolution of a Special Project Team. For purposes of this research, "special project team" is defined as an engineering team organized to develop a marketable product. The team operates outside normal channels or in some way is breaking new organizational ground, due to schedule, security, product complexity, different market niche, or some other challenge that is not routine to your company.

This set of questions has been trialed to take twenty minutes to answer. Please feel free to write additional comments in margins, below questions, or on the last page. Your support of our research is appreciated.

1) Select (check) the organizational profile below that most closely matches your company:

Experienced-based authority, intensive collaboration with experts inside and outside the company, professional standards, flexible and quickly adopt strategies and structures consistent with dominant competitors.

Clear and well documented general rules, measurements based on efficiency, industry leadership role that includes government lobbying and engaging in trade agreements and cartels.

Focused niche strategies, informal and simple structures, intuitive decision making, and risk taking. Uniform corporate culture and general understanding of owner/founder/CEO goals.

Analytical decision making, planning department formally codifies and widely distributes strategic plans. Structure is created by market niche selection. Typical customers solicited insist on novelty or state-of-the-art. Avoid cost-conscious or commodity buyers.

2. How many levels are between you and the CEO of your company? ____
how many levels report to you if any. _____

3. Please circle or "rank" your perception of **communication** in your company and in your immediate department or work group (people reporting to you and your manager).

<u>Company</u>		<u>Work group</u>
Speed (or lack) vertically and horizontally		
1	Dismally slow speed of communication	1
2		2
3		3
4		4
5	Nearly always receive news/information quickly	5

Accuracy of information travelling between more than one level or individual.

1	Extrem screening or distortion of info	1
2		2
3		3
4		4
5	Info nearly always accurate	5

Need for manager to have extensive amounts **of information** immediately available.

1	Others have files/data bases, little need for mgr	1
2		2
3		3
4		4
5	Mgr needs immediate access to much data	5

4. a) Are you a line manager? Y N
 b) Are you a project manager? Y N
 c) Are you currently a member of a project team? Y N
 d) How many projects are you currently a leader or an active and regular participant:
- no projects
 - 1-2 projects
 - 2-4
 - 5-10
 - more than 10 projects

5. What percent of your assignments or work direction is given to you by your immediate superior?

- less than 10%
- 10-25%
- 25-50%
- 50-75%
- more than 75%

6. Who contributes most to long range (>1 year) planning in your company?

- Chief executive does it
- A planning staff or team of which you are not a direct participant does it.
- You and your peers on a planning staff do it with executive or staff coordination
- You, your peers, and subordinates do it with executive or staff coordination
- Not sure who does long range planning.

7. Your best estimate of annual turnover rate in your company, department (including all working for your manager). Exclude corporate layoffs.

<u>Company</u>	<u>Department</u>	
<input type="checkbox"/> under 2%	<input type="checkbox"/>	
<input type="checkbox"/> 2-5%	<input type="checkbox"/>	
<input type="checkbox"/> 5-10%	<input type="checkbox"/>	Exclude corporate layoffs.
<input type="checkbox"/> 10-15%	<input type="checkbox"/>	
<input type="checkbox"/> over 15%	<input type="checkbox"/>	

8. What best describes how your company interviews engineering employees?

- Hiring manager is the only one who conducts full interview.
- Personnel and hiring manager interview prospects.
- Hiring manager interviews, with screening or interviewing support from personnel and a key technical expert or additional level of management.
- A team of people do screening and interviews, including hiring manager, personnel, candidate or manager's peers, and/or key project manager(s).

9) What best describes your company's dominant factor for promotion of engineering management:

- Demonstrated ability to meet and exceed formal goals for product or project costs or budgets.
- Demonstrated ability to meet or exceed project schedule requirements
- Demonstration of high technical capability and innovation to meet or exceed performance standards.
- Demonstrated ability to work well with others, to get along with key personnel inside and outside immediate work group.
- Ability to get along well and excell at acheiving the objectives of your immediate management.

10) Given what you know about existing project management at your company, what kind of requirement is most likely to require a "special project team" working outside the established patterns to succeed? If more than one, please mark each and put a "1" next to the one most likely to result in such a team.

- New market direction
- Schedule constraints
- Cost constraints
- New technology required
- Customer "specialization" requirements
- Security/proprietary requirements
- Complexity
- Specialized skills required
- Other: _____

11. Have you ever been involved with a "special project team" that had to operate outside of previously established corporate patterns. Y N

12. If yes, estimate how many such special teams you have participated on:

- 1
- 2-4
- 5-7
- 8-10
- more than 10

13. For each special project team you have been involved with in your company, check the factors that caused those teams to be set up. Check all that apply. Please attempt to distinguish, and don't include "standard" or routine corporate programs using on-going project management.

14. Given the role as a project manager on a new project, what do you think works best to build a project team that can work effectively in your company

- Select the individuals to work on your project team
- Have department mangrs assign people to team based on overall goals
- Write a task or job description and present requirements to the functional manager who assigns memembr to your team.
- Write task/job description, then joint interview prospects with functional mgr.

15. Special projects teams that have been most successful in your experience used the following method for physically locating team members:

- 1 Physical location of team members insignificant for success
- 2 Team members remained in parent groups
- 3 A few members put together, rest stayed in parent groups
- 4 Most located together, a few stayed in parent groups
- 5 Were all physically located together

16. Is personality a criteria for team member selection?

- 1 Not a consideration
- 2 Barely a consideration
- 3 Considered, but not as critical as technical skills
- 4 Considered equally with technical skills
- 5 Considered most highly

17. Are time and money budgeted to keep your project team members skills current with their peers in the parent organization?

Example: A new CAD system for mechanical design is purchased by the engineering group. Most of the mechanical designers in the company are trained on the new equipment. Does the mechanical designer on your team get training on this system during your project timeline, even if your project does not specifically require it? What you have "experienced" vs what you recommend:

Experienced		Recommend
1	No time or money budgeted by project manager	1
2	Some slack time, up to individual to keep current	2
3	Some slack time from project, parent group handles training	3
4	Occasional trade shows/training budgeted into project	4
5	Study/training time is mandatory in project on regular basis	5

18. As a project reaches the final phase, do team members in your company typically leave the project to pursue work on another project?

- 1 All team members engage in separate/independent job searches
- 2 Project leader and a key person or two stay to completion
- 3 A large percent are reassigned prior to project completion
- 4 Most of the team stays together
- 5 The entire team stays together to completion

19. Do the projects you manage, or are a member of, come to a close according to an agreed-on contractual milestone? This agreement may have been reached with a customer or your management.

- 1 Never, no milestone is set
- 2 Projects typically go on indefinitely with a "maintenance" crew
- 3 Project has informal completion date that few people know about
- 4 There is a recognized completion, some tie-in w/ team disbanding
- 5 A milestone is formally agreed upon and the team is disbanded only upon meeting this milestone.

20. Is there an established checklist or procedure for bringing a project to a close?

- 1 No established procedures.
- 2 Processes if any are established by the project leader
- 3 Informal procedures.
- 4 Informal or formal procedures used by most project managers
- 5 Management approved written procedures, clearly communicated.

21. Do you, or the project manager, find new projects or job assignments for the team members upon completion of the project?

- 1 No, the project manager does not look for new projects.
- 2 Project manager occasionally makes effort to reassign key people
- 3 Project manager typically takes informal action, such as writing a letter of commendation for each team member to use in finding a new job.
- 4 Action (eg a review) is required of project mgr to close with members
- 5 The project mgr finds each team member a new project to work on.

22. Before your last project was completed, did you or your team members know what their next assignment would be?

N/A (eg: Last project never completed, was cancelled without warning, etc)

- 1 You or the team members did not know 30 days from completion what the next assignment was to be
- 2 A few people had some idea about their next assignment
- 3 Much of the team had some idea of their new assignment.
- 4 Most of the team knew what they were working on next
- 5 You and team knew exactly what assignment awaited completion of the current project.

23. At the formation of the project team, are considerations made for the dissolving of the team?

- 1 No considerations.
- 2
- 3 Some consideration but no action plan.
- 4
- 5 An action plan to dissolve the team is developed

Comments: