

A Study on the Types of Managerial Behaviors, Styles and Practices that Lead to Project Success

by

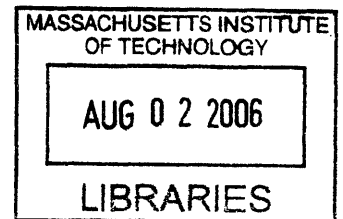
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ABSTRACT

To expand on the understanding of effective leadership and management, this study provides new evidence on the relation between employee satisfaction, project success, and managerial characteristics for the optimization of both. During the twentieth century, many have tried to uncover what it really means to be a good leader and to determine if it is possible to identify or create such people. In the managerial context, researchers have looked at project success and employee satisfaction as potential measures of leadership effectiveness. This study evaluates a behavioral and a value-based leadership theory and provides evidence consistent with both. The findings do not point to a strong direct relation between employee satisfaction and project success. However, the results do offer two sets of unique leadership characteristics, one with a strong relation to employee satisfaction and one with a strong relation to project success.

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Introduction

During the twentieth century, many have tried to uncover what it really means to be a good leader and if it is possible to identify or create such people. In the managerial context, researchers have looked at project success and employee satisfaction as potential measures of leadership effectiveness. Several theories have evolved showing that certain traits, certain behaviors, or a combination of both, identify effective leadership.

However, current research on the relationship between employee satisfaction with management and its relationship to project success is sparse. The literature tends to focus either on project success as a result of manager behaviors or on employee satisfaction as related to work performance. In the former case, employee satisfaction is only sometimes indirectly linked to project success and manager behaviors. In the latter case, employee satisfaction is often ambiguously defined – is it satisfaction with self, group, or organization?

This study focuses on the relation between employee satisfaction with management, project success, and the managerial characteristics for optimization in both realms. This study will address the following questions:

- (1) What is the relation between managing a successful project and being well-liked by the employees?
- (2) What types of managerial behaviors contribute to each?

Background

During the first half of the twentieth century, researchers focused on identifying traits which characterize a great leader. The objective was to study great leaders and learn which characteristics can potentially contribute to their unusual success in leadership. This search for common traits making up the “Great Man” produced several large sets of characteristics but not a single one could robustly predict effective leadership.

Disappointed by this trait leadership research, researchers at the Ohio State University began considering alternative theories of effective leadership. Among the pioneers were Stogdill, Shartle, and Hemphill. Instead of extracting common traits, they decided to examine common leadership behaviors (Stogdill 1950). Their work – one of the oldest behavioral project management theories – brought behavioral leadership research to the mainstream. This theory consists of two ideas – consideration and initiating structure. In 1953, Fleishman identified and evaluated these two behavioral factors contributing to group effectiveness. He argued that consideration is the “degree to which a leader shows concern and respect for followers, looks out for their welfare, and expresses appreciation and support” (Judge et al. 2004). More broadly, it is characterized by concern for people. Consideration leadership focuses on developing a relationship between followers and leaders based on trust, respect, and friendship. A leader of this type shows respect for subordinates’ ideas as well as consideration for their feelings.

In contrast to consideration, initiating structure refers to the “degree to which a leader defines and organizes his role and the roles of followers” and “is oriented toward goal attainment, and

establishes well-defined patterns and channels of communication” (Judge et al. 2004). A new structure or procedure is initiated for accomplishing the organizational goals and objectives (Hemphill 1949). Initiating structure leaders are often directive rather than participative. They focus on the task at hand and rely on transactions to get the job done.

This early theory of behavioral management was followed several studies, which argue that consideration and initiating structure behavioral theory is outdated and not adequately supported by the data. Conceptually, new theories emerged postulating that effective leadership characteristics are dependent on and vary with the particular setting or nature of the project. Additionally, behaviors were supplemented with traits to build comprehensive theories to characterize effective leaders.

Recently, however, some interest has been re-directed towards consideration and initiating structure as valid management theory (Keller 2006). Contemporary research has found that consideration is strongly correlated with followers’ satisfaction with leaders as well as their job satisfaction, their motivation, and perceived leader effectiveness. Concurrently, initiating structure has been found to be strongly correlated with leader job performance and group-organization performance (Judge et al. 2004).

Nevertheless, the leadership theory which for the past decades has garnered more attention is the value-based transactional-transformational theory laid out by Burns in 1978 and later modified by Bass in 1985 (Keller 2006, Chan & Chan 2005). This newer theory focuses on satisfying individuals’ needs and rewarding them for accomplishments.

A large body of literature is currently devoted to the discussion of transactional and transformational leadership theory. Transformational leaders are those who “offer a purpose that transcends short-term goals and focuses on higher order intrinsic needs” (Judge & Piccolo 2004). In essence, they provide motivation and inspiration to followers to perform well, often playing the role of coach, mentor, and teacher (Chan & Chan 2005). In 1978, Burns wrote:

One or more persons engage with others in such a way that leaders and followers raise one another to higher levels of motivation and morality... [It] causes followers to operate on a higher value plane, such as making good decisions for the good of society.

Transformational leadership inspires trust, confidence, admiration, and loyalty with the purpose of improving employee satisfaction and effectiveness. It has the object to transform the followers.

By contrast, transactional leadership focuses on the exchange of rewards, such as bonuses, raises and promotions, for jobs well done (Judge & Piccolo 2004, Chan & Chan 2005). Transactional leaders are goal-oriented and “are responsive to one’s immediate self-interests if they can be met by getting the work done” (Chan & Chan 2005). Specific performance and achievement guidelines are provided for followers, and rewards are given in return. The method is to achieve desired goals through transactions.

The original theory of transactional and transformational management was developed by Burns in 1978. He identified and defined the value-based leadership theory by expanding on the pioneering studies of behavioral leadership, which recognized that leadership can be multidimensional and can be learned (behaviors can be learned, while traits were originally thought to be inherent). He also recognized that traits, not only behaviors, are important characteristics of good leadership. He claimed that managers belonged to either the transactional or the transformational group. Later, in 1985, Bass argued for the importance of transactional and transformational theory and modified it by claiming that the best managers, in fact, belong to both groups. Bass also introduced the set of the six original factors used to measure the level of either transformational or transactional leadership.

This transformational-transactional method of managerial categorization, which has been developed throughout the past few decades, currently consists of nine characteristics modified by Bass and Avolio in 1993/1994 (Chan & Chan 2005):

Transformational Leadership	Transactional Leadership	Non-Leadership
Charisma Attributes	Contingent Rewards	Laissez-faire
Charisma Behaviors	Active Management-by-Exception	
Inspirational Motivation	Passive Management-by-Exception	
Intellectual Stimulation		
Individual Consideration		

Figure 1: Table of transformational-transactional leadership characteristics

Transformational Leadership Characteristics

Charisma Attributes	Manager deemed trustworthy and held by followers in high regard
Charisma Behaviors	Manager practices idealized influence on followers and portrays an image of resolute confidence and conviction
Inspirational Motivation	Manager uses figurative analogies and appeals to simple emotions to illustrate and convey the objectives and their importance to followers; provides encouragement and optimism
Intellectual Stimulation	Manager enhances followers' ability to function independently by honing their analytical skills and encouraging creativity
Individual Consideration	Manager builds a relationship of friendship and trust with followers and focuses on their individual goals and accomplishments

Transactional Leadership Characteristics

Contingent Rewards	Manager provides rewards in the form of praise, compensation, or advancement to followers for specific tasks performed or goals achieved
Management-by-Exception	Manager continuously involved in

Active	followers' tasks to supervise, to ensure correct performance and to instantly address any shortcomings
Management-by-Exception	Manager intervenes in followers' tasks
Passive	when performance falls below expectations

Non-Leadership Factor

Laissez-faire	Manager avoids involvement and responsibility
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The set of dependent variables in studies that evaluate these nine factors usually consists of employee work outcomes. Researchers ask which, if any, of the above characteristics results in extra effort, a perception of effective leadership, and satisfaction with the leadership (Chan & Chan 2005). Some research has provided evidence that both transformational leadership and contingent reward practices have a positive correlation with follower job satisfaction with the leader ($p < 0.01$), leader job performance, group and organization performance, and rated leader effectiveness (Judge & Piccolo 2004).

The transactional and transformational theory is not only more current and popular than the consideration and initiating structure theory, but it is also more comprehensive in that it includes both behaviors and traits.

First, the value-based theory includes consideration as one of several transformational factors. To that effect, the behavioral theory does not account for charisma, inspirational motivation, or intellectual stimulation. However, consideration and transformational leadership are both predicted to improve employee satisfaction.

Second, while the transactional and transformational theory introduces the transactional leadership style grounded in contingent reward and management-by-exception, the consideration and initiating structure theory relies on only a specific type of transaction, namely initiating structure. Both of these characteristics are predicted to improve project success. Keller (2006) performed an extensive study on transformational leadership and initiating structure together and found that both types are correlated to the technical quality, schedule performance, and cost performance of a team project.

There are two main issues to be addressed:

- (1) Although the value-based theory intuitively builds on and shares some broad similarities with its behavioral predecessor, there are key differences in specifically what factors are considered relevant for employee satisfaction and project success.
- (2) Moreover, while both theories imply that employee satisfaction is positively associated with project success, the explicit relation between the two remains an open issue.

To address the latter issue, this study provides some explicit evidence on the relation between employee satisfaction and project success. A series of surveys measures employee satisfaction and project success under individual managers. The implication of both theories outlined above

would be that higher employee satisfaction is associated with higher project success. Alternatively, the two could be unrelated. To address the former issue (regarding the specific factors determining satisfaction and success), there is empirical literature attempting to identify and evaluate leadership characteristics which contributes to both employee satisfaction and project success.

Employee Satisfaction

The body of literature relating to employee satisfaction is sparser than that on project success. Most studies point either to factors which can be determined by the leader or to those which are determined externally.

An example of the former type of factor is a study on communication within the organization. Muchinsky (1977) provides evidence that “the respondent who has a positive feeling about communication within the organization also has positive feelings regarding...the management in general”. This finding suggests that managers could improve communication to increase employee satisfaction.

An additional example is a study on employees’ overall job satisfaction. Norris and Niebuhr (1984) find that satisfaction with one’s leader is significantly positively correlated with the employee’s overall job satisfaction. According to this study, managers can affect employee satisfaction to the extent that the managers are able to control or influence the employees’ overall job satisfaction.

There are, however, certain project attributes which may affect employees’ overall job satisfaction, but are beyond the assigned manager’s control. For instance, the leadership behaviors or traits exhibited throughout the duration of a project have no direct affect on the original quality of that assigned project. Interestingly, a study by Keller (1986) finds that job satisfaction is not significantly correlated to project quality (as assessed by the manager). In other words, the literature provides some evidence consistent with the hypothesis that there are general leadership actions and attributes which can contribute to employee satisfaction, independently of the context of the project.

Project Success

A similar set of studies has been done with respect to project success. An enormous amount of literature is devoted to project success, but here a stronger case is made against the hypothesis that general optimal leadership characteristics exist.

Researchers have argued that optimal management depends on the project specific context. Some provide evidence to show that project success depends on the nature of the project, and that different project types call for different optimal leadership characteristics. Another provides evidence that optimal leadership will depend on the characteristics of the project team. Yet another study states that it is the stage in the lifecycle of a product which will determine optimal leadership. Taken together, these studies make the case that general good leadership characteristics, which would apply to all projects independently of context, cannot be identified.

The first set of studies looks at the nature of the project. Balachandra and Friar (1997) point to the nature of the project as a key determinant of project success. The authors examined the literature on project success and found many contradicting results. They found a total of 72 factors (gathered from various literature sources), which have been argued to affect project success. However, many of these factors contradicted each other, and their interpretation of a subsequent data analysis supports the view that project success actually varies depending on the context in which the project is initiated.

Balachandra and Friar (1997) argued that the nature of the project varies by the nature of the innovation, the nature of the market, and the nature of the technology. The nature of the innovation refers to the newness of a project, and can be classified as either incremental or radically innovative (Balachandra & Friar 1997). Incremental projects are ones that typically use heavy R&D to develop a product that is based on some other existing product. Innovative projects tend to use very little R&D; the market is often ill-defined, and the venture is considered risky (Tushman 2004, Ulrich & Eppinger 2004). Market can be divided into existing or new, where new markets are much more risky and difficult to understand. The nature of the technology of a project can be either high tech or low tech, which describes the rate of new technology introduction. A project in a high tech industry will have to compete with a high rate of new product introductions (Balachandra & Friar 1997). The authors conclude that projects are very different, and that to achieve project success, one has to account for these differences.

Another study similar to this has been presented. In Shenhar (2001) projects were categorized based on two groups – system scope and technological uncertainty of the project. System scope at its simplest is in an assembly project, which consists of only one element – “a stand-alone product that performs a *single function* of a limited scale” (Shenhar 2001). A collection of assemblies creates a system project, and a collection of system projects results in an array project (or program). Technology can be divided into low-tech, medium tech, high-tech, or super high-tech, where higher product technology means higher technological uncertainty. The study on different project types revealed that projects with different characteristics (scope and technology) cannot be managed successfully in the same manner. Again, the case is made that the characteristics of optimal leadership depend on the project specific context, because there are different project types which have to be managed differently.

A second set of studies analyses the nature of project teams and success. Wheelwright and Clark (1992) divide project teams into four categories, each requiring a different style of management: functional, lightweight, heavyweight, and autonomous.

In a functional team setting, a project is essentially funneled through different divisions within a firm (i.e. engineering -> manufacturing -> marketing). This type of team is most commonly found in large, established companies. Functional managers are specialized in their area, so they are better equipped to help teams solve problems. In addition, recurring problems are easily solved, due to past experience. However, because no manager devotes all of his/her time to one project, they are less attached to and aware of the project mission. There is also less room for creativity, since solutions are systematically applied.

Lightweight managers are responsible for coordinating the activities of the functional groups, but he/she only spends about 25% of his/her time on a project. Lightweight managers do not have a great deal of power over these groups (sometimes none at all, due to team members' disregard) – their main responsibility is to give guidance.

Heavyweight project managers have roughly the same job description as lightweight managers, but they spend much more of their time on the project, and they carry more decision-making clout. Heavyweight managers (as well as project team members) are more aware of project missions, and they have a stronger sense of ownership and commitment. Communication is better between cross-functional team members, since they are better integrated into the development of the project.

Finally, the autonomous team, also known as the tiger team, is a group independent of the functional hierarchy. These groups typically work on new products, where the market is less defined and the technology more difficult. Members of tiger teams are dedicated entirely to one project and are usually “co-located.” Since the team members are devoted 100% to these projects, and since they are not located with the rest of the traditional functional division, there is much more room for creativity. These teams are generally given more freedom, and the level of bureaucracy is much lower, allowing for faster product-to-market timing. However, it is important that the tiger team manager sets clearly defined guidelines for the project team, since it is easy to diverge in a less regulated environment. Project leaders of these groups also have total control of all the group's resources and group evaluations. (Wheelwright & Clark 1992)

Given the four different types of project teams, Wheelwright and Clark (1992) suggest that optimal leadership characteristics have to match the nature of the project team. They make a case that one cannot identify general optimal leadership characteristics without regard for who is being managed.

A third set of studies examines the project stage. Success factors were assigned based on the stage of the product in its life cycle – strategic or tactical. The strategic stage refers to the developmental phase of the project, or “up-front planning activities” (Pinto & Mantel 1990). In this stage, it is important to have a clear mission, top management support, and detailed schedule/plans. The tactical stage refers to the actual “project execution, performance checks, and transfer of the project to its intended users” (Pinto & Mantel 1990). During this stage, it is important to focus on client consultation, personnel, technical tasks, client acceptance, troubleshooting, monitoring and feedback, and communication (Pinto & Mantel 1990). Here, too, it is argued that optimal leadership characteristics depend on context, namely the project's position in its lifecycle.

A fourth set of studies has identified individual factors which potentially lie outside the control of the leadership, but that can nevertheless affect project success. These include having: clearly defined goals (i.e. project mission or philosophy), a competent project manager, top management support, competent project team members, sufficient resource allocation, adequate communication channels (i.e. information on project objectives, status, changes), control mechanisms (i.e. planning and scheduling), feedback capabilities, and responsiveness to clients. Pinto and Slevin (1987) argue that all contribute to project success, yet it is apparent that many

of them cannot be affected by changes in leadership characteristics. To the extent that these external characteristics can determine what leadership is most suitable, it is unclear that general optimal leadership characteristics can be identified.

All in all, there seems to be a great deal of mixed evidence regarding employee satisfaction and project management success. The two theories discussed earlier suggest that there are general leadership characteristics which determine the level of follower satisfaction and project success. Other studies focus on the project environment, on the nature of project teams, on the stage of the product lifecycle, and other external factors. These studies tend to suggest that it is inappropriate to identify general leadership characteristics applicable to all situations, because they will vary with the specific context.

To shed some light on these competing views, as well as to provide support for the behavioral-theory, the value-based theory, or both, this study provides evidence on managerial attributes and practices in a general context. In a series of surveys measuring project success and employee satisfaction, certain characteristics of leadership are evaluated.

The identification of any such characteristic as significantly related to project success or employee satisfaction would be consistent with the view that there are general optimal leadership qualities. However, if no such relation is found, then the evidence would be consistent with the view that optimal leadership qualities vary with situation.

Given that general optimal qualities are identified, a comparison of those related to the consideration and initiating structure leadership theory to those related to the transformation and transaction leadership theory will shed some light on the validity of both.

Methodology

This study relies on data from engineers at a medium-sized, high-tech software company located in the US. This company, which is organized in a functional hierarchy, develops computing equipment which is used by equipment manufacturers in different industries. At the time the surveys were sent out, near the end of 2004, the company was 20 years old and had 730 employees, over half of whom were engineers. These engineers formally report to a functional manager who also has project management responsibility. Engineers work on projects in a matrix organization, which means that they may or may not be directly managed by their own functional manager.

Data collection

All 353 engineers were asked by the CEO, via e-mail, to respond to the survey as part of a research study. Four weeks and several follow-up e-mails later, we received a total of 208 responses, or a 59% response rate. The survey asked the engineers to provide information on the frequencies with which his/her manager performs certain tasks (Appendix A). It also asked them to evaluate how satisfied they were with their manager. Although employees were given the option to rate three managers, nearly all of them only rated one – their functional manager. We make the assumption that managers have styles, and that their functional reports can reliably

provide information on the frequency of managerial practices, such as problem solving, holding meetings, coaching, etc.

Our first task was to try and understand the main differences in manager behavior. Twenty-four behaviors were measured in the survey, and my first task was to determine which of these behaviors exhibited a wide variation across managers. Somewhat surprisingly, we found some variation across all of the practices, but to really understand this variation and whether it has consequences, the survey responses needed to be rescaled.

Scaling responses

The employee survey responses were assigned on an ordinal scale where “daily” responses were assigned a 1; “weekly” responses were assigned a 2; “bi-weekly” responses were assigned a 3, and so on, until “never,” which was assigned an 8. Respondents’ scores for each task for each manager were then averaged to yield a group inferred score. This means that every manager was given a single score for each practice that was the average of all of the subordinates who rated that manager.

However, this score is not accurate since the ordinal averages do not reflect the proportional differences between the responses (i.e. the difference between daily and weekly is vastly different from monthly and quarterly). To mitigate this problem, a new method was implemented which takes into account the relative differences between the scores.

I assigned the numbers [1, 8] to the values [700, 100, 50, 24, 8, 2, 1, 0]. The second set of values represents the *number of times* that the given task is performed in a two-year period. In a parallel trial, I assigned [1, 8] to the values [1, 7, 14, 30, 90, 365, 700], where the second set of values represents the *number of days between each event* over a 2-year period. The two-year period designation was arbitrarily assigned, since I am interested in the relative difference more than the absolute difference of time in between events. The plot of the group inferred score vs. the actual number of times each event occurs, in general, represents an exponential curve in the form of either $a(b^{cx})+d$. Best fit curves were estimated for both cases, but it was found that the second trial most accurately represents the proportional difference between the scores. The final equation for the best fit line is approximately $1.66(1.25^{3.98x})-3.08$. This equation was then applied to all of the group inferred frequency scores.

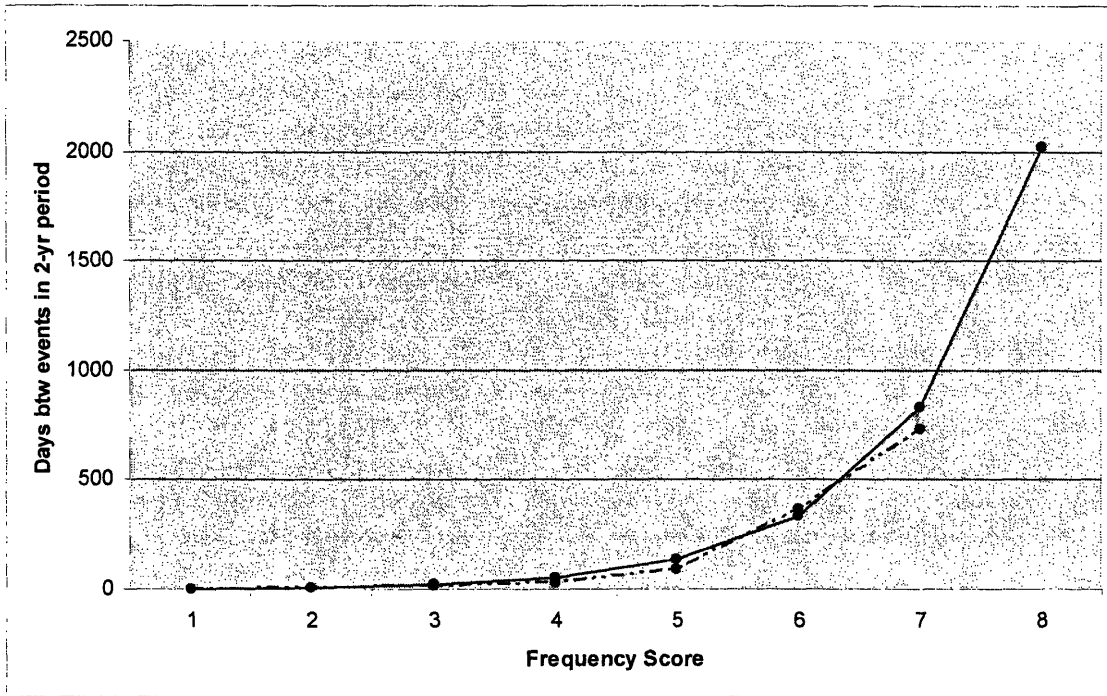


Figure 2: A plot of the best fit curve (dotted line) vs. the actual curve (solid line).
There are no points for $x = 8$ because the y -value is too high.

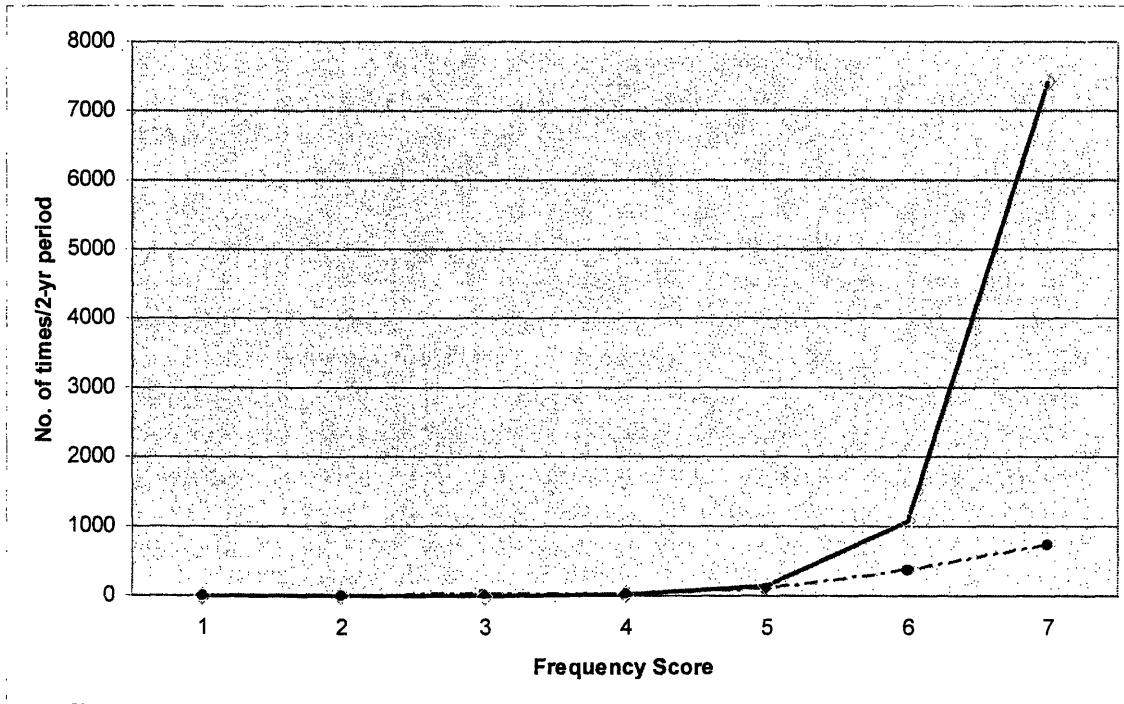


Figure 3: A plot of the best fit curve (dotted line) vs. the actual curve (solid line).
There is no point on the best fit curve for $x=8$ because it is infinity.

Project performance data was gathered via an expert panel. Experts within the company, primarily senior managers, were asked to evaluate the projects on which the engineer

respondents had worked. These experts were asked to rate the characteristics and outcomes of certain projects that they were familiar with (Appendix B).

Since the experts on the project evaluation panel all had different experience bases and backgrounds, not all projects were evaluated equally. It is important to have a diversified set of evaluators for each of the projects, so we categorized the evaluators into groups and picked out projects that were represented from all points of view. The software company provided a list of project evaluator backgrounds, which are divided into three categories: engineering, business, and corporate. It is possible for an evaluator to have more than one type of background. Each surveyed project was then categorized based on the number of evaluations for it and the diversity of the evaluators. Those projects with two or more evaluators and consisting of all three backgrounds (engineering, business, and corporate) were singled out for further study. A total of 63 projects out of the original list of 101 survived this process (63% retention).

Success and Self Ratings

The success ratings were based on the last six questions of the senior manager project evaluation surveys:

- All in all, how successful was this project?
- All in all, how well do you think this project was managed, given the external risks that it faced?
- All in all, how well did the team work together on this project?
- To what extent was this project delivered on time?
- To what extent was this project completed within the original budget?
- How well did this project meet customer requirements?

The project outcomes were rated on a scale from 1 to 7, where 1 = not at all, 4 = somewhat, and 7 = extremely. The average of the six answers is the respondent's success rating for the surveyed project. The average of all the ratings for each project then becomes the average success rating for that project.

However, some of the projects were surveyed by a senior manager who was personally involved in the project, who we will call a self-rater. Self-rater scores may be subjective and therefore skew the overall score. We postulated that the extraction of the self-rater surveys would decrease the success scores of the project. To solve this problem, self raters were taken out of the project success calculation for the remainder of the study.

Out of the 101 projects that were given success scores, 47 of them had one self rater, 3 had two self raters, and the remaining 54 had no self raters. A comparison of the new results without self ratings, versus the results including self ratings, showed that on average, there is no significant difference between the two. Of the 50 projects, 27 of them had higher success scores after the extraction of the self ratings, while 23 of them had lower scores. The average increase in scores for the 27 projects was 0.3124, while the average decrease in scores for the 23 projects was 0.2822. The standard deviation for the former group was 0.4485, and 0.2911 for the latter.

	Increase in score	Decrease in score
Total	27	23
Average change	0.312397	0.28219
Standard deviation	0.448455	0.291079

Figure 4: Results when scores without self ratings were subtracted from scores with self ratings

Data analysis

The purpose of the following data analysis is to determine which of the 24 manager behaviors are linked to either project success or employee satisfaction with the manager. First, I had to identify the most successful managers, or “performing” managers, and the best-liked managers, or the “satisfaction” managers. The performing managers are those who have the highest average project success scores (top 25%), and the satisfaction managers are those who have the highest rated employee satisfaction scores (top 25%). Then, two t-tests were performed on the group inferred average scores (modified by the best-fit curve), which give the frequency with which managers perform certain behaviors. The success scores are taken from the senior management project evaluation surveys, and the employee satisfaction scores are taken from the engineering version of the surveys.

One test was done on performing managers versus non-performing managers. The performing managers group consists of the top 25% most successful managers, meaning that they had, on average, the highest project success scores. The success scores (average success of projects) of these managers are 20% higher relative to all managers, 25% higher than the remaining managers, and 55% higher than the bottom 25% managers, or the least successful quartile of managers.

The second test was done on managers with the top 25% highest satisfaction scores versus the remaining managers. The employees of these managers gave them, on average, the highest satisfaction ratings. These managers on average have 74% higher satisfaction ratings across all managers, 2.5 times higher ratings than the remaining managers, and more than 11 times higher ratings than the lowest 25% of manager satisfaction ratings.

Results

The following tables (Figure 4) show the results of the mean comparison t-tests, where the numbers in the charts represent the number of days in between each task.

	Hold scheduled group meetings	Host social activities (e.g. lunches, parties, happy hours)	Engage in team building activities	Resolve conflicts among group members	Provide formal performance feedback	Monitor the progress of work being done in your group	Openly discuss your work group performance	Assess the quality of your work
HP STDEV	389.9	730.0	680.1	615.8	356.7	184.8	517.9	365.7
HP AVG	152.2	682.9	747.3	862.4	348.5	71.3	429.5	270.8
P AVG	78.9	303.3	616.0	638.6	333.5	24.5	260.6	239.5
P STDEV	114.0	349.7	476.1	395.8	75.2	28.4	185.4	158.6
T STAT	1.08	2.27**	-0.21	1.62*	0.46	1.98**	2.04**	0.61
NS AVG	105.122	678.478	916.880	948.391	386.771	97.368	445.053	328.265
NS STDEV	232.297	762.531	684.835	640.814	369.285	229.668	516.288	383.604
S AVG	227.770	366.218	394.066	551.890	257.080	22.274	390.853	132.820
S STDEV	575.883	268.191	439.615	392.620	113.059	35.726	593.345	135.559
T STAT	-0.830	1.92**	3.41***	2.83***	2.05**	2.18**	0.320	2.92***

	Conduct formal reviews of work products (e.g. code reviews)	Discuss organization strategy, priorities and direction	Discuss your schedule and deadlines	Update or modify formal technical specification documents	Update formal project planning documents	Openly discuss work group schedules and deadlines	Spend time with you doing 1-on-1 coaching	Collaborate with you to solve problems
HP AVG	731.7	433.1	306.3	772.2	698.2	473.8	586.3	476.4
HP STDEV	932.2	330.4	177.7	694.2	471.9	201.3	450.5	281.4
P AVG	1104.9	145.8	122.5	601.8	164.3	44.5	258.6	380.2
P STDEV	625.9	90.8	109.4	346.8	189.7	43.8	157.0	311.8
T STAT	-0.66	2.67***	1.22	0.78	2.56***	2.50***	2.21**	-0.47
NS AVG	1011.5	316.9	197.0	729.8	378.9	205.6	500.1	432.3
NS STDEV	706.4	426.5	296.1	706.6	600.1	484.7	585.9	559.8
S AVG	902.7	234.7	135.2	634.1	512.4	218.1	295.5	34.2
S STDEV	793.5	304.3	300.2	838.5	784.8	578.6	577.4	39.9
T STAT	0.48	0.81	0.71	0.41	-0.59	-0.08	1.18	1.68***

	Discuss career goals with you	Meet with you 1-on-1 for at least 30 minutes	Conduct or sponsor training sessions	Informally converse with you	Publicly recognize staff members for their contributions	Receive status updates from you	Discuss organization financial performance	Resolve conflicts with individuals outside of your group
HP AVG	559.6	538.3	581.0	468.4	457.5	179.7	681.7	605.6
HP STDEV	581.6	357.7	602.2	147.5	353.5	64.8	664.3	586.2
P AVG	417.2	231.8	403.6	17.4	214.6	122.0	297.6	336.4
P STDEV	208.2	222.7	195.0	18.3	192.0	275.8	158.0	362.9
T STAT	1.64*	1.31*	2.15**	2.21**	1.84**	-0.44	3.55***	1.93**
NS AVG	610.0	369.8	699.2	217.6	438.4	116.6	704.4	627.7
NS STDEV	584.1	484.4	627.7	217.6	438.4	116.6	704.4	627.7
S AVG	437.6	274.3	293.5	3.7	150.2	10.5	422.4	418.4
S STDEV	539.4	555.6	179.6	2.5	223.3	5.9	580.0	405.1
T STAT	1.05	0.59	3.85***	2.45***	2.94***	2.75***	1.58*	1.47*

Figure 5: T-test Results

(The average (AVG) and standard deviation (STDEV) numbers in this chart are measured in days.)

- P = Performing (top 25% most successful managers)*
NP = Non-Performing (remaining 75% of managers)
S = Satisfaction (managers with the top 25% satisfaction scores)
NS = Non-Satisfaction (remaining 75% of managers)

The following tasks had the most strongly statistically significant results ($p < 0.01$) in the successful managers group:

- discuss organization financial performance;
- openly discuss work group schedules and deadlines;
- update or modify formal technical specification documents;
- discuss organization strategy, priorities and direction.

The following tasks also had significant results ($p < 0.05$) in the successful managers group:

- host social activities (e.g. lunches, parties, happy hours);
- publicly recognize staff members for their contributions;
- monitor the progress of work being done in your group;

- spend time with you doing one-on-one coaching;
- informally converse with you;
- resolve conflicts with individuals outside of your group;
- openly discuss your work group performance;
- and conduct or sponsor training sessions.

The following tasks had less significant results ($p < 0.10$) in the successful managers group:

- discuss career goals with you;
- meet with you one-on-one for at least 30 minutes;
- resolve conflicts among group members.

The following tasks had the most statistically significant results ($p < 0.01$) in the best-liked managers group:

- engage in team building activities;
- resolve conflicts among group members;
- assess the quality of your work;
- collaborate with you to solve problems;
- conduct or sponsor training sessions;
- informally converse with you;
- publicly recognize staff members for their contributions;
- receive status updates from you.

The following tasks also had significant results ($p < 0.05$) in this group:

- host social activities (e.g. lunches, parties, happy hours);
- provide formal performance feedback;
- monitor the progress of work being done in your group.

These tasks had less significant results ($p < 0.10$):

- discuss organization financial performance;
- resolve conflicts with individuals outside of your group.

Eight of the 24 behaviors from the survey are significant in both manager performance and manager satisfaction ratings. These eight behaviors are: resolve conflicts among group members, monitor the progress of work being done in your group, host social activities, conduct or sponsor training sessions, informally converse with you, publicly recognize staff members for their contributions, resolve conflicts with individuals outside of your group, and discuss organization financial performance.

As for manager evaluation, there was only one overlap between the top quarter most successful managers and the top quarter best-liked managers. Although only one out of the sixty managers fell into both categories, eight of the 24 tasks have at least some statistical significance in both categories.

The charts below (Figure 6) compare the difference (in days between events) for the performing and non-performing groups and the satisfied and non-satisfied groups.

PERFORMANCE		SATISFACTION			
TASK	P does task x times more often than NP	TASK	S does task x times more often than NS		
***	Update formal project planning documents	2.9	Engage in team building activities	2.3	
	Openly discuss work group schedules and deadlines	4.5	Resolve conflicts among group members	1.7	
	Discuss organization financial performance	2.2	Publicly recognize staff members for their contributions	2.9	
	Discuss organization strategy, priorities and direction	2.3	Receive status updates from you	11.1	
**	Monitor the progress of work being done in your group	2.9	***	Conduct or sponsor training sessions	2.4
	Openly discuss your work group performance	4.5		Informally converse with you	58.8
	Host social activities	2.3		Collaborate with you to solve problems	12.6
	Spend time with you doing one-on-one coaching	1.7		Assess the quality of your work	2.5
	Conduct or sponsor training sessions	1.5		Provide formal performance feedback	1.5
	Informally converse with you	8.5	**	Monitor the progress of work being done in your group	4.4
	Publicly recognize staff members for their contributions	1.6		Host social activities	1.8
	Resolve conflicts with individuals outside of your group	1.7		Discuss organization financial performance	1.7
	Resolve conflicts among group members	1.4		Resolve conflicts with individuals outside of your group	1.5
	Discuss career goals with you	1.3			
Meet with you one-on-one for at least 30 minutes	1.5				

Figure 6: Comparison between significant P and NP and significant S and NS.

The numbers in the chart represent the number of times more that the performing or satisfied groups performed a task over the non-performing and non-satisfied groups, respectively. In all cases, the performing group – the most successful managers – performed the tasks more frequently than the non-performing group. The same applied to the managers with the highest satisfaction ratings. Though not shown on the chart, the standard deviation values for the performing group and the satisfied group are smaller than those of the non-performing group and the non-satisfied group, respectively.

Discussion

An evaluation of the empirical results reveals that the characteristics of managerial practices most significantly associated with differences in project success are (in order of significance): to discuss the organization's financial performance; to discuss the organization strategy, priorities, and direction; to update formal project planning documents; and to openly discuss work group schedules and deadlines. Successful managers have been found to perform these tasks between 2 to 5 times more often than non-successful managers. In general, these tasks seem to focus more on the technical aspects of project management – finance, strategy, priorities, direction, formal documentation, schedules, and deadlines. Together, they give the employee a clear idea of what has been done, what needs to be done, and what the end goal or project mission is.

On the other hand, the most significant factors for becoming the best-liked manager are (in order): to collaborate with the follower to solve problems, to conduct or sponsor training sessions, to engage in team building activities, to publicly recognize staff members for their contributions, to assess the quality of the follower's work, to resolve conflicts among group members, to receive status updates from the follower, and to informally converse with followers. All of these tasks, with the exception of three, were performed 1 to 3 times more often by the best liked managers. Best-liked managers received status updates from followers about 11 times more frequently than their peers; collaborated with followers to solve problems about 13 times more frequently; and informally conversed with followers about 59 times more frequently. It seems that, in general, well-liked managers engage their followers, open lines of communication with them, and are interested in their personal development.

It is interesting that none of the most significant factors appear twice (in the successful group and the best-liked group). The data suggests that managers who are perceived in the best light by their employees are not the same as those who carry out the most successful projects. Moreover, only one manager was in the top quartile of both most successful project group and most satisfied employees group. The data provides very little support for the link between employee satisfaction and project success implied by the consideration and transformational leadership theories.

Our results have implications relating to leadership behaviors postulated by the consideration and initiating structure leadership theory. The results are consistent with the former behavior in leading to higher employee satisfaction and the latter in leading to higher project success. Indeed the factors most significantly associated with project performance are behaviors such as enhancing formal organization and establishing clear expectations, with a focus on performance. This is typical of an initiating structure leader. Similarly, the factors most significantly associated with employee satisfaction are behaviors such as collaboration, team building, individual recognition, and an overall creation of a friendly, informal, and amicable atmosphere. Although many contemporary scholars dismiss this theory as "archaic" (Judge et al. 2004), the evidence provided here reinforces the argument that consideration and initiating structure are still very relevant in the development of contemporary leadership research.

In evaluating the transformational and transactional leadership theory, we see that there is also a link between this data and the theoretical predictions. On the transactional side, it is interesting

to note that only one of the contingent reward activities, such as formal performance feedback, discussion of group performance, or assessment of the quality of work, and none of the management-by-exception activities, such as monitoring, were among the factors most significantly related to project performance. In fact, only four transactional behaviors had any statistically significant relation to project performance: discussion of group performance, discussion of financial performance, monitoring of work in the group, and public recognition of staff member contributions. Comparing them to initiating structure behaviors, the transactional behaviors have a relatively weaker association with project performance.

Although contingent reward behaviors may imply a rigid and formal organizational structure, just as the original behavioral theories may imply transformation and value, it may be prudent to include initiating structure as an additional factor under transactional leadership. However, unlike initiating structure, which was mainly associated with project performance, transactional factors were also, even highly, associated with employee satisfaction. Status updates, assessment of work quality, and public recognition are all highly significantly related to employee satisfaction.

On the transformational side, behaviors beyond just individual consideration had a highly statistically significant relation with employee satisfaction. Managers who sought to motivate and to enhance the capabilities of their followers had more satisfied employees than those who did not. In other words, the additional behaviors and traits postulated by the transformational theory, beyond consideration, are of significant value, too.

Conclusion

Having evaluated some evidence on the relationship between employee satisfaction and project success, it appears premature to assign a causal link between the two. However, it is important to note the potential limitations of this preliminary evidence and the opportunities for future extension. Considering the research on situational leadership, vastly different settings from the one examined in this study may produce different results. To further validate the findings, the most significant factors of this study could be evaluated in a different setting.

The employee evaluations of managers should also be revised for the next study. In this study, employees evaluated their functional managers, and we assumed that managers exhibit the same behaviors whether in the functional or the project sense. However, this may not always be the case, since managing a functional environment could be very different from that of a project environment. For more accurate descriptions of project manager behaviors, employees should be asked to survey managers specific to projects that they worked on.

Furthermore, this study does not track the managers and their teams for multiple projects. There is no significant relation between employee satisfaction and immediate project success. Nevertheless, it is plausible that employee satisfaction and leadership factors significantly related to it greatly improve long-term performance. Although there is no overlap of the most significant leadership tasks between both groups, there are eight overlapping characteristics which are to some degree significant. This study suggests that managers who want to be well-liked and to also have successful projects should place priority on these

tasks. Conceptually, this essentially entails a combination of transactional and transcendental leadership or, alternatively, a combination of consideration and initiating structure leadership. Practically, however, this study offers evidence on which specific managerial practices are most strongly related to project success, employee satisfaction, or both and thereby constitute what some may call effective leadership.

Appendix

Appendix A: Engineering Survey

How frequently does the manager you identified do each of the following things? Please select the frequency that most closely describes his/her normal behavior.

	At Least	At Least	At Least	At Least	At Least	At Least	Only Rarely or when problems arise	Never
	Daily	Weekly	Bi- weekly	Monthly	Quarterly	Annually		
Hold scheduled group meetings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Host social activities (e.g. lunches, parties, happy hours)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Provide formal performance feedback to your direct reports	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Discuss organization strategy, priorities and direction with staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Publicly recognize staff members for their contributions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Monitor the progress of work being done in your group	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Spend time with individuals doing one-on-one coaching	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Receive status updates from individual direct reports	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Engage in team building activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Discuss schedules and deadlines with individuals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Informally converse with your direct reports	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Discuss organization financial performance with staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Assess the quality of work being done in your group	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Openly discuss work group schedules and deadlines	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Collaborate with subordinates to solve problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Update or modify formal technical specification documents	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Discuss career goals with all of your direct reports	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Meet individual staff members one-on-one for at least 30 minutes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Resolve conflicts among your group members	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Openly discuss your work group performance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Conduct formal reviews of work products (e.g. code reviews)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Conduct or sponsor training sessions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Resolve conflicts with individuals outside of your group	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Update formal project planning documents	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix B: Expert Panel Survey on Project Characteristics and Outcomes

Project Characteristics

Please evaluate project characteristics on a scale from 1-7 where 1 = *not at all*, 4 = *somewhat*, and 7 = *extremely*.

Characteristics
Overall, how important was this project to Mercury's success?
How difficult were the technical challenges on this project?
How much did the project's requirements change over the course of the project?
To what extent did the intended customer change over the course of the project?
To what extent did this project involve working with legacy Mercury technologies?
How much did this project depend on other groups or entities to be successful?
To what extent was this project able to engage the necessary resources within Mercury?

Project Outcomes

Please evaluate project outcomes on a scale from 1-7 where 1 = *not at all*, 4 = *somewhat*, and 7 = *extremely*.

Outcomes
All in all, how successful was this project?
All in all, how well do you think this project was managed, given the external risks that it faced?
All in all, how well did the team work together on this project?
To what extent was this project delivered on time?
To what extent was this project completed within the original budget?
How well did this project meet customer requirements?

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