

# HOW BEHAVIORAL SKILLS CAN MAKE PROJECT MANAGERS SUCCESSFUL FROM THE SENIOR MANAGERS PERSPECTIVE

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## Abstract

Project managers' direct companies' vital business practices by improving, coordinating and implementing the organizations critical money making work contented called projects. Projects which include new constructions, product launches and business processes improvements are required to be completed on time, on budget and within quality specifications by project managers. This requires that project managers demonstrate effective technical and non-technical skills in order to be successful in these tasks. This paper hypothesizes that effective behavioral skills are important to a project managers' success, and are greatly influenced by their personality type.

This research investigated the relationships between the technical skill ratings of a project manager and their personality type distinction as measured by the Five Factor Personality Inventory. The evaluation measures project managers and a project manager expert group for comparisons. The expert group consisted of experts in the field of project management, senior managers who manage project managers, and senior manager who were promoted from the project manager position. Models were created and tested using regressions to relate the technical skills with the personality factors of project managers in comparison to the expert group.

## Introduction

The implementation of projects and project management techniques continues to grow in our society and its organizations. Businesses regularly use project management to accomplish unique outcomes with limited resources under critical time constraints (Meredith 2003). The technical skills of a project manager are generally what their hiring is based upon, but, their success is not simply based on these technical skills. When companies are hiring a project manager they review their past experience and technical abilities, but this tells them little about their non-technical skills including, working with a team, empathy and motivation skills. Although these are also very important to the project success, they are not easily measured.

## Objective

The objective of this research was to evaluate the relationships of technical skills with the personality traits of successful project managers. Models were created to relate the personality traits of project managers and expert project managers to their technical skills of scheduling, budget control and project quality. This research suggests that these models may be used to predict the technical skills based upon personality traits.

## Big Five Factor Theory

Currently a popular approach among psychologists for studying personality traits is the Big Five Personality Factors (DeRaad, 2000). The five factors were derived from factor analyses of a large number of self-scored and peer reviewed reports on personality-relevant adjectives and questionnaire items. The constructs, or measurement categories, for the Big Five Personality Factor are openness, conscientiousness, extroversion, agreeableness and neuroticism. Many practitioners refer to this as the OCEAN constructs for the first letter of each factor (Buchanan, 1999). The Five Factor Personality Inventory test has been tested for reliability many times. The reliability of a questionnaire is a measurement of its ability to give similar results when different people administer it or when alternate forms are used.

There are many tests for personality type. One of the most well-known tests is the Myers-Briggs Type Indicator (MBTI). It was developed, based upon the work of Carl Jung, by Katharine Briggs and her daughter, Isabel Myers. Its roots were very unscientific, but it has been used by many practitioners and has been proven valid in categorizing personality types (Bayne, 1995). Because of the validity problems, the researchers did not use these tests.

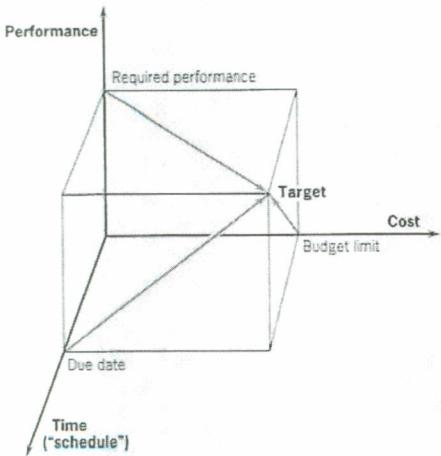
## Project Manager Background

The phrase "Project Management" began to emerge in the late 1950s and early 1960s when the size, scope, duration, and resources required for new projects began to warrant more analysis and attention. As defined by the *Project Management Institute (PMI)*, "Project Management is the application of knowledge, skills,

tools, and techniques to a broad range of activities in order to meet the requirements of a particular project. Project management is comprised of five processes: initiating, planning, executing, controlling, and closing" (Project Management Institute, 2004). The project manager (PM) is the person who executes the project management.

Project managers are held to many metrics but the classic three form a triangle of time, quality and budget as shown in Exhibit 1. The project manager must complete a project on time, under budget and to a quality that is acceptable to their superiors. Some practitioners refer to this as the titanium triangle. Titanium is a very hard and strong metal, yet it is relatively light. Similarly, the tasks of the project manager are very often taken lightly by their superiors, yet the work is generally very difficult to complete (Damicon, 2003).

**Exhibit 1. Project Management Targets (Meredith 2003)**



**Classifications.** Almost any human activity that involves carrying out a non-repetitive task can be classified as a project. By this definition, project management is used almost everywhere in the world in some form. In the business world, project management is applied with just as much diversity. A project manager can fall into one of many categories including; new product development leaders, quality project leaders, consultants, and construction managers.

There are many classifications of project managers. They are involved in everything from multi-billion dollar project launches to quality improvement projects utilizing almost no capital. The common tie between all the groups is the goals or metrics that they

are held to. A project manager is expected to complete all projects on time, within the budget limitations and with a certain level of quality, regardless of the type of project.

**Technical Skills.** A project manager must be competent in many areas including reporting, negotiating, time and money management. They must have the technical skills to be able to complete the activities of planning, budgeting, scheduling, reporting, and negotiating. If they are not competent in these areas, this work will take too much of time and they will be unable to manage other unexpected problems that arise. These technical skills must be added to other technical skills like computer skills, understanding the product or process being built and presentation skills are also important, along with many others. A project manager is expected to be an expert or obtain training in each of these areas.

**Non-Technical Skills.** The technical skills of a project manager are generally what their hiring is based upon, but, their success is not simply based on these technical skills. The non-technical skills include; leadership, empathy, communication and listening skills, motivation skills, and political skills. These "soft" skills are numerous, varied and many times seem contradictory. All of us have experienced situations in which we have encountered people with "book smarts" who lack "common sense" and "people skills" (Frame, 1999). Competent project professionals must be able to balance "hard" and "soft" skills. The hard skills are much easier to deal with than the soft ones. It is a relatively simple matter to teach people how to calculate the critical path on a PERT chart. It is much more difficult to teach people how to mediate conflicts on a project team or to motivate borrowed human resources to work sixty-hour weeks (Frame, 1999).

### Methodology

**Questionnaire Implementation.** The personality types of the project managers in the study were evaluated with a questionnaire called the Five Factor Personality Inventory (FFPI). Because quantification of non-technical skills is difficult to define, this research determined the criteria to measure a project manager by utilizing a control group called a panel of experts. The panel of experts was interviewed for the non-technical criteria. The test population was a sampling of project managers chosen from several groups. Project managers that are currently active in the industry were targeted through direct contacts and past project managers were found in schools and training classes. Also, the local chapter of PMI (Project Management Institute) was utilized as an

additional source of active project managers. The expert group was targeted through direct contacts.

The expert population included managers of project managers, or senior managers, who were asked the skills they require in a PM that they would promote and the negative factors that has lead them to fire a PM in the past. An additional group of experts were interviewed in the project management education field. Professors, who rank as experts in the fields of project or engineering management, were asked similar questions as to the requirements of a project manager. Also, the expert group was asked if they had worked as project managers prior to becoming a senior manager or professor.

All the participants in the expert group were asked to take the Five Factor Personality Inventory (FFPI) to determine their own personality within the constructs of the Big Five Personality Factors. In this way a direct comparison was made between the expert group and the answers of the project manager group.

**Regression.** The three traditional pillars of project management that make up the titanium triangle are controlling the schedule, budget and quality. The dependent variables are a measure of the project manager's technical skills in these the three areas. This study shows how personality traits will indicate these dependent variables or hard skills.

The three dependent measures that were used in this study were: *scheduler*, *budgeter*, and *quality*. *Scheduler* is a measure of the project manager's ability to control the timing of the activities within the project. *Budgeter* is a measure of the technical ability of the PM to manage the budget of the project. *Quality* is the variable that measures a PM's attention to the overall expectation of the internal and external customer. All three variables were scored within a range from 1 to 7. Each score range is described below:

- The score of 1 represents a project manager who is extremely weak at the particular skill.
- The score of 2 represents a project manager who is clearly weak at the particular skill.
- The score of 3 represents a project manager who is somewhat weak at the particular skill.
- The score of 4 represents a project manager who is neither weak nor strong at the particular skill.
- The score of 5 represents a project manager who is somewhat strong at the particular skill.
- The score of 6 represents a project manager who is clearly strong at the particular skill.
- The score of 7 represents a project manager who is extremely strong at the particular skill.

The dependent variables were the test subject's self-scored, technical skills classification. The independent variables were the descriptions of the test subject's personality. This study used these independent variables to predict the dependent values or hard skills. These were defined as the constructs of the Five Factor Personality Inventory (FFPI). These values gave the PM's inclination in five areas of their personality, namely: *openness*, *conscientiousness*, *extraversion*, *agreeableness* and *neuroticism* from the Big Five Personality Factor theory. They have been defined as:

1. *Openness*: breadth, complexity and depth of an individual's life,
2. *Conscientiousness*: impulse control, goal directed behavior,
3. *Extraversion*: activity and energy level traits, sociability and emotional expressiveness,
4. *Agreeableness*: altruism, trust, modesty, pro-social attitudes, and
5. *Neuroticism*: emotional stability, anxiety, sadness, and irritability (VerWys, 2001).

The FFPI was administered to project managers and the expert group to find their affinity to each of the five constructs. Their score was based on a scale within a range of 1 – 7. For example, a score of 7 represents a test subject whose personality fits the independent variable extremely well, e.g., strongly extroverted. A score of 1 indicates the subject is completely opposite of the trait listed, e.g., an introvert, not an extrovert. A score of 4 points shows a subject that is equally on both sides of the scale, e.g., an introvert at times and extroverted at other times.

**Model Validation.** Validation is a process of ensuring that the questionnaire represents reality at a given confidence level. The coefficient of determination,  $R^2$ , is commonly used in research to measure the proportion of variation in the dependent variables "explained" by the model. Thus, it can be used as a measure of internal consistency for the different measure included in the models. Regressions were completed for the total responses including both populations for each dependent variable. The quality of the regression lines was tested through the Analysis of Variance approach utilizing SPSS<sup>®</sup>. Next, a regression for each of the populations separately was completed and an ANOVA created for each of these models. Finally, the two populations were tested for normality. Violations of assumptions were tested for using correlation charts, histograms and scatter plots.

## Results

The data was compiled for both the project manager and senior manager populations and the demographics of the population were collected. The questionnaire responses were checked for the reliability of the instrument utilizing Cronbach's alpha and the split-half method. The data was then analyzed using the statistical analysis software, SPSS®, to determine the effects of and interaction between the different constructs and the technical skill classifications. Regression equations were created to model the entire body of responses and the each population separately.

The panel of expert group had a mean age of 43.14 years with a standard deviation of 9.21 years. Thirteen out of the fourteen senior managers had worked as a project manager prior to their promotion. This supports the idea that the senior managers are examples of successful project managers because they were promoted. Eight of the managers had to fire a project manager in the past and the two reasons most often listed were: missed budget and incompetence. The average budget of the senior managers was above three million dollars with a maximum figure of ten million. Three of the senior managers have bachelor's degrees, the rest have graduate degrees. A summary of their experience and background was collected and is shown in Exhibit 2.

#### **Exhibit 2. Demographics of the Senior Manager Population**

Category	Mean	Std Dev	Min	Max	Number in Sample
Age of SM (yrs)	43.14	9.21	24	55	14
Time as SM (yrs)	5.13	3.62	1.67	15	13
Ave. Project Budget (\$)	3.2M	3.1M	120k	10M	12
# of PMs Managed	11.07	11.98	4	50	14

The demographics of the project manager sample such as age, years in the industry, and training were captured. Their mean age was 30.77 years with a standard deviation of 9.52 years. There were 28 respondents as to their project manager classification. Eleven project managers were in product development, twelve in program management, three were construction managers and two listed themselves as consultants.

The project managers in the study all had at least some college classes. Five of the PMs have bachelor's degrees and 22 either have or were working on a graduate degree. Overall, there were 30 respondents in the project manager sample population. The

demographic statistics of the project manager population are summarized in Exhibit 3.

#### **Exhibit 3. Demographics of Project Manager Respondents**

Category	Mean	Std Dev	Min	Max	Number in Sample
Age of PM (yrs.)	30.77	9.52	21	54	30
Time in PM Position (yrs.)	2.68	5.58	0	25	30
Number of Projects	8.5	27.18	0	150	30
People Managed	5.19	6.76	0	25	27
Project Budget (\$)	2.1M	5.3M	0	22M	25

**Multiple Regression Results.** It was hypothesized that a relationship existed between the behavioral factors of a project manager and their technical skills. This was tested with a regression line of the data for the respondents from both the project manager and senior manager populations. The mean value and standard deviation for each construct are presented in Exhibit 4.

#### **Exhibit 4. Construct Means and Standard Deviations – All Respondents**

Construct	Mean	Std Dev	n
Openness	5.3159	0.7243	44
Conscientiousness	5.3932	0.6770	44
Extroversion	4.5864	0.9913	44
Agreeableness	5.0182	1.0029	44
Neuroticism	3.2409	0.8716	44

#### **General Test Hypotheses.**

$H_0$  = The dependent variable *Scheduler, Budgeter, Quality* has no statistically significant effect on the independent variable *Openness, Conscientiousness, Extroversion, Agreeableness, Neuroticism*

$H_A$  = There is a statistically significant effect between the two variables.

If the proportion of explained variation is high relative to the unexplained, then  $H_0$  was rejected and

utility of the model was confirmed by using the F test associated with the respective construct mean.

**Regression.** A multiple linear regression was performed using the stepwise method for each of the three dependent variables; *Scheduler*, *Budgeter*, and *Quality*. The stepwise method indicates that variables were brought into the equation with an alpha value of 0.05 unless the null hypothesis did not get rejected. The results presented nine valid regression models, in this paper the investigators summarize the overall effect with the following table. The exact equations can be attained by contacting the authors of this paper. All of the independent variables were measured on a scale of one to seven. Therefore the magnitude of the coefficient of each variable is an indication of the magnitude of affect it has on the dependent variable.

1. The dependent variable, *scheduler*, has the highest coefficient values for conscientiousness and extroversion for the total population and each of the groups separately.
2. The dependent variable, *budgeter*, has the highest coefficient values for conscientiousness and openness for the project manager population. The senior manager population showed the dependent variable, *budgeter*, has the highest coefficient values for conscientiousness and agreeableness.
3. The dependent variable, *quality*, has the highest coefficient values for conscientiousness and openness and neuroticism for the project manager population. The senior manager population showed the dependent variable, *quality*, has the highest coefficient values for conscientiousness openness and agreeableness.

All the simplified linear equations included the independent variable conscientiousness with a strong positive affect on the technical skill. This indicates that a positive relationship exists between this variable to all the technical skills. The affect each independent variable had on each dependent variable is compiled in Exhibit 5.

**Exhibit 5.** Effect of Each Independent Variable

All Respondents	<i>Scheduler</i>	<i>Budgeter</i>	<i>Quality</i>
Openness	0	+	+
Conscientiousness	+	+	+
Extroversion	(-)	(-)	0
Agreeableness	0	(-)	0
Neuroticism	0	(-)	+

Project Managers	<i>Scheduler</i>	<i>Budgeter</i>	<i>Quality</i>
Openness	0	+	+
Conscientiousness	+	+	+
Extroversion	(-)	(-)	(-)
Agreeableness	(-)	(-)	(-)
Neuroticism	(-)	(-)	(-)

Senior Managers	<i>Scheduler</i>	<i>Budgeter</i>	<i>Quality</i>
Openness	+	0	+
Conscientiousness	+	+	+
Extroversion	(-)	(-)	(-)
Agreeableness	(-)	(-)	+
Neuroticism	(-)	0	(-)

Openness has a positive effect or close to zero on all the regression lines. Conscientiousness has a strong positive effect in every relationship. Extroversion has a negative effect on almost every dependent variable. Agreeableness has a negative effect on all the regression lines except the *Quality* equation for the senior manager population. Neuroticism has a negative effect everywhere it is applied except in the *Quality* equation for the all the respondents.

**Limitations.** This research was, for the most part, limited to direct contacts rather than a random sampling of the entire Project Management population. This, along with the fact that the technical skills were self-scored raises some concerns about sampling bias.

Also, the population size may have been small to draw strong statistical significance from the results. The population size for the project managers was 30 and the population size for the senior managers was 14.

#### Conclusions and Recommendations

This research found a valid relationship between the personality factors and the technical skills of the total population studied. The independent variables were the constructs of the Five Factor Personality Inventory and the dependent variables were the self scored technical skills of budgeting, scheduling and quality control.

A project manager in the field will find this research useful in several ways. The project manager

that takes this questionnaire may understand why they struggle in one certain aspect of their job such as scheduling. Simply gaining an understanding of their personality will help them to better cope with the unfavorable aspects of their personality. On the other hand, it will give the project manager a list of strengths specific to their work and the expectations of their managers. These strong points can be built upon once the project manager knows to work with them.

The senior manager who wishes to hire a new project manager will have a strong use for this research. A manager has a view of a candidate's technical or "hard" skills they have utilized in the past from their resume. It is much more difficult to assess their behavioral or skills, yet these can be the key to the success of the project. The senior manager can utilize this research to help judge and sort the applicants. It will give them a way to measure the applicant to get more information than is simply on the resume.

Also, the senior manager may apply this research to their current employees in the project management field. This would enable them to find areas that the project manager may be weak and could use additional training.

The Project Management Institute is made up, primarily, of project managers. By supporting this study, all their members will gain from the knowledge of their personality factors. In this way, they will know the areas that they should highlight with their superiors and those that they should seek additional training.

The Project Management Body of Knowledge (PMBOK) is a resource published by PMI and considered to be the manual for project managers. The book covers simply technical skills; it does not cover areas of non-technical skills. The addition of this research may be invaluable to this published work.

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