NORTHCENTRAL UNIVERSITY

THE RELATIONSHIP BETWEEN PERSONALITY, LEADERSHIP STYLE, AND SOCIAL POWER BASES ON THE CAREER SUCCESS OF PROJECT MANAGERS

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by

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ABSTRACT

The Relationship Between Personality, Leadership Style, And Social Power Bases On The Career Success Of Project Managers

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This quantitative study examined the relationship between specific skills, traits, and behaviors and the career success of project managers in the Architectural and Engineering Design Services Industry across the United States. The variables examined included personality traits, leadership styles, social power styles, educational and training backgrounds, and professional experiences. Instrumentation included the Inscape Dimensions of Leadership Profile®, the Frost/Stehlski Social Power Questionnaire, and the Goldberg 50 Marker Big-Five Questionnaire. A total of 332 useable responses were received, representing a 74% response rate. A logical progression of statistical analysis was followed, from simple descriptive statistics to correlation analysis. The results indicate that project manager career success is low to moderately associated with personality traits and social power style. The findings indicate that professional qualifications and leadership style are not useful factors for predicting project manager career success.

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APPROVAL

We, the undersigned, certify that we have read this dissertation and approve it as adequate in scope and quality for the degree of Doctor of Philosophy.

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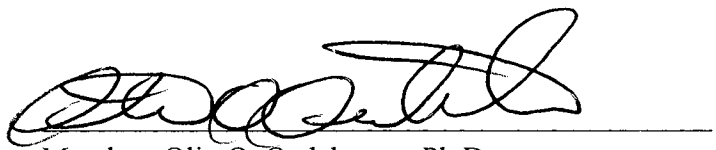

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LIST OF ABBREVIATIONS

A.....Agreeableness Personality Factor

AE .....Architect/Engineer firm

BM .....Balanced Matrix organization

C.....Conscientiousness Personality Factor

CPM .....Critical Path Method

E .....Extroversion Personality Factor

EC .....Engineer/Constructor firm

FSE.....Full Service Engineering firm

Func.....Functional organization

GMA .....General Mental Ability

LPC .....Least Preferred Coworker

MBO .....Management by Objectives

MDE.....Multiple Discipline Engineering firm

N.....Emotional Stability Personality Factor

O.....Openness Personality Factor

P .....Psychoticism Personality Factor

PERT.....Project Evaluation and Review Technique

PMI .....Project Management Institute

PMP .....Project Management Professional

Proj.....Projectized organization

SE.....Specialty Engineering firm

SM.....Strong Matrix organization

SOW.....Statement of Work

TQM.....Total Quality Management

WM.....Weak Matrix organization

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Chapter 1: Introduction

A maxim in the Architectural and Engineering Design Services Industry states that project success equals business success. A corollary holds that successful projects require successful project managers. It seems logical that companies would focus on selecting capable project managers and providing support to insure their long-term success. In reality, new project managers are typically recruited with little more than a vision of career advancement and good wishes from senior management. These new project managers usually have little, if any, idea of what skills and behaviors are key to success in their new role.

Technical professionals, who are given little or no project management training, typically practice engineering project management. These project managers typically view the project as a temporary occurrence with specific objectives to be achieved. Once the objectives are accomplished, the project is deemed successful. This is not always the case. A project can still be considered a failure although its outcome criteria may have been met. For example, a project may succeed outside the company (from the client's viewpoint), but fail within (from management's viewpoint). The success of a project, then, is dependent not only upon its objectives being met, but also upon the manner in which they are accomplished. Both the product and the process of a project must be managed for it to be deemed successful (Gaughan, 1998). Many engineers are ill equipped to manage these widely differing goals.

It is no accident that significant problems in project management job performance arise in the engineering profession. As college students, engineers were instructed throughout their curriculum to provide the correct answer (outcome based)

with little partial credit allotted for the work supporting the final answer (process based). Upon graduation, they focused upon largely task-oriented work as they learned how to apply their skills, again focusing on the outcome of their efforts. Eventually, the engineers moved into areas of increased responsibility, including technical supervision and project management. In many cases, they discovered that they were unprepared for the challenges presented in their new managerial positions. Therefore, technical expertise does not correlate directly to successful project management. This is commonly reflected in work assignments, as the most technically competent personnel are frequently used as consultants rather than as project managers.

Project managers occupy a unique and often precarious position within many firms. Possessing little formal authority and forced to operate outside the traditional organizational hierarchy, they quickly learn the real limits of their power. Thamhain and Gemmill (1974) stated that an effective project manager is the kingpin, but not the king. They are the bosses, but often in a loosely defined way. In most firms, they may lack the formal authority to conduct performance appraisals and offer incentives and rewards to their subordinates. As a result, their management styles must be those of persuasion and influence, rather than coercion and command.

Because of these and other limitations on the flexibility and power of project managers, project management has rightly been termed the "accidental profession" by more than one author (Curling, 2002; Heerkens, 2001; Pinto & Kharbanda, 1995). There are two primary reasons for this designation. First, few organizations have formal or systematic programs for selecting and training project managers, even within firms that specialize in project management work. This results at best in ad hoc training that may

or may not teach these people the skills they need to succeed. Most project managers fall into their responsibilities by happenstance rather than by calculation. Second, as Frame (1994) observed, few individuals grow up with the dream of one day becoming a project manager. It is neither a well-defined nor a well-understood career path within most modern organizations. Generally, the role is thrust upon people, rather than being sought.

Within many corporations, novice project managers are given a project to complete with the directive to operate within a set of narrowly defined constraints. These constraints most commonly include a specified time frame for completion, a budget, and a set of performance characteristics. Those who are able to quickly master the nature of their myriad duties succeed; those who do not generally fail. The inherent career risks of this process creates an attitude of fear among potential project managers. Generation after generation of them learn their duties the hard way, often after having either failed completely or stumbled along from one crisis to another. The predictable result is wasteful, troubled projects; managers battling entrenched bureaucracy and powerful factions; and less than satisfying careers.

The amazing part of this scenario is that it is repeated in many organizations. Rather than treating project management as the unique and valuable discipline it is, necessitating formal training and selection policies, many companies continue to repeat their past mistakes. This almost leads one to believe they implicitly view experience and failure as the best teachers.

The industry needs to recognize the wide range of demands, opportunities, travails, and challenges that are part of becoming a successful project manager. Many of

the problems these individuals struggle with every day are far more managerial or behavioral in nature than technical. Such behavioral challenges are frequently vexing, and though they can sometimes seem inconsequential, they have a tremendous impact on the successful implementation of projects, and the ultimate career success of the project manager. For example, it does not take long for many project managers to discover exactly how far their personal power and status will take them in interacting with the rest of the organization. Hence, an understanding of influence tactics and political behavior is absolutely essential. Unfortunately, novice project managers are rarely cognizant of this important bit of information until it is too late-- until, perhaps, they have appealed through formal channels for extra resources and been denied.

This ad hoc approach to project management--coupled, as it frequently is, with an on-the-job training philosophy--is pervasive and detrimental. Under the best of circumstances, project managers are called upon to lead, coordinate, plan, and control a diverse and complex set of processes and people in the pursuit of achieving project objectives. To hamper them with inadequate training and unrealistic expectations is to unnecessarily penalize them before they can begin to operate with any degree of confidence or effectiveness. The successful management of projects is simultaneously a human and technical challenge, requiring a far-sighted strategic outlook coupled with the flexibility to react to conflicts and trouble areas as they arise on a daily basis. The project managers who are ultimately successful at their profession must learn to deal with and anticipate the constraints on their project team and personal freedom of action while consistently keeping their eyes on the ultimate prize.

Statement of Problem

The purpose of this quantitative, descriptive, correlational study was to examine factors that may predict the career success of project managers in the Architectural and Engineering Design Services Industry across the United States. The broad research question guiding this study was: What, if any, differences exist in the career success of project managers in the Architectural and Engineering Design Services Industry based upon specific skills, traits, or behaviors.

The following specific research questions were examined in this study:

What, if any, differences exist in the career success of project managers based upon measures of personality traits?

What, if any, differences exist in the career success of project managers based upon the attainment of professional qualifications?

What, if any, differences exist in the career success of project managers based upon measures of leadership style?

What, if any, differences exist in the career success of project managers based upon measures of social power style?

Most companies would likely agree that project success is based upon both outcome criteria and process management, resulting in accomplishment of the project objectives with minimal disruption within the organization. Once this is accepted, it is of interest to the organization to be able to select, train, and reward project managers. This may be accomplished by defining appropriate project manager skills, traits, and behaviors that result in exceptional project performance, as well as identifying complimentary factors that also contribute to project success.

It is also of significant interest to the project management practitioner to define those areas of study that will provide beneficial results in project performance. This interest can be partially satisfied by understanding those factors that contribute most significantly to project success.

The study hypothesized that various personal attributes of the project manager are at least correlated with the results of project managers' success. These attributes include personality traits, leadership style, social power style, education and training, company context, and project management experience. Those traits that correlate with effective project management may in the future be used as predictors of project management career success.

Definition of Key Terms

Project: A project is defined as "any undertaking with a defined starting point and defined objectives by which completion is identified" (Gannon, 1994, p. 3). Furthermore, it is "a complex system of resources managed to achieve a specific objective within budget and schedule constraints" (Kerzner & Cleland, 1985, p. 1).

Project Management: Project management is the application of knowledge, skills, tools, and techniques to project activities in order to meet or exceed stakeholder needs and expectations from a project (PMI Standards Committee, 1996).

Architectural and Engineering Design Services Industry: The Architectural and Engineering Design Services Industry is comprised of establishments primarily engaged in applying physical laws and the principles of engineering in planning and designing

institutional, commercial, and industrial buildings and structures (U.S. Census Bureau, 2003).

Brief Review of Related Literature

Project managers have dual roles: manager and principal content expert (Einsiedel, 1987). In the architectural and engineering industry, the project manager is responsible for coordination of the activities of a number of technical specialists. Project management has been expanded over the years to address organizational, leadership, and technical roles in organizational situations (Einsiedel, 1987).

Effective project management requires a multitude of skills to enable a leader to resolve unique issues and problems that arise. Bolman and Deal (1997) suggested that effective project leadership is perceived to fall into the following categories: leaders who have the ability to get things done through others, leaders who have the ability to motivate people through persuasion, leaders who provide a vision, and leaders who facilitate and empower people to do what they want. According to Murch (2001) and Kerzner (2001), effective project managers require ten skills: team building, leadership, conflict resolution, technical expertise, planning, organization, entrepreneurship, administration, management support, and resource allocation.

The study of project management would not be complete without considerable attention placed upon the subject of leadership. The literature consistently cites three primary theories of leadership: trait, contingency (situational), and behavioral theories.

Trait theorists believe that people contain characteristics that make them leaders. Tead (1935) argued that leadership was a combination of qualities that enables an

individual to induce others to accomplish a given task. Stogdill (1974) reviewed over five thousand literary works, and found that many traits of leaders are different than the traits of followers. Stogdill's research indicated that, on average, leaders have more desire to excel, drive for responsibility, initiative, task orientation, ability to enlist cooperation, tact, and interpersonal skills than the common people.

Hersey and Blanchard (1993) developed situational leadership in the 1960s. According to the situational leadership model, there is no best way to influence people. "Situational leadership stresses that leadership is composed of both a directive and a supportive dimension, and has to be applied appropriately in a given situation" (Northouse, 1997, p. 53). Hersey and Blanchard's situational model is premised on the leader's ability to match the appropriate leadership style with the team's development stage.

In the 1940s, social scientists believed that behaviors were primarily learned, and that "leaders are made, not born." Significant studies were conducted during this time at the University of Michigan (Likert, 1961) and Ohio State University (Stogdill, 1974). The Michigan studies attempted to define the leadership attributes that contributed to effective job performance. Likert (1961) identified these two distinct styles of leadership as "job-centered" and "employee-centered." The Michigan studies did not find that one style was better than the other, nor did they recommend one set of behaviors over the other.

In the Ohio State studies, researchers defined a two-factor theory of leadership that included "consideration" and "initiating structure" (Stogdill, 1974). Initiating structure analyzes leader behaviors that are focused on getting the job done.

Consideration is concerned with leader behaviors that focus on interacting with their followers/employees in a way that encourages friendship, mutual trust, warmth, and rapport between the leader and followers. An important discovery of the Ohio State studies was that leaders high in both consideration and initiating structure were the most effective.

With project responsibility comes the need to integrate and coordinate tasks with functional organizations that provide needed services or support personnel. Without direct authority, the project manager must rely on other forms of influence to get results. According to Handy (1993), "Power and influence make up the fine texture of organizations and indeed of all interactions.

French and Raven (1959) identified five bases of social power in organizations that determine the influence of individuals within those organizations. These five primary bases of social power are: Reward power, Coercive power, Legitimate power, Expert power, and Referent power. Reward power is the ability to influence that derives from the power to reward others. Coercive power is the ability to punish others or withhold rewards from them by delivering negative valences or withholding positive valences. Legitimate power is the perception of legitimate authority. Expert power is derived from the perception of special knowledge, talents or abilities, usually within a specific cognitive area. Referent power is the power a superior holds due to the ability and/or desire of a subordinate to identify with him/her.

The research of Gibby (1975) and of Hawkins (1985) indicated a difference in the overall authority and influence of the functional and project managers and the work

of Richardson (1996) indicated a difference in the type of influence used respectively by the functional and project managers.

In the last two decades there have been a series of advances which unequivocally demonstrated that personality, as assessed through standardized instruments, has a predictive relationship with job performance approaching, and in some cases exceeding, that of cognitive ability (Kierstead, 1998). The greatest single advance in personality research has been the emergence and broad acceptance of the Five Factor model of personality, commonly referred to as the "Big Five" (Digman, 1990; Hogan, Hogan, & Roberts, 1996). The Big Five are bipolar dimensions of personality that have been found to form the taxonomic core of personality models and also capture laypersons descriptions of personality as found in everyday language (Goldberg, 1990). The five factors include: (a) Openness to Experience, (b) Conscientiousness, (c) Extroversion, (d) Agreeableness, and (e) Emotional Stability.

Openness to Experience (O) represents the affinity an individual has for fantasy, aesthetics, feelings, actions, ideas, and values. Conscientiousness (C) describes the desire of the individual to do a job well. Thus, an individual with high Conscientiousness has an affinity for competence, order, dutifulness, achievement striving, self-discipline, and deliberation (Costa & McCrae, 1992a). Extroversion (E) is the outgoing nature of the individual. Extroverted individuals will be outwardly focused in a situation involving other individuals, whereas the Introverted person will be inwardly focused (Costa & McCrae, 1992a). Agreeableness (A) is a trait representing the ability of the individual to compromise a position. The Agreeable individual will have empathy and respect for others in interpersonal communication, which result in the

ability to get a job completed efficiently. The Neuroticism (N) trait demonstrates anxiety, angry hostility, depression, self-consciousness, impulsiveness, and vulnerability (Costa & McCrae, 1992a). The Emotionally Stable individual demonstrates an ability to "roll with the punches."

Career success has be defined as the real or perceived achievements individuals have accumulated as a result of their work experiences. Career success can be partitioned into extrinsic and intrinsic components (Judge, Cable, Boudreau, & Bretz, 1995). Extrinsic success is relatively objective and observable, while intrinsic success is defined as an individual's subjective reactions to his or her own career, and is most commonly experienced as career or job satisfaction (Gattiker & Larwood, 1988; Judge et al., 1995). Judge et al. (1995) defined extrinsic success in terms of salary, number of promotions, and occupational status. In terms of intrinsic success, it would appear that job satisfaction is the most relevant aspect. Judge and Bretz (1994) identified job satisfaction as the most salient aspect of career success.

Highlights and Limitations of Methodology

A quantitative methodology was used to analyze the constructs that are significantly and positively correlated to project managers' career success. This was accomplished by investigating the correlations among the career success of project managers, the project managers' traits, and environmental factors. The constructs included the project managers' personality traits, leadership style, social power style, educational and training background, and professional experience. Organizational

structure and company type were considered to determine if they affect of any of the constructs of career success.

A self-administered questionnaire was used in this study. The questions were derived from established, validated instruments designed to assess the constructs of interest. A cross-section of firms from various segments of the AE industry was selected for participation to ensure broad viewpoints. In order to capture a large sample size, the survey was constructed in a manner that allowed self-administration, and did not require more than 30 minutes to complete. This design also enabled the test to be administered in a consistent manner, without the direct intervention of the researcher.

A logical progression of statistical analysis was followed, from simple descriptive statistics to correlation analysis. A data model was developed to relate the various constructs of interest (independent variables) to the dependent variable of project management career success. In order to analyze the appropriateness of this model, a regression equation was constructed to define the necessary variables and coefficients. Interaction terms were not considered due to the complexity of the model and since the literature does not suggest interactions between the specific domains considered in this study.

The study was limited to a survey of Project Managers currently employed in the Architectural and Engineering Design Services Industry who were willing to participate in the study. Because of this limitation, it is not possible to make generalizations about project managers employed in other industries.

Research Expectations

There are many benefits to be gained by examining if a relationship exists between personality traits, leadership style, social power style, and career success in a project manager. These benefits underscore the importance of a study of this type, by providing competitive advantage to those organizations that understand and maximize their project management capabilities.

First, understanding the traits of successful project managers helps to select team leaders. Although no overall "leadership" trait has been defined in the literature, it is likely that a defined group of traits specifically fitted to a professional engineering design services organization would enhance its ability to select project managers.

Secondly, training investment for project management can be better defined once the selection criteria for project managers are ascertained. Establishing selection criteria enables the organization to design a training regimen to improve project management, resulting in greater long-term organizational competitiveness and increased job satisfaction for its project managers.

Third, the ability to match project managers with appropriate projects will result in more productivity. Certain personality traits will contribute to an ability to accomplish tasks, or to accept risk, providing infinite possibilities. In each case, the strengths and weaknesses of the project manager will define what type of projects should and should not be undertaken.

Fourth, self evaluation of strengths and weaknesses by the project manager will result in a better job fit within the organization, and thereby, will increase the project manager's job satisfaction. There are two main items of interest in this case. Not only

will the project manager be able to define a project in a manner that affords the greatest degree of project success, but he or she may also select those projects supporting his or her strengths. In the latter case, the project manager might also be able to define those areas of development that might enhance his or her ability to manage projects more effectively.

Finally, the design of curriculums in the engineering and project management professions might be expanded to include a greater emphasis on the process of completing a project and those necessary skills and traits that a successful project manager must possess. While personality traits are assumed to be static, underlying behaviors can be modified through training, which could improve project manager success. This may result in a significant reduction of the learning curve experienced by technical professionals when entering the workforce.

These potential benefits underscore the importance of defining the project manager traits and behaviors and project success. It is essential that project managers and organizations begin to understand that project managers are not likely to succeed regardless of situation, and not all project managers will succeed in any given situation. Project managers must be placed into situations most appropriate to their individual traits and skills.

Chapter 2: Literature Review

Introduction

The literature review conducted for this chapter focused on the unique requirements of project management, and the factors that contribute to career success of project managers. The literature review addressed: project organizational structures, the role of project managers; leadership theories and styles; social power and influence; personality style and job performance; the characteristics and skills required of effective and successful project managers, the significance of education, training, and prior experience; and finally the factors that contribute to job satisfaction. Particular emphasis was made on the available research that addressed the importance of project managers' leadership roles.

Project management has arisen from the engineering disciplines. The increasing complexity and magnitude of projects in present-day organizations brought about the need for project management. As project complexity and magnitude expanded, the need for a standardized and effective project management methodology arose. Projects in the early- to mid-1900s, evolving from the earlier hierarchical organizational forms into project teams with project managers, were used by some in the construction, architectural, and engineering industries, though they typically did not use terms like project management and matrix organization (Smith, 1980). The concept known as project management is a relatively modern organizational model, originally used for projects in the Department of Defense and in the construction industry (Kerzner, 2001). The project approach was used occasionally during the Second World War's Manhattan

Project, but was not widely accepted because volume production could generally be carried out more efficiently with a functionally oriented organization (Killian, 1971). By 1954, the United States was in a race with Russia to develop an intercontinental ballistic missile (ICBM) system and Russia was thought to be in the lead - a major strategic problem. The lead-time to develop such a complex system using existing organizational management techniques was unacceptable. General Bernard Schriever (Killian, 1971) was selected to head a task force to develop the next ICBM, and his team had full authority without typical organizational constraints. This "project team" produced a fully operational and deployed system by 1959, a dramatic time reduction if one considers previous experience. As technology has grown (driving increased complexity) and response requirements of organizations have increased (reducing development lead time), the project management approach was adapted to provide a more focused method to meet customer needs (Smith, 1980).

Project Management

Many definitions of project management appear in the literature, often reflecting nuances of specific industry application (Kliem & Ludin, 1998; Souder, 1979). Litterer (1973) provided a universal definition by describing project management as the planning, organizing, directing, and controlling of company resources for a relatively short-term endeavor that has been established to complete specific goals and objectives. The Project Management Institute defines project management as the application of knowledge, skills, tools, and techniques to project activities in order to meet or exceed stakeholder needs and expectations from a project (PMI Standards Committee, 1996).

From a personal perspective, project management is "the investiture in a single person of the responsibility for success or failure of a project" (Gannon, 1994, p. 3). It is important to note the focus many put on the project manager relative to project deliverables. The project manager must continuously coordinate many different components of a project and keep them in proper relation to one another (Standards Committee (1996), cited in Gannon, 1994): (a) project elements, (b) project tasks, and (c) project management functions.

The eight elements of the project that must be managed include scope, schedule, cost, procurement or contracting, risk, quality, communications, and staffing. The project-specific tasks are those individual tasks and deliverables that must be completed in order to meet the agreed-upon customer requirements. The six project management functions to be performed include planning, organizing, executing, monitoring, controlling, and reporting.

Successful project management can be defined as having achieved the project objectives within time, within cost, at the desired performance/technology level, and while utilizing the assigned resources effectively and efficiently (Kerzner, 2001). The project manager is thus tasked with getting the project done in a proper manner -- a strong task orientation.

Rosenau (1992) defined project management as the process of achieving project objectives in any organizational framework despite countervailing pressures. Rosenau then defined project objectives in terms of the "Triple Constraint" which provides some indication of the project manager's performance. The Triple Constraint's parameters are specification, schedule, and budget. Rosenau's definition is a rewording of the minimum

core requirements of project management; however, like its predecessors this definition could be used to describe any single task, repetitive or unique, which needed to be performed.

The Project Management Institute (PMI Standards Committee, 1996) defines project management as a superset of Rosenau's Triple Constraint: Project management is the application of knowledge, skills, tools, and techniques to project activities in order to meet or exceed stakeholder needs and expectations from a project. Meeting or exceeding stakeholder needs and expectations invariably involves balancing competing demands among: (a) scope, time, cost, and quality, (b) stakeholders with differing needs and expectations, and (c) identified requirements (needs) and unidentified requirements (expectations). This definition includes not only meeting the cost, schedule, and requirements, but also satisfying the customer's and other stakeholder's needs and expectations.

The literature on project management contains two common terms, project and program, which have often been used interchangeably in the definition of project management. In general, these terms are interchangeable; however, a program is typically larger than a project. This research will consider both program management and project management to be part of the project management field. Within the industry under study, these terms are sometimes used interchangeably. Small programs may be considered projects.

Architectural and Engineering Design Services Industry

The Architectural and Engineering Design Services Industry is comprised of establishments primarily engaged in applying physical laws and the principles of engineering in planning and designing institutional, commercial, and industrial buildings and structures (U.S. Census Bureau, 2003). These establishments employ professional engineers, architects, designers, and support personnel with specific knowledge of system and facility design principles, zoning regulations, building codes, and construction procedures. The assignments undertaken by these establishments may involve any of the following activities: provision of advice, preparation of feasibility studies, preparation of preliminary and final plans and designs, sourcing of equipment and subcontracts, provision of technical services during the construction or installation phase, inspection and evaluation of engineering projects, and related services.

Firms within the industry are generally classified into five types as listed in Table 1.

Table 1

Design Services Industry Firm Types

Firm type	Description
Specialty Engineering (SE)	Consulting engineering firm practicing in one discipline.
Multiple Discipline Engineering (MDE)	Consulting engineering firm practicing in more than one discipline, but not a full-service firm. May also practice architecture, but considers itself an engineering firm (as distinguished from AE firms).
Architect/Engineer (AE)	Firms with architecture plus at least one engineering discipline.
Full Service Engineering (FSE)	Consulting engineering firm practicing civil, structural, mechanical, and electrical engineering. May also practice in other engineering disciplines. May also practice architecture, but considers itself an engineering firm.
Engineer/Constructor (EC)	Consulting engineering firm that also offers construction or construction management services. Derives more than 50 percent of its revenue from construction services.

Project Organizational Structures

The project organization is typically responsible for completing an assignment on schedule, within cost and profit goals, and to established standards (Killian, 1971). The organizational structure associated with projects takes different forms based on the structure of the parent organization and the nature of the project. Gobeli and Larson (1987) developed a framework which distinguished five basic project management structures in order of increasing authority of the project manager relative to functional or

resource unit managers: (a) Functional, (b) Weak Matrix, (c) Balanced Matrix, (d) Strong Matrix, and (e) Projectized (Pure Project).

The range of authority begins with no project manager for the functional structure to total project manager control over the project for the project team structure, with a range of shared influence for the three matrix structures. A summary of project management organizational structures (Gobeli & Larson, 1987) is shown in Table 2.

Table 2

Project Management Organizational Structures

Structure	Description
Functional	The project is divided into segments and assigned to relevant functional areas and/or groups within functional areas. The project is coordinated by functional and upper levels of management.
Weak Matrix	A project manager with limited authority is designated to coordinate the project across different functional areas and/or groups. The functional managers retain responsibility and authority for their specific segments of the project.
Balanced Matrix	A project manager is assigned to oversee the project and shares the responsibility and authority for completing the project with the functional managers. Project and functional managers jointly direct many workflow segments and jointly approve many decisions.
Strong Matrix	A project manager is assigned to oversee the project and has prime responsibility and authority for completing the project. Functional managers assign personnel as needed and provide technical expertise.
Projectized	A project manager is put in charge of a project team composed of a core group of personnel from several functional areas and/or groups, assigned on a full-time basis. The functional managers have no formal involvement.

Based on a survey of Project Management Institute (PMI) members, Gobeli and Larson (1987) examined the use and effectiveness of each of these five structures. It was found that, for the sample of 1,654 members, the matrix structure was the most common method of project management, with the strong matrix being the most often used for engineering and construction projects, and a weak matrix most common for product

development projects. The data also indicated that the perceived effectiveness of the project structures seemed to increase with the strength of the project manager's role, with strong matrix and project team structures being rated the most effective. It was also noted that neither usage pattern nor effectiveness ratings appeared to change with the size of the organization.

Sometimes the terms program and project are used interchangeably, but program is also used to define a grouping of individual projects (Gray, 1997). Fems (cited in Gray, 1997, p. 5) defined a program as "a group of projects that are managed in a coordinated way to gain benefits that would not be possible were the projects to be managed independently." The project schedules are often integrated to support interdependent deliverables and staffing. A highly integrated program has as a precondition that the authority to manage is clearly vested in a designated program manager or program control body. Gray (1997, p. 7) noted that this represents a "significant movement towards matrix management, because project managers and their functional line managers would have to accept that the project `belonged' to the program, not to the line". Gray views programs as a-continuum, ranging from strong, integrated control of projects to just nominal umbrella groupings of pre-existing projects.

The combination of these structure types indicated a need for different types and mixes based on particular need. "The most successful research, development, and engineering organizations in the future will be able to effectively use both the project and functional organizations, and to develop a mix of the two" (Souder, 1979, p. 50).

Multiple factors influence the ability of an organization to draw people from functional areas and group them under a project manager with the direction to accomplish a finite task within time and budget constraints. Kerzner (2001, p. 257) cited three key attributes that must be present, from the beginning, on an effective project team: (a) trust, (b) effective decision making, and (c) effective project controls.

Trust relationships among team members is essential. It is incumbent on the project leader to develop a feeling of team membership, so that everyone feels he or she is part of the team - openness and sharing ideas leads to higher quality information exchanges within the team.

Effective decision making processes must be in place. The team members will know actions will result from sharing information, and the trust allows decisions based on the best interest of the project, not individuals.

Effective project control procedures must be followed. The first type is quantitative and includes procedures typically used to track project performance (work breakdown structures, PERT/CPM, earned value, etc.). The second is the willingness and ability of project team members to give feedback to each other regarding performance - again, relating to trust.

Role of the Project Manager

According to Einsiedel (1987), project managers have dual roles: manager and principal content expert. In the engineering industry, the project manager is responsible for coordination of the activities of a number of technical specialists. Einsiedel (1987) compared the role of a project manager to that of a bandleader who pulls together

players, each a specialist with individual score and internal rhythm. Project managers must continually work to bridge the gap between project activities and senior management concerns about attaining the desired business results. Project management has been expanded over the years to address organizational, leadership, and technical roles in organizational situations.

Robbins (2000) viewed the role of the project manager as being comprised of four principal dimensions. First, the project manager is the liaison with external constituencies. The constituencies include executive management, other teams, customers, and suppliers. The project manager represents the team, secures resources, clarifies organizational expectations, and shares information. Second, project managers are trouble-shooters. The project manager is responsible for assisting the team to find solutions to problems. Third, project managers are conflict managers. By getting team members to address the root causes of technical and personal disagreements, the project manager can minimize the disruptive aspects of intra-team conflicts. Finally, project managers are coaches. Project managers clarify expectations, roles, supports, and assist team members to improve their work performance.

The project manager is responsible for defining the vision, objectives, scope, responsibilities, and the deliverables of a project. Kliem and Ludin (1998) viewed the role of project manager as being comprised of six basic functions: (a) lead the project throughout its lifecycle, (b) define the project's goals and objectives so the team agrees on the results and success criteria, (c) plan the project in a way that results in a road map that people will follow, (d) organize the project in a manner that increases the efficiency and effectiveness of the team, (e) control the project so that its momentum and direction

are not overtaken by scope creep, (f) close the project in a manner so that it lands smoothly.

Project objectives are defined through the statement of work (SOW), which delineates the project scope. Planning is the determination of the steps needed to implement a project, identifies the start and completion dates, and who will perform the work. Organizing involves forming a team, allocating resources, assessing risk, and ensuring good communication. Controlling involves assessing status reports, and managing changes to the baselines. Project closure involves releasing team members and preparing the lessons learned document.

Project management presents unique challenges: leading in an environment of continual change and increasing complexity, new emerging technology, and the increased need to spend more time coordinating and networking with internal and external customers. Project managers constantly deal with the triple constraints of time, cost, and performance. Levin and Skulmoski (2000) viewed the role of the project manager as that of a guide, an integrator, social architect, and the protector of the project team. Project managers remove obstacles, encourage risk taking, and risk communication. Therefore, the role of the project manager is to act as the facilitator, coalition/team builder, problem solver, conflict manager, administrator, and director (Kerzner, 2001; Pinto, Thorns, Trailer, Palmer, & Govekar, 1998).

According to Pinto et al. (1998), project managers play a key role in organizations, serving as the link between various stakeholder groups and work to create a strong and cohesive team atmosphere, all while maintaining budget and schedule constraints. Project management requires the project manager to play a participative and

interactive role. According to Kliem and Ludin (1998) and Pinto and Trailer (1998), project management involves more than just building schedules and managing budgets. Project management involves a number of both traditional and non-traditional roles: providing a vision of what the project is to achieve; communicating the vision; ensuring a focus on the vision; motivating people to participate in the project; and building an effective team. The project managers also serve as the project champions and politicians (Pinto & Trailer, 1998).

Skills of an Effective Project Manager

As project management matured and projects became larger and more complex, organizational leaders began to realize that the project managers manage people in addition to managing work. To get results, the project manager must be able to relate to the project team members, the tasks to be accomplished, the processes and procedures available, the organizational environment, and the customer community. Thus, the project manager's behavioral skills are equally as important as technical skills (Kerzner, 2001).

The project manager bears greater responsibility for creating and nurturing a climate where interdependence flourishes. Effective project management requires a multitude of skills to enable a leader to resolve unique issues and problems that arise. Bolman and Deal (1997) suggested that effective project leadership is perceived to fall into the following categories: leaders who have the ability to get things done through others, leaders who have the ability to motivate people through persuasion, leaders who provide a vision, and leaders who facilitate and empower people to do what they want.

The skilled project manager understands the many facets of leading a project. Project managers need other skills besides those that are purely technical to lead and deliver projects successfully. According to Murch (2001) and Kerzner (2001), effective project managers require ten skills: team building, leadership, conflict resolution, technical expertise, planning, organization, entrepreneurship, administration, management support, and resource allocation. Managing change within an organization requires coping skills. The project manager has to acquire a number of skills to cope with different situations, conflicts, uncertainty, and change. For example, coping skills enable the project manager to be flexible, persistent, creative, patient, and handle continuous stress (Murch, 2001).

Einsiedel (1987) posited that project managers who have the skills for effective leadership probably acquired these competencies by managing projects through experience and trial and error, often with some help from mentors and through formal training. Pinto and Trailer (1998) and Kerzner (2001) shared Einsiedel's views regarding experience, training, and mentoring as effective methods of skills development. Einsiedel (1987) states that, "Good project managers must understand the critical problems that face them and be prepared to deal with them. Managing projects well requires a set of particular attributes and skills" (p. 1).

According to Pinto and Trailer (1998), the required skills are leadership, communication, organization, team building, coping, and technological. Communication skills include listening and persuading. Organization skills include planning, goal setting, and analyzing. Team building skills include empathy and motivation. Leadership skills include setting example, delegation, positive attitude, and being energetic. Coping

skills require flexibility, creativity, patience, and persistence. Technological skills include experience and project knowledge.

According to Lewis (1998), project managers require technical and non-technical skills to carry out their role. Lewis summarized the skills required of project managers and suggested that the list can serve as a basis for a career development program for project managers. The required skills are: (a) basic tools of project management, (b) advanced project management skills, (c) people skills, (d) human resources, and (e) business skills.

Basic tools of project management include planning, scheduling, and control. Advanced project management skills include systems thinking, principles of quality (TQM), contracting, and risk management. People skills include conflict management and resolution, leadership skills, decision making, communication, negotiation, and cross-cultural training. Human resources addresses how to conduct performance reviews, and how to deal with protected-class individuals. Business skills include cost/project accounting, marketing, managerial finance, economics, and business ethics.

Management is a function that deals with processes and procedures. In contrast, leadership is people centered. According to Pinto and Trailer (1998), project managers perform both roles at different stages during the life cycle of a project. Belzer (2001) contended that project management is still more art than science. Project management requires both soft and hard skills. The hard skills, the science of project management, require understanding and knowing when to apply the processes, tools, and techniques required for managing a project. According to Belzer (2001), a greater piece of the puzzle for successful project delivery is soft skills or the art of project management --

the timeless principles of working within an organization. Soft skills help to define the business value, clarify the vision, determine requirements, provide direction, build teams, resolve issues, and mitigate project risk. "Without the soft skills, the likelihood of project success diminishes" (Belzer, 2001, p. 1).

According to Mohrman et al. (1995), in addition to the technical knowledge and skills, project managers are required to have skills and knowledge in the three areas of leadership, coaching, and organizational design and change. Wideman (2001) stated that effective project managers must be skilled at problem solving, decision-making, administration, supervision, communication, team building, strategizing, influencing, empowerment, and visioning. Project success is achieved through effective project leadership employing the skills gained through education, training, and experience.

Technical Skills

Murch (2001) posited that project managers should have the technical knowledge and skills needed to do their jobs. In the engineering industry, projects are highly technical and complex. The project manager must have some understanding of the magnitude of the technical difficulties the team members are facing (Lewis, 1998). Therefore, possession of technical educational background in engineering or architecture is a requirement. Technical skills enhance the abilities of project managers to contribute technically and understand the complex issues that develop through the project life cycle (Lewis, 1998; Pinto & Trailer, 1998). Technical competence serves to enhance the project manager's credibility with the team members, customers, suppliers, and senior management.

Decision Making Skills

The complexity of projects today demands greater effort in making decisions in an effective and efficient manner. Dessler (1999) defines decision making as the process of developing and analyzing alternatives and making a choice. The project manager must be adept and skilled in leading a group in a decision-making discussion. Decision making directed toward the attainment of leadership objectives is a dynamic, interrelated process and not a simple series of discrete actions (Wren, 1995). In the project team environment, decision-making skill is a critical competency. According to Belgard et al. (1991) the project leader has to guide and facilitate the team to make decisions that are: timely and meet the schedule constraints; high quality in terms of being accurate, precise, and well thought out; and be able to foster commitment in others.

Belgard et al. (1991), and Dessler (1999) outlined four methods for decision making: Autocratic, the decision is made by the leader; Democratic, which is also referred to as majority rule; Consensus, where all team members are committed to support the decision; and Unanimous, where everyone in the team agrees that the best possible decision has been made. The consensus method of decision-making is best suited in the project teams environment, since consensus does not mean that everyone agrees on the best possible decision, but that the team members can support the decision reached and do not feel that they are compromising their ethics, values, or interests in doing so (Belgard et al., 1991). The consensus method of decision-making results in a win-win conclusion to conflicts.

Motivation Skills

Exploring and understanding the attitudes that team members hold concerning factors that motivate them to perform is important for a leader to create an environment that fosters team member motivation. The empowered employee ultimately acts like one who is self-employed, with responsibility for both results and career (Coleman, 1996). Motivation is intrinsic, and empowerment will be the result of the employees' influence and choice. According to Syrett and Hogg (1992), motivation and inspiration energize people, not by pushing the team members in the right direction as control mechanisms do, but by satisfying the basic human needs for achievement, a sense of belonging, recognition, self-esteem, a feeling of control over one's life, and the ability to live up to one's ideals. Leadership must be constantly exercised throughout a project. It requires having a basic understanding of what motivates people. According to Lewis (1998), "People are motivated to behave in ways that will satisfy their internal needs, wants, or concerns" (p. 34), and:

> For work to be motivating, it must have *meaning* for the worker (Lewis, 1998, p. 37). According to Kotter (1990), good leaders motivate people in a variety of ways. First, they always articulate the organization's vision in a manner that stresses the values of the audience they are addressing. This makes the work important to the individuals. Leaders regularly involve people in deciding how to achieve the organization vision. This gives people a sense of control. Another important motivational technique is to support employee efforts to realize the vision by providing coaching, feedback, and role modeling. "Leadership motivates by satisfying basic human needs (Kotter, 1990, p. 47)

Finally, leaders recognize and reward success, which gives followers a sense of accomplishment and belonging. When all this is done, the work itself becomes intrinsically motivating.

Conflict Management Skills

Where there is a team, there is bound to be conflict. In the project team environment, the common types of conflicts involve: technical opinions and trade-offs, priorities, procedures, team member responsibilities, and personality clashes (Kerzner, 2001). Personal conflicts occur in groups and teams and serve to hinder team progress and performance. Barriers such as differing outlooks, priorities, role conflicts, power struggles, and improper communication skills can undermine the team. The larger and more diverse the team, in terms of technical background, personal characteristics, needs, perceptions, preferences, and beliefs, the greater the likelihood that conflicts will occur (Bolman & Deal, 1997).

Belgard et al. (1991) inform that although conflict usually involves a certain amount of struggle, if managed effectively, that struggle can be a source of strength and creativity. The intensity of the conflicts can vary over the life cycle of a project. Project constraints of time, technical performance, quality, and cost and the project life cycle itself are the key driving mechanisms for team member conflict. According to Levin and Skulmoski (2000), effective team leadership requires that project managers utilize consensus-based team processes in managing conflicts.

Belgard et al. (1991) explain that conflict exists on teams because: people generally care about what they do; people are different and diverse; people on teams are generally independent in performing their technical task; people on teams are

interdependent and must closely coordinate their activities; and people have expectations and varying needs. These characteristics are the same characteristics that make a team dynamic and creative. Timely and effective response to a conflict is the key to preventing conflicts from disrupting the performance of the team. The leader must have the skills to navigate the team through the conflict and focus the team on the possibilities.

Team Leadership Skills

The understanding of teams began to develop in the 1960s as researchers began to explore the benefits of people working together with a common purpose (Hacker & Lang, 2000).

In the project-based organization, project managers and the project teams are empowered to make decisions. Wren (1995) defined team empowerment as the capacity to create environments and the appropriate social relationships that can tap and harness the energies and abilities necessary to bring about the desired results. Belgard et al. (1991) defined empowerment as the delegation of authority to an individual or team and included autonomy, encouragement, and trust to make necessary decisions to achieve results.

Hams and Harris (1996) defined a team as a "work group or unit with a common purpose through which members develop mutual relationships for the achievement of goals" (p. 23). Teamwork is the cooperative and coordinated effort by individuals working together for a common goal. Hacker and Lang (2000) defined a project team as a group of people with a high degree of interdependence, aiming for a goal or completion of a task. The advantage of project teams is their ability to bring together

skills and experiences from multiple disciplines for integration and task completion (Hacker & Lang, 2000; Pinto & Trailer, 1998; Tata, 2000). Project teams differ from other teams in that the project team disbands when the project is complete. Team building skills are a critical skill that project managers must possess. "Teams do not just happen, they must be built" (Lewis, 1998, p. 71). The project manager forms the team by utilizing a diverse group of technical specialists often with little or no experience in working together.

Laufer and Hoffman (2000) explained that in the project-based organizations, instead of people being grouped into technical functional units based on work processes or skills, they are grouped in cross-functional units based on projects or customer. Thamhain (2001) has stated that the project team members must possess the following characteristics: common goal and purpose, sense of belonging and identity, shared dependencies, and shared attitudes, norms, and values. The leader plays an essential role in guiding the team to develop and espouse these characteristics. According to Kliem and Ludin (1998), building and maintaining an effective project team requires that the project manager: (a) sets an example by not only espousing certain values and beliefs, but also exercising them; (b) encourage communication by holding frequent meetings; (c) keep the team focused on results by directing the energies of the team toward achieving the vision; (d) lay the groundwork for synergy by promoting cooperation and interdependence; and (e) encourage greater diversity in thinking, work style, and behavior to avoid the danger of groupthink.

Thamhain (2001) has contended that the leader's technical expertise becomes less important as team members possess knowledge and skills. The leader's power becomes the leader's ability to facilitate and communicate to and on behalf of the team.

Project teams exist for a limited time and go through a natural life cycle. Tuckman (1965) informs that there are four stages in the life cycle of a team: (a) forming, (b) storming, (c) norming, and (d) performing.

Forming is when the team is initially formed. At this stage the team identity, charter, and goals are established. In the storming stage, there is conflict. Team members try to resist the influence of others and contest team member roles. During the norming stage, team members have established and accepted a hierarchy within the team. In the final performing stage, the team performs the task for which it was originally formed. Research conducted by Keyton (1993), has identified a fifth stage in team development called termination. Termination occurs as part of a project team's natural life cycle.

The role of the project manager is to guide the team to develop a sense of team identity and team spirit. "Building an effective organization is ultimately a matter of meshing the different sub-cultures by encouraging the evolution of common goals, common language, and common procedures for solving problems" (Schein, 1997, p. 275). According to Covey (1999), individuals in teams move through three phases as they develop: dependence, independence, and interdependence. As the team matures and the members become increasingly interdependent and accept responsibility and ownership, the leader will need to transition to a supporting and coaching role. As the team approaches the maturity phase, the leader's role will be to articulate the team's mission, vision, and objectives.

Leadership Theories

As evidenced from the preceding discussion, the study of project management would not be complete without considerable attention placed upon the subject of leadership. This domain of knowledge defines a significant contributor to the success of projects as a whole. According to Kliem and Ludin (1998), the debate on whether leaders are born or made remains unsettled. The literature consistently cites three primary theories of leadership: trait, contingency, and behavioral theories.

Trait Theory

Trait theorists believe that people contain characteristics that make them leaders. Among the traits that have been studied are: age, height, weight, energy, appearance, intelligence, fluency of speech, scholastic abilities, judgment and decision making, insight, adaptability, dominance, and initiative.

Tead (1935) argued that leadership was a combination of qualities that enables an individual to induce others to accomplish a given task. Tead listed ten qualities: energy, sense of purpose, enthusiasm, friendliness, integrity, technical knowledge, decisiveness, intelligence, teaching skill, and faith. Many of these qualities are related to some of the independent variables of the current dissertation, leadership style, education background, or management experience. Leadership style is related to Tead's qualities of enthusiasm, friendliness, integrity, decisiveness, and teaching skill. Technical knowledge and teaching skill are developed through experience and educational background. Tead concluded that training for leadership is a genuine possibility and has been proven to be a positive benefit.

Stogdill (1974) reviewed over five thousand literary works, and found that many traits of leaders are different than the traits of followers. Some of the key personality trait results of Stogdill's research are that leaders on average are more adaptable, aggressive, assertive, emotionally balanced, enthusiastic, extroverted, independent, creative, resourceful, and self-confident than the masses. Some of the key task related and social characteristics identified in Stogdill's research indicate leaders on average have more desire to excel, drive for responsibility, initiative, task orientation, ability to enlist cooperation, tact, and interpersonal skills than the common people. Stogdill also found that leadership style (task orientation, interpersonal skills, ability to enlist cooperation, tact, adaptable, aggressive, assertive, emotionally balanced, enthusiastic, and extroverted) on average is stronger in leaders than followers.

Although Stogdill's work is comprehensive, he could not conclusively indicate that the listed traits distinguish a leader from a follower. This is emphasized by Gouldner (1950) who argues five important issues with trait theory. First, there is no discrimination between most important and least important traits. Second, personal qualities or traits are not mutually exclusive. Third, studies lack evidence that traits are essential to ascend to leadership or to the maintaining of leadership. Fourth, the traits assigned to leadership have been developed, largely, in terms of traits of particular leaders. Fifth, none of the research has proven whether the traits are inherent in the individual or acquired.

Contingency Theory

Theories that explain leadership effectiveness in terms of situational moderators are called "contingency theories" of leadership. Contingency implies "it depends." That

is, the size of the relationship between leadership traits/behaviors and effectiveness outcomes depends (or is contingent upon) aspects of the situation the leader is in.

Hersey and Blanchard (1993) developed situational leadership in the 1960s. Situational leadership is based on the interplay of three major factors: the amount of guidance and direction a leader gives, the amount of socio-emotional support a leader provides, and the readiness level of the followers for performing a specific task. According to the situational leadership model, there is no best way to influence people. "Situational leadership stresses that leadership is composed of both a directive and a supportive dimension, and has to be applied appropriately in a given situation" (Northouse, 1997, p. 53). The model is especially useful in multicultural organizations, such as engineering companies, where flexibility is a requirement due to the diversity of the knowledge workforce in a project team

Through their studies, Hersey and Blanchard (1993) identified various critical situational factors that influence a leader's style and effectiveness. Hersey and Blanchard's situational model is premised on the leader's ability to match the appropriate leadership style with the team's development stage. According to the model, teams go through a life cycle of predictable development stages as they evolve from a loose collection of individuals to a high performing team. The team development stages are orientation, dissatisfaction, resolution, and production. The leader's style evolves through the phases of directing, coaching, supporting, to delegating style of leadership. Engineering companies typically stress the usefulness of this model in project management and leadership training. Hersey and Blanchard suggest that there are circumstances and situational contexts where each of these styles would be appropriate.

The result is four possible leadership styles: (a) telling, (b) selling, (c) participating, and (d) delegating. Telling involves high task focus, low follower relationship. Selling involves high task focus, high follower relationship. Participating involves low task focus, high follower relationship. Delegating involves low task focus, low follower relationship. The application of the situational model requires that project managers evolve and adapt their leadership style through the life cycle of the project.

Project managers face a diverse range of management situations, and the personalities and leadership styles of project managers may vary significantly. One of the most researched and validated models of leadership theory is Fiedler's Contingency Theory of Leadership (Fiedler, 1976), which considers not only the situation, but also the personality of the leader. The effectiveness of a leadership style is contingent upon the demands imposed by the situation. This theory holds that the effectiveness of a group or an organization depends on two interacting factors, the personality of the leaders and the situational control the leaders have over the group's behavior. According to Fiedler, the personality of the leaders determines their leadership style.

Fiedler used the Least Preferred Coworker (LPC) Scale to assess a leader's motivation as either Task Motivation or Relationship Motivation. Leaders who are relationship motivated tend to describe their least preferred coworkers in a more positive manner, (e.g., more pleasant and more efficient). Leaders who are task motivated, on the other hand, tend to rate their least preferred coworkers in a more negative manner.

The second factor in the Contingency model is the situational control of the individual. Three factors are posited to affect the "favorableness" of a situation: (a) leader-member relations, (b) task structure, and (c) leader position power. Leader-

member relations refers to the degree of mutual trust, respect, and confidence between the leader and the subordinates. Task structure refers to the degree to which the task at hand is low in multiplicity and high in verifiability, specificity, and clarity. Leader position power refers to the power inherent in the leader's position itself.

When there is a good leader-member relation, a highly structured task, and high leader position power, the situation is considered a favorable situation. When the leader and the situation do not match, some things have to be changed. Since personally traits are relatively permanent, a better solution is for the leader to move to a better-matched situation.

The theory says that the most favorable situation for the leader (the situation which is easiest for the leader to have control and influence) is the one in which: relations with subordinates are good, the leader has much position power (formal authority), and the task/job is highly structured. The situation that is least favorable (in terms of providing for leadership control and influence) is one in which leader-member relations are poor, the task is highly unstructured, and position power of the leader (formal authority) is low. The theory predicts that when the situation is either very favorable or very unfavorable, low LPC leaders (task oriented) will be more effective than high LPC leaders (relationship oriented). When the situation is neither high nor low in "favorability," the theory predicts that high LPC leaders (relationship oriented) will be more effective than low LPC leaders (task oriented).

Researchers often find that Fiedler's contingency theory falls short on flexibility. They also noticed that LPC scores could fail to reflect the personality traits it is supposed to reflect. However, Fiedler's contingency theory is an important theory

because it established a brand new perspective for the study of leadership. Many approaches developed after Fiedler's theory have adopted the contingency perspective.

Behavioral Theory

In the 1940s, social scientists began to promote the idea that everything could be scientifically explained and predicted, including human behavior. Extensive research was conducted focusing on making employees more productive and managers more effective. It was believed that behaviors were primarily learned, and that "leaders are made, not born." If specific behaviors used by successful leaders could be identified, it was believed that they could be taught to others in leadership positions. Significant studies were conducted during this time at the University of Michigan and Ohio State University.

The Michigan studies. The Michigan studies attempted to define the leadership attributes that contributed to effective job performance. The leaders studied were essentially split into two groups. The first group was focused on the welfare of their subordinates, while the second group was focused on the completion of tasks. Likert (1961) identified these two distinct styles of leadership as "job-centered" and "employee-centered."

The job-centered leader believes that employees are just a means to an end (production of the product, profit) and that the best way to motivate them is to closely supervise them and use rewards and coercion to communicate with them. This leader uses legitimate power as the basis of influencing employees.

The employee-centered leader believes that it is necessary to create a supportive work environment in order for workers to be successful in helping the company meet its

goals. This leader is concerned with giving employees opportunities for advancement, growth, and for meeting their achievement needs. The employee-centered leader views employees as part of the team and believes that in order for the company to be successful, the individuals who work there must feel successful too.

The Michigan studies did not find that one style was better than the other, nor did they recommend one set of behaviors over the other.

The Ohio State studies. The Ohio State studies attempted to measure the attributes of effective leadership much the same as in the Michigan studies. The researchers defined a two-factor theory of leadership that included "consideration" and "initiating structure" (Stogdill, 1974).

Initiating structure analyzes leader behaviors that are focused on getting the job done. This includes the use of job descriptions that clearly tell employees what is expected of them and how they should do their jobs, and organizational charts that tell employees where they fit into the big picture. These issues are very similar to Michigan's "job-centered" skills.

Consideration is concerned with leader behaviors that focus on interacting with their followers/employees in a way that encourages friendship, mutual trust, warmth, and rapport between the leader and followers. These issues are similar to Michigan's findings on "employee-centered" skills.

An important discovery of the Ohio State studies was that leaders high in both consideration and initiating structure were the most effective. This conclusion extends beyond the Michigan studies conclusions, as it demonstrates that more than a single type of leadership skills is appropriate within different contexts. The managers who are able

to switch between several different leadership styles are more effective for the organization.

The Leadership Grid®. The Blake and Mouton Managerial Grid (Blake & Mouton, 1964) attempted to relate the attributes of human behavior and task oriented leadership by means of a grid. This model was subsequently renamed The Leadership Grid® (Blake & Mouton, 1985) as it refocused more on leadership than on traditional administrative management.

In general, the Leadership Grid® measures a leader's bias toward the two major elements of success in organizations: the concern for people and the concern for production. By plotting these concerns on a grid, five different leadership styles were identified based on the relationship between these two elements. The five types of leaders were labeled Impoverished, Country Club, Authoritarian, Middle-of-the-Road, and Team Leader.

Impoverished Leaders (grid position 1,1 - low task, low relationship) tend to focus on doing no more than is the absolute minimum to get the required work done. They tend to have very little concern for either the human element or the production level of the team. This type of leader uses a "delegate and disappear" leadership style. Since the leader is not committed to either task accomplishment or maintenance, the team is essentially allowed to do what ever it wishes.

Country Club Leaders (grid position 1,9 - low task, high relationship) have a high concern for people and a low concern for production. These leaders have a tendency to give thoughtful attention to the needs of the people involved in the organization and in creating a comfortable, friendly atmosphere. These leaders

predominantly use reward power to maintain discipline and to encourage the team to accomplish its goals. Conversely, they are almost incapable of employing the more punitive coercive and legitimate powers. This inability results from the leaders' fear that using such powers could jeopardize their relationships with the team members.

The Middle-of-the-Road Leader (grid position 5,5 - mid task, mid relationship) has been categorized as the Organization Man. This type of leader is constantly trying to balance the concerns of the workforce and the concern with getting out the work. They constantly try to compromise between the two competing forces, keeping morale reasonable but not excellent and production close to expectations without significantly exceeding them. This type of leader tends to burn out rapidly as they keep both elements neither happy nor unhappy.

Authoritarian Leaders (grid position 9,1 - high task, low relationship) focus on productivity with little concern for individuals. They focus on streamlining operations so that the human resources interfere as little as possible with the other resources. These leaders have been frequently labeled as "tyrants" or "slave-drivers." They get the work done, but at the sacrifice of some of the human resources. People who get this rating are very much task oriented and are hard on their workers (autocratic). There is little or no allowance for cooperation or collaboration. Heavily task oriented people display these characteristics: they are very strong on schedules; they expect people to do what they are told without question or debate; when something goes wrong they tend to focus on who is to blame rather than concentrate on exactly what is wrong and how to prevent it; they are intolerant of what they see as dissent so it is difficult for their subordinates to contribute or develop.

Team Leaders (grid position 9,9 - high task, high relationship) understand the need for high concern for both the human and the other resources of the organization. These leaders work toward helping their people improve their commitment, developing relationships of trust and respect with employees and others, and in enhancing productivity through a focus on common vision and mission. This type of leader leads by positive example. They endeavor to foster a team environment in which all team members can reach their highest potential, both as team members and as people. They encourage the team to reach team goals as effectively as possible, while also working tirelessly to strengthen the bonds among the various members. They form and lead the most productive teams.

Comparison of the behavioral theories. Because the Michigan and Ohio State models focused on only two sets of behaviors, most researchers were not confident that they were sufficient to predict good leadership or to teach good leadership behaviors to emerging leaders. In addition, the business community was interested in finding a means to identify specific performance indicators such as the leader's ability to positively affect production, profits, efficiency, and job satisfaction of their employees. The recommendations from these two studies did not provide sufficient and specific guidance to accomplish those goals.

The Leadership Grid® is very similar to the Michigan and Ohio State studies, except it does make a specific recommendation for the "best style of leadership." Overall, it is believed that the Team Leader approach is most effective in the general case, a conclusion consistent with the Ohio State studies. However, the model recognizes that certain situations might call for one of the other styles to be used at

times. For example, by using the Impoverished Leader style, a leader allows the team to gain self-reliance. The Authoritarian Leader style can be used to instill a sense of discipline in an unmotivated worker. By carefully studying the situation and the forces affecting it, a leader can determine the appropriate style to achieve the desired result.

Applications of Leadership Theory to Project Management

The literature consistently cites leadership as one of the top attributes of a successful project manager. Kerzner (2001, p. 175) states, "An absolutely essential prerequisite for program success, is the program manager's ability to lead the team within a relatively unstructured environment." Sayles (1979, cited in Einsiedel, 1987, p. 194), states "Project managers function as bandleaders who pull together their players, each a specialist with individual score and internal rhythm. Under the leader's direction, they all respond to the same beat."

In Posner's (1987) survey to determine personal characteristics required to manage a project, leadership skills included these attributes/behaviors: energetic, sets example, vision (or big picture), delegates, and positive. The same study also addresses critical project problems, and when Posner aligned problems with skills, it was found that unclear goals/direction and interpersonal conflicts matched with leadership skills. "Project goals are likely to be more easily understood when the project manager's leadership is consistent. Interpersonal conflicts will likely diminish when project managers set clear standards of performance and demonstrate their trust in, and respect for, others" (Posner, 1987, p. 53).

Leadership is used in some references as a summary term for other "project leader" skills or characteristics. Thamhain and Wilemon (1977) defined effective project

leadership in terms of a project manager's interpersonal influence and situational variables such as selection of project personnel, connection of personnel to functional managers, project manager inputs to functional managers, and project manager power over the life of a project. The leadership element is summarized by an information systems "Top Gun" project manager with Lucent Technologies (as cited in Melymuka, 1997):

> Listen to the team, but lead the team. Set yourself up as the leader up front. Put yourself at the head of the table. Assume responsibility. Realize that you are totally accountable for success or failure. Once you do that, you'll do what ever you can to assure that it is successful. (p. 109)

Studies and research on leadership suggest that leadership is a complex construct, and there are many ways to lead, and further, there are many styles of leadership that can be utilized (Dessler, 1999; Northouse, 1997; Robbins, 2000). Leadership experts advocate a myriad of different approaches for effective leadership. To be effective, project managers must consider all facets of getting the job done. The leadership style utilized must facilitate the integration of multi-disciplinary project resources for synergetic operation. The project manager uses leadership to execute the project efficiently and effectively. The requirements of quality, schedule, and cost demand that project managers ensure that all three are met at the same time.

According to Pinto and Trailer (1998) and Wideman (2001), the project manager's leadership style evolves throughout the project life cycle. The life cycle of a typical engineering project is comprised of five phases: feasibility study, conceptual,

development, execution, and completion. Each phase includes major attributes or emphasis. The feasibility study phase includes a sense of vision, the big picture concept, and analysis. The leadership style employed in the feasibility phase include: visionary, empowerment, and expansive. In the conceptual phase, the major emphasis is on listening, analysis, and team alignment. The leader's style is that of a listener and change agent. In the development phase, the leader is a team builder and integrator. In the execution phase the leader plays the role of decision maker, balances work and fun, and builds synergy. The completion phase requires the administrative leadership style to bring closure to the project and transfer information.

A non-sanctioned leader influences outcome just as a formally appointed leader, but must do so without formal authority. This type of leadership skill, influencing, is what is required to effectively manage projects (Kerzner, 2001).

Project managers are by definition horizontal managers. The project manager is responsible to achieve defined tasks without tacit authority. The project manager is essentially given the responsibility to accomplish specific groups of tasks, but is not given formal authority (Kerzner, 2001). The ability of the project manager to succeed in this realm then lies in the non-sanctioned leadership skills possessed by the individual.

In reviewing the literature, no leadership studies were found that had the same scope or focus as the current study. Several studies in other occupational fields have addressed analogous research questions. A brief review of their findings is included here.

Lipsky (1996) studied the relationship between managerial leadership behavior and career success in a professional services firm. Leadership behaviors were assessed

using the PRAXIS ® instrument, which measures managerial leadership using sixteen behavior categories that have been identified as important to managerial leadership effectiveness. Lipsky found that managerial leadership behaviors were significantly related to both effectiveness and career success, but that behaviors related to success measures had a weaker relationship. Behaviors that had the strongest link between effectiveness and success included Team Motivation, Staff Development, Influence, and Performance Feedback.

Martini (1999) studied the relationship between leadership style and project manager effectiveness in a large defense contractor. Leadership style was measured using Quinn's Competing Value Framework model, which defines eight leadership styles. He found that, depending upon the situation, leadership style affected project manager effectiveness. The relationship varied by type of project and level of project responsibility. The study was inconclusive as to whether educational background was related to project manager effectiveness. An interesting result of the study was the negative relationship found between experience and project manager effectiveness in several situations. He reasoned that perhaps the extensive experience is honored by assigning especially difficult projects to project managers deemed more capable based on higher experience levels.

Vitek (2002) studied the relationship between leadership behavior and managerial success in a Fortune 50 manufacturing company. Three different leadership theories were tested as predictors of managerial success. He found that all three leadership theories were poor predictors of success. Demographic characteristics, and

age in particular, were found to be a much more important predictor of some managerial success outcomes than any leadership behaviors.

Day (2003) studied the leadership practiced exhibited by project leaders at NASA. The study examined the differences in the leadership practices of project scientists (leaders) and project members as compared to leaders in the private sector. The Kouzes and Posner Leadership Practices Inventory (Kouzes & Posner, 1995) was used in the study. The inventory rates five leadership practices: (a) Challenging the Process, (b) Inspiring a Shared Vision, (c) Enabling Others to Act, (d) Modeling the Way, and (e) Encouraging the Heart. She found that project members rated project leaders higher on all five leadership practices than the project leaders rated themselves. Significant differences were found in the leadership effectiveness of project leaders and project members. Project leaders who reported spending more than 25% of their time on leadership as one of their job responsibilities reported higher use of all leadership practices except Challenging the Process. The study suggested that leadership, identified as an activity, may contribute to the overall effectiveness of project leaders as they perform in a project environment.

Power and Influence

With project responsibility comes the need to integrate and coordinate tasks with functional organizations that provide needed services or support personnel. Without direct authority, the project manager must rely on other forms of influence to get results. According to Handy (1993), "Power and influence make up the fine texture of organizations and indeed of all interactions. Influence is the process whereby A seeks to

modify the attitudes or behavior of B. Power is that which enables him to do it" (p. 123). Dill and Pearson (1984), following the convention of Katz and Kahn (1966), state the following:

> We view power as the capacity to influence individuals, decisions, or events. Authority, in contrast, is the power associated with a formal position in an organization. This distinction is critical, because it emphasizes that the distribution of power in an organization may not follow the formal structure. That is, certain individuals or interest groups may possess substantial power even though they hold no formal position in the organization. (p. 138)

This last point is especially important in considering the position of the project manager in a matrix structure, which is outside the line organizations that supply project team members.

Formal authority in an organization typically resides with functional or line management. Project managers can be vested with organizational authority via the reporting path to upper management, but direct authority over project team members often still resides with their functional managers. This creates a potential "two-boss" problem, involving the managers and team members alike:

> The superimposition of a secondary authority network leads directly to a violation of the principle of unity of command and thus, clearly, to an inherent conflict situation. There is either conflict between the project manager and the functional manager over what the workers should do, or the project manager and the functional manager ignore this conflict and the worker himself is faced with a

conflict between the various requirements placed on him by his two bosses. (Goodman, 1967, p. 396)

Social Power Typology

French and Raven (1959) identified five bases of social power in organizations that determine the influence of individuals within those organizations. These five primary bases of social power are: Reward power, Coercive power, Legitimate power, Expert power, and Referent power. They defined the five power bases as follows, using a relationship between "O", a social agent, which could be either an individual or an organization, and "P," the person who is the object, or target of the change attempt:

Reward power is the ability to influence that derives from the power to reward others. The magnitude of the reward power of O over P is a function of O's ability to administer positive valences to P and to remove or decrease negative valences.

Coercive power is the ability to punish others or withhold rewards from them by delivering negative valences or withholding positive valences. The Coercive power of O over P is a function of P's expectation that he or she will be punished by O if he or she fails to conform to the influence attempt.

Legitimate power is the perception of legitimate authority of O by P. This perception comes from internalized values by P. P has accepted some form of standard, or code, by which O can assert his or her power over P. This is not always derived from the relative roles of O and P; O may hold Legitimate power over P merely from a previous commitment or promise by P to O that P values, regardless of their respective organizational roles.

Expert power is derived from P's perception of O's special knowledge, talents or abilities, usually within a specific cognitive area. This perception could be either in relation to P's own knowledge, or in relationship to some absolute standard.

Referent power is the power a superior holds due to the ability and/or desire of a subordinate to identify with him/her. This identification need not be a desired or even conscious effect. P's identification with O is maintained if P behaves, believes, and perceives as O does. Its difference from Expert power is that while Expert power is limited to a cognitive context, Referent power is also a function of P's intuition and emotional feelings toward O (French & Raven, 1959).

Raven (1965) added a sixth source of power, information power. He stated that information power is based on the leader's possession of, or access to, information that is perceived as valuable to others. Information power in this context was not tied specifically to computer technology. Rather, information power was originally intended in a broader context of any important information O might have that P perceives as valuable.

Over the years, numerous studies in the literature have applied the French and Raven Social Power typology to a wide variety of settings in social and industrial psychology. French and Raven (1959) identified five bases of power: Legitimate, Referent, Expert, Reward, and Coercive power. Although alternative classifications of power have been suggested (Littlepage,1993), the French and Raven typology remains a dominant theoretical framework.

Dunne et al. (1978) summarized several findings from subsequent research. Ivancevich and Donnelly (1970) found that expert and referent power were positively

associated with measures of organizational effectiveness. Bachman, et al. (1968) found that legitimate power was important for complying with supervisors' requests and that expert power was positively associated with subordinate satisfaction and performance. Lucas (1973) found, via interviews, that project managers tend to discount formal authority and rate personal persuasiveness as the most important source of authority. Hodgetts (1968) found, via interviews, that the most important techniques project managers used to supplement authority were technical competence and persuasion.

During Dunne et al.'s (1978) research, they interviewed 10 project managers and 49 project personnel and found that, for both functional and project managers, position/responsibility, expertise, and professional challenge are the important influence sources and are positively associated with project personnel work attitudes.

Thamhain and Gemmill (1974) surveyed 22 project managers and 66 project personnel to determine correlations between project managers' influence methods and a rating of project manager effectiveness. Significant positive correlation was found between both work challenge and expertise (expert power) and project manager effectiveness (work challenge was added to the French and Raven list by the authors based on a review of literature on project management). A significant negative correlation was also found between authority (legitimate power) and effectiveness. Findings were summarized as follows:

> The less project managers are perceived by project personnel as emphasizing legitimate power as an influence method and the more they are perceived as emphasizing expertise and work challenge: (1) the greater the level of project

> involvement and openness of upward communications; and (2) the greater the level of project performance. (Thamhain & Gemmill, 1974, p. 217)

Thus, project management effectiveness relates directly to the balance of power and influence exercised by a project manager within the organizational context.

Gibby (1975) measured project management authority in terms of the French and Raven (1959) social power bases as perceived by project and functional managers in a matrix organization. Significant differences were found in the perceptions of project and technical functional managers, with each attributing more authority to their own function. In addition, it was found that informal sources of authority are more important than formal sources of authority. Hawkins (1985) investigated the nature of actual power bases reported by project managers and technical managers by assessing similarities and differences for each of the French and Raven (1959) power bases. It was found that project and functional managers agreed on the relative importance of the power bases and did not perceive differences in the power bases used by the two manager groups, though differences were found in how the manager groups viewed each other. Functional managers viewed the legitimate power of the project manager as lower than that perceived by the project manager group, but viewed referent power as higher than that perceived by the project manager group

In addition, the overall power of the functional managers was perceived by the project team members as higher than that of their project managers. Richardson (1996) built on this work by comparing how managers use the power bases within the matrix. The following significant differences were found: the functional manager used legitimate power more than the project manager, the functional manager used reward

power more than the project manager, and the project manager used referent power more than the functional manager. No significant difference was found for coercive and expert power.

The research of Gibby (1975) and of Hawkins (1985) indicated a difference in the overall authority and influence of the functional and project managers and the work of Hawkins and of Richardson indicated a difference in the type of influence used respectively by the functional and project managers. The key point relating to this research is that the literature presents the functional manager as primarily responsible for meeting the individual needs of the employee. This responsibility has a historical basis since, for mechanistic forms of organization, the functional manager is alone in oversight of the employee. However in a matrix setting, the employee has two managers, and the project manager has responsibility for addressing the work-related needs of the project team members. This fact suggests that the managers in a matrix organization share responsibility for meeting individual needs.

In reviewing the literature, no social power studies were found that had the same scope or focus as the current study. Several studies in other occupational fields have addressed analogous research questions. A brief review of their findings is included here.

Morrissey (1987) studied the use of social power among chief executive officers. He found that CEO's tended to rely more on Referent power than all other power bases combined. CEO's who tended to rely on Referent power were more satisfied with the achievement of their work objectives. Subordinates who reported to CEO's who were

perceived to rely on Referent power were more satisfied with their working relations and their supervision.

Bearden (1990) studied social power usage among project and functional managers in an aerospace matrix organization. She found that functional managers used more positional powers than project managers, and that there was no significant difference in the use of personal power between functional and project managers. Higher-level managers were found to use more positional powers, except when the manager had both functional and project responsibilities. She found no differences between men and women in power usage. The entire sample in this study was very high on the personal power bases, which may have obscured differences. She reasoned that the professional level and perceived marketability of the persons supervised may have had an effect on the power choices of their managers, resulting in the increased use of personal power compared to positional power.

Richardson (1996) also studied social power usage among project and functional managers in various matrix organizations. He found a significant difference between project and functional managers in their perceived use of Reward power, Legitimate power, and Referent power, but not in their perceived use of Coercive power or Expert power.

Chansler (1997) studied the use of social power in a public utility organization. Of greatest significance in this study was the result that employees in this organization perceive Coercive power as the most important base of power. In addition, the employees believed Referent power to be the least important. Supervisors in this study indicated that they were aware of the perceptions held by their subordinates. These

results were significantly different from those obtained in other studies done on similar organizations. Chansler reasoned that the potential reasons for this difference include environmental issues specific to the organization studied and the rate of change seen in the utility industry at the time of the study. He noted that many employees may have been feeling fear for their jobs due to a trend in "right-sizing" that was occurring in the utility industry at that time.

Personality

Prior to the late 1980s, it was generally assumed that the linkage between personality and job performance was tenuous at best (Kierstead, 1998). Research findings were inconsistent. In the last two decades there have been a series of advances which unequivocally demonstrate that personality, as assessed through standardized instruments, has a predictive relationship with job performance approaching, and in some cases exceeding, that of cognitive ability (Kierstead, 1998). The greatest single advance in personality research has been the emergence and broad acceptance of the Five Factor model of personality, commonly referred to as the "Big Five" (Digman, 1990; Hogan, Hogan, & Roberts, 1996).

The Big Five Model

The Big Five are bipolar dimensions of personality that have been found to form the taxonomic core of personality models and also capture laypersons descriptions of personality as found in everyday language (Goldberg, 1990). The five factors include: (a) Openness to Experience, (b) Conscientiousness, (c) Extroversion, (d) Agreeableness, and (e) Emotional Stability.

Openness to Experience (O) represents the affinity an individual has for fantasy, aesthetics, feelings, actions, ideas, and values. Openness refers to the individual's desire to experience new things. This dimension frequently is used in a synonymous fashion with Intellect. However, Costa and McCrae (1992a) note that the complete intellect is partially described by both Openness and Conscientiousness. The six facets of Openness (Costa & McCrae, 1992b) are listed below in Table 3.

Table 3

The Six Facets of Openness

Six facets of openness	"Preserver" O-	"Explorer" O+
Fantasy	Focuses on here and now	Imaginative; daydreams
Aesthetics	Uninterested in art	Appreciates art and beauty
Feelings	Ignores and discounts feelings	Values all emotions
Actions	Prefers the familiar	Prefers variety; tries new things
Ideas	Narrower intellectual focus	Broad intellectual curiosity
Values	Dogmatic; conservative	Open to reexamining values

Conscientiousness (C) describes the desire of the individual to do a job well. Thus, an individual with high Conscientiousness has an affinity for competence, order, dutifulness, achievement striving, self-discipline, and deliberation (Costa & McCrae, 1992a). The Conscientious individual seeks to perform well in his own estimation, independent of the performance of those individuals around him. The six facets of Conscientiousness (Costa & McCrae, 1992b) are listed below in Table 4.

Table 4

The Six Facets of Conscientiousness

Six facets of conscientiousness	"Flexible" C-	"Focused" C+
Competence	Often feels unprepared	Feels capable and effective
Order	Unorganized; unmethodical	Well-organized; neat; tidy
Dutifulness	Casual about obligations	Governed by conscience; reliable
Achievement striving	Low need for achievement	Driven to achieve success
Self-discipline	Procrastinates; distracted	Focused on completing tasks
Deliberation	Spontaneous; hasty	Thinks carefully before acting

Extroversion (E) is the outgoing nature of the individual. The Extroverted individual has behaviors that exhibit warmth, gregariousness, assertiveness, activity, excitement seeking, and positive emotions. Extroverted individuals will be outwardly focused in a situation involving other individuals, whereas the Introverted person will be inwardly focused (Costa & McCrae, 1992a). The six facets of Extroversion (Costa & McCrae, 1992b) are listed below in Table 5.

Table 5

The Six Facets of Extroversion

Six facets of extroversion	"Introvert" E-	"Extrovert" E+
Warmth	Reserved; formal	Affectionate; friendly, intimate
Gregariousness	Seldom seeks company	Gregarious, prefers company
Assertiveness	Stays in background	Assertive; speaks up; leads
Activity	Leisurely pace	Vigorous pace
Excitement-seeking	Low need for thrills	Craves excitement
Positive emotions	Less exuberant	Cheerful; optimistic

Agreeableness (A) is a trait representing the ability of the individual to compromise a position. Behaviors observed might include trusting, straightforwardness, altruism, compliance, modesty and tender-mindedness (Costa & McCrae, 1992a). The Agreeable individual will have empathy and respect for others in interpersonal communication, which result in the ability to get a job completed efficiently. The six facets of Agreeableness (Costa & McCrae, 1992b) are listed below in Table 6.

Table 6

The Six Facets of Agreeableness

Six facets of agreeableness	"Challenger" A-	"Adapter" A+
Trust	Cynical; skeptical	See others as honest & well-intentioned
Straightforwardness	Guarded; stretches truth	Straightforward, frank
Altruism	Reluctant to get involved	Willing to help others
Compliance	Aggressive; competitive	Yields under conflict; defers
Modesty	Feels superior to others	Self-effacing; humble
Tender-mindedness	Hardheaded; rational	Tender-minded; easily moved

Emotional Stability is the opposite of Neuroticism. The Neuroticism (N) trait demonstrates anxiety, angry hostility, depression, self-consciousness, impulsiveness, and vulnerability (Costa & McCrae, 1992a). The Emotionally Stable individual demonstrates an ability to "roll with the punches." This adaptability results in an individual that is capable of operating effectively in a variety of situations. The six facets of Emotional Stability (Costa & McCrae, 1992b) are listed below in Table 7.

Table 7

The Six Facets of Negative Emotionality

Six facets of negative emotionality	"Resilient" N -	"Reactive" N +
Worry	Relaxed; calm	Worrying; uneasy
Anger	Composed; slow to anger	Quick to feel anger
Discouragement	Slowly discouraged	Easily discouraged
Self-consciousness	Hard to embarrass	More easily embarrassed
Impulsiveness	Resists urges easily	Easily tempted
Vulnerability	Handles stress easily	Difficulty coping

Consensus on the Big Five Model. In the strictest sense of the word, consensus requires universal agreement, as in a unanimous vote. Consensus within a group implies that all within the group agree with a particular point. While many have claimed that consensus exists within the psychological community on the Big Five Model as the research paradigm for the foreseeable future, certainly not 100% of personality researchers would agree. Eysenck (1991), for one, advocated a three-factor solution. Hogan (1986) advocated a six-factor solution. But what is different about the personality research community today versus twenty years ago is that there is a clear trend towards embracing a single model--the Big Five--as the research paradigm to follow. In the past, the personality research community was fragmented, with Freud, Erikson, Horney, Jung, Murray, Eysenck, and others all claiming the best model. All were partially right, but only the Big Five is broad enough to include them all.

While unanimity among personality researchers is still not a reality, one can sense the excitement among researchers from the following quotes in the recent literature (as cited in Howard & Howard, 1995, p. 9):

> A series of research studies of personality traits has led to a finding consistent enough to approach the status of law. (Digman & Inouye, 1986).
>
> The past decade has witnessed a rapid convergence of views regarding the structure of the concepts of personality. (Digman, 1990).
>
> The major aim of this article has been to provide sufficient evidence to alleviate any qualms about the generality of the Big-Five structure. (Goldberg, 1990).
>
> We believe that the robustness of the 5-factor model provides a meaningful framework for formulating and testing hypotheses relating individual differences in personality to a wide range of criteria in personnel psychology, especially in the subfields of personnel selection, performance appraisal, and training and development. (Barrick & Mount, 1991).
>
> The past decade has witnessed an electrifying burst of interest in the most fundamental problem of the field--the search for a scientifically compelling taxonomy of personality traits. More importantly, the beginning of a consensus is emerging about the general framework of such a taxonomic representation. (Goldberg, 1993)

Personality and Job Performance in the Technical Domain

Campbell, Gasser, & Oswald (1996) postulated that job performance is better described as a behavior and not an outcome. His descriptions of six models of job performance are often used as a basis for job performance measurement design.

However, Campbell does not discuss the underlying motivations that underpin the rating of an individual.

These motivations are contextual and related to personality dimensions to some degree. It is believed that personality dimensions play a significant role in job performance, and should also be utilized within reasonable limits for assessing that performance. This position is supported by several studies of significance.

Barrick, Mount and Strauss (1993) discussed the effect of setting goals on job performance. They discovered that those individuals who were high in Conscientiousness were also typically goal setters. This goal setting behavior resulted in higher job performance, and the goals set by the individuals were ranked as difficult by supervisors. Thus, the individuals rated high in Conscientiousness are also accomplishing more difficult work for the organization.

Drucker (1954) described the process of Management by Objectives (MBO). This process is a systematic method of goal setting accomplished mutually between the rater and ratee. The effect of this process is improved job performance and reduced employee turnover. This demonstrates the longer-term effect of goal setting. With MBO, the use of goal setting becomes a standard practice within the organization.

McGregor (1957) discussed the application of Management by Objectives as an effective method of improving job performance. It is suggested that this process will allow the supervisor to act in a coaching role for the subordinate. Appraisals without mutually agreed upon goals violate the trust necessary for a coaching relationship. McGregor also recommended the use of psychological testing in the appraisal process, but only for use by the employee.

Salgado (1997) investigated the impact of the Big Five on job performance and discovered a correlation between job performance and Conscientiousness and Emotional Stability. This is interpreted as support for the notion that personality factors impact job performance. Therefore, those employees who are high in Conscientiousness will have improved job performance. Because these individuals may be accomplishing more difficult work (i.e., higher value) for the organization, these personality measures might be used as a scaling factor in job performance to improve assessments.

Keller (1997) found a link between job involvement, organizational commitment, and job performance for scientists and engineers. He postulated that engineers have an inward focus, thereby having a high organizational commitment. The result of this study is the recommendation to measure both of these components to assess job performance in engineers. He noted that technical professionals are very difficult to assess in job performance due to the lower opportunity to be observed by their supervisors. This lack of direct observation should result in a higher level of reliance by the supervisor on indirect observation. If this were indeed the case, we would expect to see a correlation between Agreeableness and job performance. This correlation is reported in Salgado (1997) as he stated that Agreeableness is a valid predictor of job performance for professionals, although the correlation is small. Van Scotter and Motowidlo (1996) also found Agreeableness (a component of interpersonal facilitation) as a valid predictor of job performance.

The correlation between Agreeableness and performance would seem intuitively correct. A technical professional who performs his or her job with minimal impact on the organization (i.e., in an agreeable fashion) would expect more positive responses to

his behavior than a professional would who possesses lower Agreeableness. Thus, the individual demonstrating an agreeable personality would gain more positive feedback directed to the supervisor, resulting in a potentially higher job performance rating.

Those individuals who exhibit lower levels of Agreeableness might expect negative feedback provided to the supervisor. Thus, the technical professional may be measured on the interpersonal process rather than actual job performance or outcome. Additionally, many technical professionals value Conscientiousness highly, and do not value the necessary interpersonal skills for Agreeableness.

A further consideration is that those individuals who set higher goals for accomplishment would have a more difficult time accomplishing those goals without a high level of Agreeableness. This is due to the impact the project may have on other individuals in the organization. In other words, the higher the goals, the more the project impacts the organization. The more organizational impact created, the more negative feedback is generated to the supervisor, resulting in potentially lower performance ratings, requiring a greater level of skill in influence management.

A disturbing conclusion to be drawn is that this reliance upon indirect observation for supervisory ratings may be resulting (long-term) in lower goal setting by individuals in the organization, in an effort to improve job performance ratings. The implementation of Management by Objectives can successfully circumvent this process, as the technical professional's performance is tied more directly to actual behavior and agreed upon measures.

Therefore, the actual performance of the technical professional is made up of several components. These components include actual job performance, interpersonal

behavior, and the difficulty of the work being performed. Appropriate job assessment must take into account each of these facets to accurately reflect the performance of the technical professional. Thus, a model considering both the individual's traits as well as the type of the project is most appropriate.

In reviewing the literature, no personality studies were found that had the same scope or focus as the current study. Several studies in other occupational fields have addressed analogous research questions. A brief review of their findings is included here.

Nicol (1988) studied the relationship between personality and career success of salespeople, administrators, and managers. She found that personality significantly predicted monetary success, and the combination of personality and background history showed some degree of prediction of overall career satisfaction. Personality was also found to be able to predict career interest and was a factor in career choice.

Nguyen (2000) studied the relationship between personality and job satisfaction for engineers-turned-managers. He found that engineers-turned-managers had a significantly higher score on the dominance personality scale than engineers. There was no significant difference in the sociability factor between the two groups. Most notable, he found no significant relationship between job satisfaction and personality factors for both groups.

Sanchez (2003) studied the relationship between personality and motivation to lead. She found that personality was a significant predictor of the motivation to lead. Among the five personality factors, the most consistently significant found were Extroversion, followed by Conscientiousness and Emotional Stability.

Williams (2005) studied the relationship between personality and the success of self-directed work teams. Personality was found to be significantly related to success. Extroversion was found to be the most significant personality factor. Dominance and Cohesiveness were also found to be significant variables and accounted for most of the variance of success for the work teams. Several variables were found to not have a significant impact on the success of the work teams. These included motivation, age, gender, education, job position, and organizational structure.

There is a significant lack of studies that attempt to clarify the impact that personality traits and project context have on the job performance assessment for the technical professional. This study will attempt to identify the correlations, if any, that exist between the individual traits of the project manager and the context of the project with respect to a perceived successful project outcome.

Methods of Measuring Personality Traits

Several studies have outlined methods for measurement of personality traits. Each of these attempts to define the traits of an individual through the use of a personality inventory. Various taxonomies exist, perhaps the best of which is that of Hough (1992). Hough described the creation of the Five-Factor Model as based upon a simplification of the language utilized to describe personality. Of the 17,953 such words, 35 core words were selected. From these, the five factors (O-C-E-A-N) were discovered to describe personality. Various examples of research utilize different terminology.

Smither (1998) also addressed the issue of personality factors. When discussing the "Big Five" taxonomy, the term Intellect is substituted for Openness. This taxonomy is then discussed with respect to predicting job performance. Overall, it was concluded

that general cognitive ability is a valid predictor of job performance, as well as Conscientiousness. These results are consistent with other research. However, an interesting conclusion of Smither's is the discussion of validities of personality inventories. It is stated that supervisory observations of Conscientiousness and Extroversion are better predictors of job performance than personality inventories given to the job occupant.

Schermerhom (1999) described the "Big Five" Framework utilizing the same five factors as other contemporary authors. Additional factors were proposed, such as Problem-solving ability, Authoritarianism, Machiavellianism, Self-monitoring, and Type A or B behavior. These were considered as possible inclusive terms in personality measurement, but specific research results are not cited.

Eysenck (1991) described a research study in which the five-factor model was correlated to social class and gender of the testee. Results of the research indicated little or no correlation between the five-factor model and social class. In this case, the five factors included Neuroticism, Extroversion, Rigidity, Nervousness, and Emotionality. Of these five factors, the first three showed significant intercorrelation, while the latter two did not. Also noted is a significant difference between genders in the correlation. This result might reflect the differing social climate of the time, as women were shown to be more introverted, nervous, have greater emotionality, and neuroticism. These results have not been replicated.

Goldberg (1992) described an inventory for use in measuring the Big Five personality traits. This paper is of significant importance as it described a compact personality inventory that can be utilized to assess the Big Five Factors. These can then,

in turn, be correlated to job-performance in specific domains. The personality inventory is not written for a specific domain, resulting in a highly flexible assessment tool.

Definition and Dimensionality of Career Success

Career success has be defined as the real or perceived achievements individuals have accumulated as a result of their work experiences. Career success can be partitioned into extrinsic and intrinsic components (Judge et al., 1995). Extrinsic success is relatively objective and observable, and typically consists of highly visible outcomes such as pay and ascendancy (Jaskolka, Beyer, & Trice, 1985).On the other hand, intrinsic success is defined as an individual's subjective reactions to his or her own career, and is most commonly experienced as career or job satisfaction (Gattiker & Larwood, 1988; Judge et al., 1995).Research confirms the idea that extrinsic and intrinsic career success can be assessed as relatively independent outcomes, as they are only moderately correlated (Bray & Howard, 1980; Judge & Bretz, 1994).

Judge et al. (1995) defined extrinsic success in terms of salary, number of promotions, and occupational status. Occupational status is related to societal perceptions of power and authority afforded by the job (Blaikie, 1977; Schooler & Schoenbach, 1994).Occupational status is a measure of occupational stratification reflecting the ability to attain high-status and prestigious jobs.

In terms of intrinsic success, it would appear that job satisfaction is the most relevant aspect. Individuals who are dissatisfied with many aspects of their current jobs are unlikely to consider their careers, at least at present, as particularly successful. Judge and Bretz (1994) identified job satisfaction as the most salient aspect of career success.

Defining Job Satisfaction

There seems to be general agreement among researchers on the key elements of job satisfaction. Smith, Kendall, and Hulin (1969) defined it as "the feelings the worker has about his job" (p. 6).These feelings were based on the individual's perceptions of the differences between what was expected as a fair return and what was actually experienced.

Locke (1969) defined job satisfaction as "the pleasurable emotional state resulting from the appraisal of one's job achieving or facilitating one's values" (p. 316). He also claimed that job satisfaction was a function of what a person wanted from a job and what he perceived it as offering. Lawler (1973) also explained job satisfaction in terms of the difference between what people thought they should receive and what they perceived that they actually did receive.

Schultz (1982) defined job satisfaction as " the psychological disposition of people toward their work - and this involves a collection of numerous attitudes or feelings" (p. 287).

Lofquist and Dawis (1991) defined satisfaction as "an individual's positive affective evaluation of the target environment; result of an individual's requirements being fulfilled by the target environment; a pleasant affective state; the individual's appraisal of the extent to which his or her requirements are fulfilled by the environment" (p. 27).

There has been much less agreement on the part of researchers as to what causes job satisfaction. Various theories on job satisfaction have been developed, presented, and ultimately have been either supported or questioned by others in the field.

Traditional theories have contended that job satisfaction and dissatisfaction share a single continuum; certain job factors create feelings of satisfaction when they are present and feelings of dissatisfaction when they are absent.

Traditionalists have claimed that both intrinsic and extrinsic factors have the capacity to create satisfaction or dissatisfaction. Intrinsic factors include recognition, achievement, responsibility, and advancement. Extrinsic factors of the job include salary, working conditions, supervision, and administrative policies. Hoppock (1935) and Maslow (1954) are two prominent traditionalists who are cited throughout the literature promoting this line of thought.

Hoppock concluded that if the presence of a certain variable led to satisfaction, then its absence led to dissatisfaction. Thus, job satisfaction and job dissatisfaction shared the same continuum. Midway between satisfaction and dissatisfaction was a feeling of neutrality in which the individual was neither satisfied nor dissatisfied.

Maslow (1954) theorized job satisfaction as a hierarchy of needs in which he categorized human needs into five orders. The lowest order consisted of the basic physiological needs such as water, food, and shelter. The second order consisted of physical and financial security. The third order consisted of social needs, which included belonging, love, and acceptance of others. The fourth order consisted of self-esteem and recognition by peers. The fifth and highest order of needs consisted of self-actualization, which included self-development, autonomy, and self-direction. According to Maslow, needs at one level had to be met before the next level could become a motivator.

Herzberg's Motivator-Hygiene Theory. Herzberg et al. (1957) accomplished a comprehensive review and analysis of research involving the factors relating to job

attitudes and the effect of job attitudes on work performance. Much disagreement was found, which the authors attributed to the "unstable nature of the subjective data on which studies in this field have typically been based" (Herzberg et al., 1957, p. vii). In an attempt to provide a more analytical approach to the study of job attitudes, Herzberg and his colleagues (Herzberg et al., 1959) followed up the research review with a series of interviews designed to study the question of what factors affect job satisfaction.

Herzberg et al. (1959), in their study using 203 randomly selected accountants and engineers, refuted the concept of a single continuum between the satisfiers and dissatisfiers. Herzberg contended that job satisfiers were those aspects of work that were intrinsic to the employee and tended to promote feelings of happiness in the worker. The dissatisfiers were those aspects of work that were extrinsic and focused on the environment of the work (Herzberg et al., 1959). He further concluded that there probably were two continua present, one including those factors that caused satisfaction or lack of satisfaction, and a second which included job satisfaction factors that caused dissatisfaction or a condition of no dissatisfaction (Herzberg et al., 1959).

The responses from the 203 engineers and accountants were categorized according to similarity (not to some predetermined groupings) to give an indication of the factors important for motivation. When the individual data was correlated with whether the employee was telling a satisfying or a dissatisfying experience, the researchers obtained a sense of which factors most affected satisfaction or dissatisfaction.

The study produced a two-factor hypothesis relating to the grouping of individual factors that caused either job satisfaction (motivators) or job dissatisfaction (hygienes). Herzberg (1964) stated:

> This hypothesis suggests that the factors involved in producing job satisfaction were separate and distinct from the factors that led to job dissatisfaction. Since separate factors needed to be considered depending on whether job satisfaction or job dissatisfaction was involved, it followed that these two feelings were not the obverse of each other. The opposite of job satisfaction would not be job dissatisfaction, but rather no job satisfaction; and similarly the opposite of job dissatisfaction is no job dissatisfaction, not job satisfaction. The fact that job satisfaction is made up of two unipolar traits is not a unique occurrence. The difficulty of establishing a zero point in psychology with the procedural necessity of using a benchmark (mean of a population) from which to start our measurement, has led to the conception that psychological traits are bipolar. (p. 3)

Herzberg's approach thus was different from traditional thinking on satisfaction and dissatisfaction as simple opposites; they are two different sets of needs. The motivator factors, as described by Herzberg (1966), are achievement, recognition, advancement, possibility of growth, responsibility, and the work itself. The hygienic factors are: salary, interpersonal relations with a superior, interpersonal relations with peers, interpersonal relations with subordinates, company policy and administration, working conditions, factors in personal life, and job security. Herzberg (1966) justified the unipolar grouping by pointing to the results from the initial study, in which

motivator factors contribute little to job dissatisfaction and hygienic factors contribute little to job satisfaction. The significance is that one group (the motivators) describes people's relationship to what they do and the other group (hygienes) describes the relationship to the context or environment in which the job is done.

Because discrepancies exist between the thought of the traditionalists and Herzberg, researchers continue to explore various methods to assess the cause of job satisfaction. Robbins (2000) suggested this is important to do because a link may exist between job performance and satisfaction.

A review of the factors described as motivators reveals two that have a strong relationship to several hygienic factors: Advancement and Possibility of Growth. In the original research that became the Motivator-Hygiene Theory, Advancement was found to be a motivator, relating to positive long-term feelings. Herzberg (1966) defined selection of this factor as follows:

> This category was used only when there was an actual change in the person's status or position in the company. In situations in which an individual transferred from one part of the company to another, with no change in status but with increased opportunities for responsible work, the change was considered an increased responsibility (for which we have a category) but not formally an advancement. (p.195)

Possibility of Growth was described as changes in situations involving objective evidence such that the possibilities for growth were increased or decreased. Included was not only the likelihood that individuals would be able to move onward and upward

within the organization, but also a situation in which individuals can advance their own skills and in their profession.

These definitions are particularly narrow when compared to the other factors. The line between potential for advancement, including the resultant change in status, and actual advancement is a fine one. The potential to advance could be interpreted as possibility of growth, but again there is also the relationship to changing status. Even Herzberg (1966) considered possibility of growth to be a fringe factor and associates the possibility of growth with changing status in his definition for the term.

In describing advancement following his review of studies utilizing the Motivator-Hygiene Theory, Herzberg (1966) stated,

> Advancement can be visible evidence for psychological growth, but it occurs in only one-third of the studies because of its higher order nature and because the opportunity for this factor is less frequent than for achievement, recognition, and responsibility. (p. 127)

Typically, increased compensation accompanies advancement. Thus, advancement is closely associated with the two hygienes of pay and status.

Summary of Literature Review

The nature of project management is changing from an emphasis on management to an emphasis on leadership. Traditional project management has been successful in achieving specific objectives. For project managers, "There has been a progression from administrative command to team leadership, a change driven by an enlightened work force and a need to be fiercely competitive" (Verma & Wideman, 2002, p. 1).Therefore,

the shift to the human side of project management and incorporation of techniques for dealing with people equitably and effectively will continue to figure heavily.

Murch (2001) stated that, rarely has a professional field evolved as rapidly as project management. The struggle to stay abreast of new and rapidly evolving technologies and managing information requires that project managers continuously train and learn. According to Wideman (2001), leading a project invokes the whole gamut of skills from motivation, negotiation, delegation, to coordination and successful conclusion. Therefore, education, training, and experience will become more important to meet the organizational business demands of the future. But, more importantly, what have traditionally been viewed as "soft skills" will take on greater significance in leading the new class of highly-mobile knowledge workers that make up today's project-based organizations.

Project management is a complex undertaking. The project manager must possess many skills to accomplish all of the project goals, both tangible and intangible. The tangible goals include the outcome criteria of the project, such as the scope, schedule, and budget. Intangible goals include the ability to complete the project while simultaneously minimizing the amount of chaos introduced into the organization. Other intangibles might include the ability of the project manager to implement change without negatively impacting the ability of the organization to function. Thus, the tangibles of the project might be described as what is done, and the intangibles of the project may be defined as how it is done.

The individual traits of the project manager may contribute to the success of the project (Pettersen, 1991). These traits might include professional qualifications and

experience personality characteristics, leadership focus, and social power style. Each trait will contribute to the success of the project manager in both tangible objective attainment and intangible goal success.

Individual behavior may be a significant contributor towards the career success of project managers (Flannes & Levin, 2001). The individual traits and behaviors of the employees are what constitute the richness of the organization, and lead to invention, creativity, knowledge, conflict, and chaos. The impact individual behavior has upon project management is best illuminated through leadership.

Leadership in the project context is similar to leadership of an autonomous enterprise. The typical project functions as a company within a company. The benefits and responsibilities of the project manager are then similar to the requirements of an executive in an organization. A great deal of study has been dedicated to the traits of the leader within organizations, but no single description of a "leader" has resulted.

Leadership theories describe the behavior of project managers from an individual perspective through the leadership of teams. From this body of literature, it is apparent that the individual traits of the project manager are critical to the success of the project and ultimately to the career success of the project manager.

As described in this chapter, there are several factors contributing to the career success of project managers. No study was found connecting these various contributors to project manager career success. Shenhar (1997) described several facets of project success, including project efficiency, impact on the customer, business success, and preparation for the future. Unfortunately, Shenhar considered the financial successfulness of the project to be a primary measure of overall success. However,

because it is clear that project success can be high in companies where individuals misunderstood the marketplace, project manager career success can be independent of financial success.

To define the significant contributors to project manager career success, this research addressed the following factors: (a) the project manager's professional qualifications, (b) the project manager's professional experience, (c) the company context within which the project manager functions, (d) the project manager's personality traits, (e) the project manager's leadership focus, and (f) the project manager's social power style.

These factors were utilized in this study to determine what factors, if any, contribute most significantly to project manager career success.

Chapter 3: Methodology

Overview

This quantitative correlational study examined to see if a relationship exists between specific skills, traits, or behaviors and the career success of project managers in the Architectural and Engineering Design Services Industry across the United States. This objective was accomplished by investigating the correlations between the career success of project managers, the project managers' traits, and environmental factors. The constructs included the project managers' personality traits, leadership style, social power style, educational and training background, and professional experience. Organizational structure and company type were considered to determine if they were significantly associated with any of the constructs of career success.

Restatement of Problem

The purpose of this study was to examine if a relationship exists between career success in project management and the individual traits of Architectural and Engineering Design Service Industry project managers. Those traits that correlate with effective project management may be used as predictors of project management career success. The study proposed that various personal attributes of the project manager are at least significantly correlated with the results of project managers' career success. These attributes include personality traits, leadership style, social power style, education and training, company context, and project management experience. A successful career in project management is one characterized by consistent project success, and the feeling of job satisfaction as a result of the work experience.

The following specific research questions were examined in this study:

What, if any, differences exist in the career success of project managers based upon measures of personality traits?

What, if any, differences exist in the career success of project managers based upon the attainment of professional qualifications?

What, if any, differences exist in the career success of project managers based upon measures of leadership style?

What, if any, differences exist in the career success of project managers based upon measures of social power style?

Statement of Hypotheses

The hypotheses proposed in this study are described below. A separate hypothesis was proposed for each domain as follows:

Hypothesis 1 – Personality Domain

Hypothesis 2 – Qualifications Domain

Hypothesis 3 – Leadership Domain

Hypothesis 4 – Social Power Domain

Null Hypothesis 1 – Personality Domain

Ho1 In the population of Project Managers in the Architectural and Engineering Professional Design Services Industry, there will be no statistically significant differences in career success based upon the measures of personality captured in Goldberg's "Big Five" inventory.

An alternative hypothesis was proposed for each of the five factors of personality. Each alternate hypothesis in this domain is described below.

Openness refers to the tendency to seek out novelty and variety, with a marked preference for complexity. Individuals who are high in Openness are perceptive in recognizing the emotions of others. They are also attracted to new ideas and alternative value systems, making them creative and highly tolerant of others. Hence, Openness may also be a valid predictor of interpersonal facilitation. To the extent that being creative and tolerant of alternative viewpoints may contribute to problem analysis, which is an important component of task performance in project management, individuals high in Openness will demonstrate a greater adaptability in project management. Those individuals who exhibit the greatest managerial adaptability will generally enjoy greater career success. This success is likely to be recognized by the company in terms of rewards, recognition, and promotion. This leads to the following Alternate Hypothesis:

$H_1$1A Project Managers who have high Openness will have greater career success than those with lower Openness.

Job performance research that has attempted to define those universal traits that contribute to high job performance has defined Conscientiousness as a good predictor of job performance (Barrick, et al. 1993). Thus, those individuals who have a desire to accomplish the job in an acceptable fashion will be recognized by the company as having high job performance. It has been established that project management career success is based not only upon the completion of the job, but also upon the manner in which the job was completed. This leads to the consideration that those individuals with exceptionally high Conscientiousness will focus on task completion while respecting the process of

project completion. This will be recognized by the organization as higher job effectiveness. Those individuals who exhibit high conscientiousness will achieve higher career success. This will be recognized within the company with rewards, recognition, and promotion. This leads to the following Alternate Hypothesis:

$H_1$1B Project Managers who have high Conscientiousness will have greater career success than those with low Conscientiousness.

The process of project completion is crucial to the career success of project managers. Shainis (1995) noted that individuals who can complete projects with minimal impact on the organization will have greater success. The manifestation of this minimal impact on the organization is based upon the ability of the individual to manage the stakeholders' expectations (Rosenau, 1992). Stakeholders in a project include those individuals connected to a project in both an internal and an external fashion. These stakeholders maintain expectations for the project, which must be managed by the project manager to increase the likelihood of success. Expectations are not managed through stubbornness, but rather through Agreeableness. The project manager demonstrates this through the use of communication skills, negotiation skills, and the ability to delegate tasks effectively. Agreeableness provides the individual with the ability to compromise and collaborate more effectively. This will likely lead to career success, and be recognized by the organization in the form of rewards, recognition and promotion. This leads to the following Alternate Hypothesis:

$H_1$1C Project Managers who have high Agreeableness will have greater career success than those with lower Agreeableness.

Project managers must be able to adapt to changing situations and constant chaos (Peters, 1987). This is necessary due to the dynamic nature of organizations, and the chaos that has become a standard within them (Bak, 1996). As unpredictability increases, the project manager must be able to accept and embrace change in order to lead a project team effectively. Those project managers who have high Emotional Stability will perform better in this dynamic environment than those who are more Neurotic. This is demonstrated by the project manager who accepts scope changes within the project and negotiates effective solutions. Project managers who have lower Emotional Stability might react as though the scope changes are a personal affront or problem caused by others. The project manager who recognizes that change is essential in projects, and who is able to adapt to change more readily, will have greater career success. This career success will be recognized within the organization in the form of rewards, recognition, and promotion. This leads to the following Alternate Hypothesis:

$H_1$1D Project Managers with high Emotional Stability will have greater career success than those who have high Neuroticism.

The ability to manage a project effectively requires that a manager act in a leadership capacity. Leadership requires the individual to do the right things, which will frequently be unpopular or unattractive things (Schermerhorn, 1999). The project manager must also take a proactive stance in communicating the status of the project, negotiating the changing requirements of the project, and delegating the tasks to the individuals operating the project. It is believed that extroversion is a trait that will enable the project manager to communicate more directly, as well as take an active role in managing the expectations of the project. Extroversion should enable the project manager

to actively participate in potential changes to the project status, thereby influencing the outcome. The ability to influence the outcome will increase the confidence of the project team in the leader. This confidence will result in the team having higher job performance, resulting in greater success for the project manager (Schermerhorn, 1999). This success results in the project manager being given the continued opportunity for success within the organization. The organization will likely reward this behavior with rewards, recognition, and promotion. This leads to the following Alternate Hypothesis:

$H_1$1E Project Managers who are Extroverted will have greater career success than those who are Introverted.

Null Hypothesis 2 – Qualifications Domain

Ho2 In the population of Project Managers in the Architectural and Engineering Professional Design Services Industry, there will be no statistically significant differences in career success based upon Professional Qualifications (Education and Training, and Experience).

Each alternate hypothesis in this domain is described below.

Individuals possess knowledge in several forms that is used to manage projects effectively. The direct knowledge that the individual possesses is based upon instruction received in related domains. This knowledge forms the basis for the behaviors of the individual within the organization (Robbins, 2000). As the level of knowledge increases, it is likely that the ability of the individual to recognize similarities in situations will increase. This ability to recognize situations will allow the individual to apply direct knowledge to a situation, thereby increasing the chances for success.

Specialized knowledge in a domain will enable an individual to better recognize application specific situations when they arise. For example, those individuals possessing

a greater degree of project management knowledge would be expected to perform better than those individuals without this specialized knowledge. Therefore, the combination of both a general education and specialized training could be expected to produce a project manager who is better able to identify environmental factors, and correlate those factors to applicable knowledge about the situation. This project manager will likely have greater career success, and the company will recognize this ability. The company will compensate this project manager with rewards, recognition, and promotion. This leads to the following Alternate Hypothesis:

$H_1$2A Project Managers who possess more Education and Training will exhibit greater career success than those with less Education and Training.

Much of project management involves the use of tacit knowledge (Schermerhorn, 1999), that is, knowledge that cannot be codified and made explicit for others to learn. Such tacit knowledge might include how to resolve conflicts within a project team, how to delegate activities among team members, and how to successfully manage the expectations of management throughout the project. This tacit knowledge is not learned through education and training, but rather is gained experientially. As the manager is exposed to more diverse situations, the manager learns patterns of behavior that extend across all projects, and thus develops generalized knowledge. Additionally, as the manager encounters situations that are unique, the manager can apply the generalized knowledge based upon observed similarities in situation. The manager can also enrich his or her generalized knowledge by noticing the environmental factors that contributed to the differences in the situation. As this new generalized knowledge is incorporated by the

manager into future practice, the likelihood of project success increases. Such project success is likely to be recognized by the organization in the form of rewards, recognition, and promotion. This leads to the following Alternate Hypothesis:

$H_1$2B Project Managers with more Project Management Experience will have greater career success than those individuals with less Project Management Experience.

Null Hypothesis 3 – Leadership Domain

Ho3 In the population of Project Managers in the Architectural and Engineering Professional Design Services Industry, there will be no statistically significant differences in career success based upon the measures of Leadership Style captured in the *Dimensions of Leadership Profile*® (Inscape Publishing).

It has been established that no leadership style is appropriate in all situations. The appropriateness of a particular leadership style is dependent on a variety of situational factors. This is especially true for project managers in the design service industry, where the most effective leadership style will vary based on team composite, project scope, and project lifecycle phase. This leads to the following Alternate Hypothesis:

$H_1$3 In the population of Project Managers in the Architectural and Engineering Professional Design Services Industry, career success will be associated with one or more specific Leadership Styles captured in the *Dimensions of Leadership Profile*® (Inscape Publishing).

Null Hypothesis 4 – Social Power Domain

Ho4 In the population of Project Managers in the Architectural and Engineering Professional Design Services Industry, there will be no statistically significant differences in career success based upon the measures of Social Power Style captured in the Frost/Stehlski Social Power Questionnaire.

Pitts (1990) studied one hundred and forty-six project managers in matrix organizations to determine their perceptions of the social power style required for an outstanding project manager. Pitts' research revealed that there is no single social power style used by project managers to influence team members. Project managers use a variety of social power styles based on specific team composition and organizational culture, among other factors. This leads to the following Alternate Hypothesis:

$H_1$4 In the population of Project Managers in the Architectural and Engineering Professional Design Services Industry, career success will be associated with one or more specific Social Power Styles captured in the Frost/Stehlski Social Power Questionnaire.

Summary of Research Hypotheses

The research hypotheses for this study are summarized in Tables 8, 9 and 10.

Table 8

Research Hypotheses – Intrinsic Factors

Domain	Null hypotheses		Alternate hypotheses	
Personality	Ho1	There will be no statistically significant differences in career success based upon the measures of personality.	$H_1$1A	Project managers who have high Openness will have greater career success than those with lower Openness
			$H_1$1B	Project managers who have high Conscientiousness will have greater career success than those with low Conscientiousness
			$H_1$1C	Project managers who have high Agreeableness will have greater career success than those with lower Agreeableness
			$H_1$1D	Project managers with high Emotional Stability will have greater career success than those who have high Neuroticism
			$H_1$1E	Project managers who are Extroverted will have greater career success than those who are Introverted

Table 9

Research Hypotheses – Qualification Factors

Domain	Null hypotheses		Alternate hypotheses	
Qualifications	Ho2	There will be no statistically significant differences in career success based upon Professional Qualifications	$H_1$2A	Project managers who possess more Education and Training will exhibit higher career success than those with less Education and Training
			$H_1$2B	Project managers with more Project Management Experience will have greater career success than those individuals with less Project Management Experience

Table 10

Research Hypotheses – Job Performance Factors

Domain	Null hypotheses		Alternate hypotheses	
Leadership	Ho3	There will be no statistically significant differences in career success based upon the measures of Leadership Style	$H_1$3	Career success will be associated with one or more specific Leadership Styles
Social Power	Ho4	There will be no statistically significant differences in career success based upon the measures of Social Power Style	$H_1$4	Career success will be associated with one or more specific Social Power Styles

Description of Research Design

A quantitative correlational methodology was used to analyze which, if any, of the constructs were significantly and positively correlated to AE project managers' career success. This was accomplished by investigating the correlations among the career success of project managers, the project manager traits, and environmental factors. A self-administered questionnaire was used in this study. The questions were derived from established, validated instruments designed to assess the constructs of interest. A logical progression of statistical analysis was followed, from simple descriptive statistics through correlation analysis. A data model was developed to relate the various independent variables to the dependent variable of project management career success. Regression analysis was used to test the appropriateness of the model.

It has been established that the contributors to effective project management career success are not known in detail. Through the use of a deductive model, the potential dimensions significantly correlated with effective project management career success have been defined. Data was gathered to examine both the relationships among the various dimensions and the significance of each dimension in measuring success.

The model of effective project management career success presented defines the dimensions of interest to be measured. However, the method for measuring those dimensions, essentially the how and when, was not well defined. Therefore, a systematic approach to the design and implementation of the test was required. This method considered content, administration, and scoring (Cascio, 1997).

Test selection was based upon the content to be measured. The dimensional measures are defined in a manner that allowed the use of self-assessment. One of the

fundamental requirements in assessing another's job performance is the opportunity to observe. Additionally, in order to observe the participant over a period of time that is sufficient to overcome emotional assessments of specific projects, an observation period of many projects is required. In today's environment of job change and organizational restructuring, it would be impractical to attempt to find participants with supervisors or colleagues who have had significant opportunity to observe. Additionally, this might introduce further uncertainty into the measurement, as the sample might be limited to those participants who have stayed with specific employers for perhaps longer than 10 years. In light of these considerations, a self-administered survey methodology was used.

Established, validated instruments were used to assess the constructs of interest. Since the reliability and validity of these instruments have been demonstrated in previous studies (Goldberg, 1992; Inscape Publishing, 1994; & Frost & Stehlski, 1988), the instruments could be administered in other settings without having to duplicate this analysis each time. Thus, it was assumed that the reliability and validity analysis need not be repeated in this study.

The process of the administration of the survey was also carefully considered. The survey may have been given at a group or individual level, and may have required a large or small amount of time (Cascio, 1997). In this case, it was appropriate to administer a test to the individual, as that is the unit of measure within the study. In order to capture a large sample size, the survey was constructed in a manner that allowed self-administration, and did not require more than 30 minutes to complete. This design also enabled the survey to be administered in a consistent manner, without the direct

intervention of the researcher. Moreover, the expected return on the surveys was increased due to the brevity of the test.

The method of scoring the survey can be either open-ended or closed-ended. To reduce the uncertainty of inconsistent grading, the survey was designed for closed-ended scoring. Thus, each scale utilized was based upon a number value that describes either a discrete value or a position on a continuum.

Babbie (1998) described survey research as a method suitable for descriptive studies of large sample sizes, representative of a sample population. Additionally, Babbie noted that a self-administered questionnaire is expected to improve the validity of the data, as interviewer bias is removed. Anonymity of the participants can also increase the reliability of results.

Self-Administered Questionnaires

The use of a self-administered questionnaire was selected for a variety of reasons.

First, the use of a questionnaire precludes the potential for bias of an interviewer on the topic of effective project management. As an example, if the participant perceived the interviewer as a project manager, some form of competition may have entered the communication between the interviewer and participant.

Second, the use of a questionnaire potentially increased the sample size, as the number of participants was no longer limited by the ability or time constraints of the interviewers. This was expected to generate a greater number of respondents in the study.

Third, the use of self-administered questionnaires removed the potential bias of the researcher in presenting the survey. The design of the present research was intended to allow remote administration by impartial assistants. If the researcher introduced the

survey, some error might be introduced based upon the ability of the researcher to communicate in a consistent fashion during the introduction or explanation of the survey.

Fourth, a closed-ended questionnaire removed the need for some subjective interpretation of answers that might be given in an interview. This likely increased the reliability of the test over a subjectively scored test, due to the objective scoring designed into the survey.

Finally, more responses are likely when the test is structured in a simple straightforward manner that does not require additional explanation.

Therefore, the design of a self-administered questionnaire was proposed to be undertaken to measure the contributors to project management career success.

Data Model

The model used in this study relates the various constructs of interest (independent variables) to the dependent variable of project management career success. The model is depicted in Figure 1.

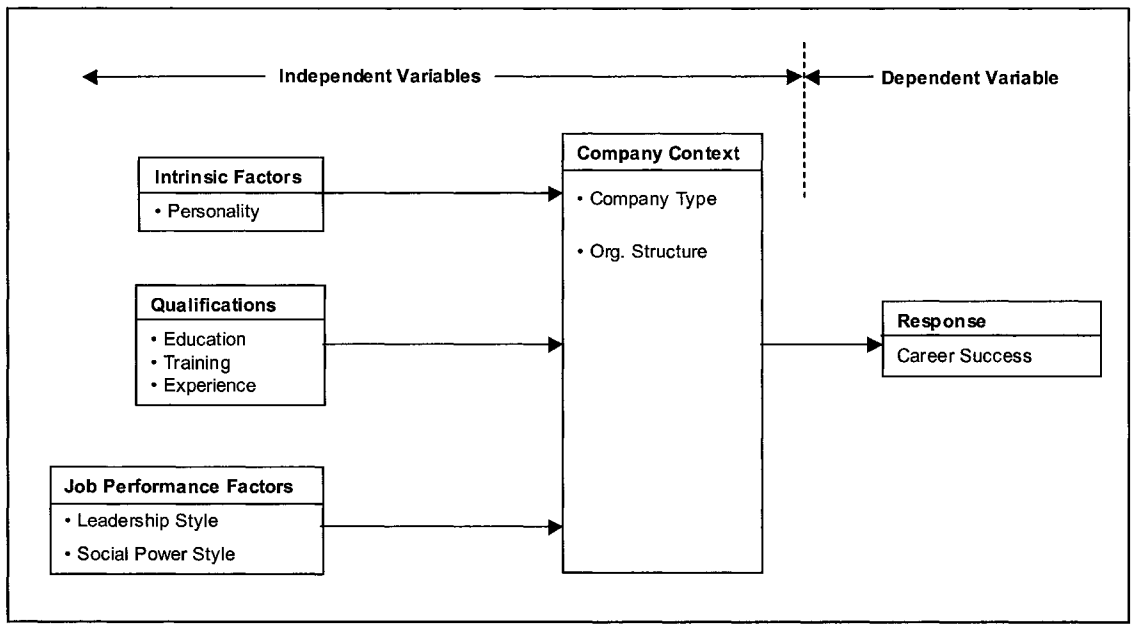

Figure 1. Data model.

In order to analyze the appropriateness of this model, a regression equation was constructed to define the significant variables and coefficients. The basic equation used was:

$$\text{Career Success} = \beta_0 + \beta_1 P + \beta_2 L + \beta_3 S + \beta_4 G + \beta_5 E + \beta_6 T + \beta_7 C + \beta_8 IE + \beta_9 PE + \beta_{10} F + \beta_{11} O + \varepsilon \quad (1)$$

Where:

β_0 = Intercept term

$\beta(_1) \ldots \beta(_{11})$ = Regression Coefficients

P = Personality Traits

L = Leadership Focus

S = Social Power Style

G = Gender

E = Education Level

T = PM Training

C = Professional Certification

IE = Industry Experience

PE = Project Management Experience

F = Firm Type

O = Organizational Structure

ε = Random Error Term

Operational Definitions of Variables

Each of the constructs described within the model of successful project management was defined in a manner allowing measurement of the construct within the context of a survey. The survey of demographic data is included in Appendix B, Part 1. Each construct is discussed separately.

Company Context Variables

Firm type. Tukel and Rom (1998) described a taxonomy for the type of companies involved in project work. This taxonomy is used to gain insight into project management practices within various industries. It provides a reasonable classification of various industries into manageable categories.

Five industry segments of the AE industry were listed as options in the survey. The five segments are broad categorizations of company type that were universally recognized by industry professionals.

Tukel and Rom (1998) allowed respondents to choose more than a single category in the company typology. While this allowed consultants to respond describing projects

in varying industry segments, response statistics exceed 100 percent. To ensure that effects are categorized by company context, the participants in this study were asked to select a single response for the majority of their project work. It was considered likely that consultants generally work within a single industry segment.

Organizational structure. Organizational structure was utilized to determine its effect, if any, on the project manager's ability to complete the projects appropriately. Shenhar (1998) categorized projects into one of several classifications. In a similar manner, five organizational structures were listed as options in the survey

The organizational structure classifications were defined in the questionnaire to help ensure uniform interpretation of the terminology. Common descriptors were chosen that are familiar to most individuals working in the Architectural and Engineering Design Services Industry. Shenhar (1998) utilized terminology common to the defense industry, possibly creating confusion in individuals unfamiliar with the terminology. Thus, this rewording was intended to standardize the responses for direct comparison in the data analysis portion of the study.

Professional Qualification Variables

Project manager certification. Many project managers undertake extensive training in preparation for professional certification. Currently, the only certification that is universally recognized within the Architectural and Engineering Design Services Industry is the Project Management Professional (PMP) designation awarded by the Project Management Institute (PMI). This type of discipline-specific certification is of importance since it represents demonstrated knowledge of contemporary project

management theory. For this reason, respondents were asked if they hold the PMP certification.

Project manager education. The educational level of the individual was defined by a nominally scaled value describing the level of education attained in formal settings. This educational level was based upon the degree level achieved.

In addition to the academic level achieved, it is possible that the respondent also had received specific training in the area of project management. This type of discipline-specific training is of importance due to the impact it may have on project management practices. For this reason, respondents were asked if they received training in project management principles.

Project manager experience. Project manager experience is based upon the number of years of project-based work experience the participant had undergone, whether as a member of a project team or as a project manager. This question contained two parts, requiring the participant to identify both the interval containing the number of years of professional experience in the industry, and the cell interval containing the number of years acting as a project manager.

The dimension was measured independently, by means of two input areas describing the number of years of experience in each area. The first input, representing the number of years of professional work, provides some indication of the participant's knowledge of how project teams function. The second input, project management experience, was measured separately. This provides some idea as to the present responsibilities of the participant with respect to project management.

Career Success Variables

Project manager career success is a highly subjective construct and may be described differently by different project managers. Most would agree, however, that the dimensions described by Shenhar (1997) are significant. The difficulty is in when the assessment is performed. The longitudinal nature of engineering projects may affect the short-term perception of success. To overcome this shortcoming, the survey was designed to ask the participants to describe which of the included constructs they had been able to achieve consistently over the courses of their careers. These items were constructed in a manner that allowed objective measures of career performance based upon a relative peer comparison. Each of the five distinct measures is described separately. The operational measurement of Career Success was calculated as the simple arithmetic average of the these elements.

Compensation. Compensation was selected as a very tangible, linear, and distinct measure of relative long-term success among colleagues. Although many individuals are not aware of specific salary levels among colleagues within their own firm, they are aware of salary levels based upon trade publication salary studies. Therefore, participants were able to rank themselves with respect to their colleagues on a compensatory basis.

Promotions and Title Level. Promotions and Title Level was included as a long-term measure of career success, as job title classifications are being standardized through the use of tools such as the Dictionary of Occupational Titles (Cascio, 1997). This measure, in accordance with Ability to Move Up, is utilized to describe the job level attained, thereby determining the rate of promotion of the individual. As the title level increases, the promotion rate demonstrates higher career success. Kerzner (2001) also

noted that title level establishes relative authority level, thereby demonstrating a degree of autonomy afforded the more successful project manager.

Awards and Recognition. Awards and Recognition, coupled with Commendations, are important within the application of Maslow's hierarchy of needs (Maslow, 1954) and within the project management domain (Kerzner, 2001). As this compound measurement addresses both the social and self-esteem levels of Maslow's hierarchy (Maslow, 1954), it was appropriate that it be included as an element of career success in project management. Additionally, in the situation where a company rewards employees through methods other than monetary means, it provides information defining the success of project managers within that context.

Project Opportunities. Project Opportunities is a significant goal for many project managers, as the freedom to select a project or to define an attractive project is seen as a reward. Moreover, project managers are likely to achieve more when they are allowed to set their own goals. The corresponding measure for reliability purposes is Choice in Projects. Cascio (1997) cites autonomy as a necessary context to develop leadership. This measure of choice also provides the goal-setting behavior modification noted by Robbins (2000). Therefore, this measure of project manager career success addresses those individuals who are motivated at a level higher than monetary rewards.

Job Satisfaction. Job Satisfaction is a crucial measure of career success in project management. Satisfaction is an important outcome assessment that focuses on how well a person is adapting to all aspects of work.

Job Performance. Additionally, Job Performance, as evaluated by an immediate supervisor, is an independent measure of success in project management. Participants

were asked to indicate the results of their Annual Performance Reviews for the past three years using a five point scale ranging from poor (1) to exceptional (5).

Description of Materials and Instruments

As discussed previously, established, validated instruments were used in this study. A separate, specialized instrument was used for each domain of interest. These are described below.

Assessment of Leadership Style

The *Dimensions of Leadership Profile*® (Inscape Publishing, 1994) was used to assess leadership style. The *Dimensions of Leadership Profile*® is an established, validated instrument that identifies four "Focus of Attention" groups: Character, Analysis, Accomplishment, and Interaction. The Focus of Attention groups identify the extent to which the leader focuses on internal characteristics (Character) in comparison with the external environment the leader effects (Accomplishment). It also compares the leader's attention to the intellectual world of ideas (Analysis) with the social world of people (Interaction). Within each Focus of Attention, three leadership attributes are identified.

A primary Focus on Character identifies a leader who exhibits a high concern for commitment, integrity, and ability to learn from experience. The three leadership attributes within this Focus are Enthusiasm, Integrity, and Self Renewal.

A primary Focus on Analysis identifies a leader with creative ideas, a well-defined vision, reliable intuition, good judgment, and courage to face challenges. The three leadership attributes within this Focus are Fortitude, Perceiving, and Judgment.

A primary Focus on Accomplishment identifies a leader who gets things done. The three leadership attributes within this Focus are Performance, Boldness, and Team Building.

A primary Focus on Interaction identifies a leader with the ability to bring people together and motivate them to act. The three leadership attributes within this Focus are Collaborating, Inspiring, and Serving Others.

The leadership style assessment instrument is included in the survey in Appendix B, Part 2 (Project Leadership Attributes).

Assessment of Social Power Style

This study used the same questionnaire used by Frost and Stehlski (1988). The survey instrument, the Frost/Stehlski Social Power Questionnaire, was designed by Frost and Stehlski (1988) as part of their response to previous criticism of social power research (Podsakoff & Schreisheim, 1985). Frost and Stehlski (1988) used factor analysis to show that their questionnaire yields five orthogonal and distinct measures of social influences, which they identified as the five social power bases of French and Raven (1959).

Podsakoff and Schreisheim (1985) identified three faults of previous social power research. First, the scales used were primarily single-item statements that appeared to lack content validity when compared to the French and Raven (1959) original constructs. Second, the scales used were primarily ordinal rankings, and did not have Likert-like response formats to provide a means for interval scaling. Third, the scales used primarily attributional versus behavioral referents (such as "what do you think'', as

opposed to "how did you respond," or "what did you do"). Such attributional referents risk confounding of responses due to social biases.

Additionally, studies prior to Frost and Stehlski (Podsakoff, Todor, Grover, & Hover, 1984) had used the rank-order scheme mentioned above to posit correlations between two or more of the power bases, for example, suggesting that providing rewards may increase Referent power. This contradicts the original French and Raven (1959) constructs in which the interaction between the power bases was only discussed once. The clear intent of French and Raven (1959) was that any of the five power bases might exist independent of the others.

Frost and Stehlski (1988) were the first to address the possibility of the social power bases existing independent of each other, by using factor analysis and orthogonal rotation to show the individual bases are in fact orthogonal and distinct measures of social influence.

The Social Power Style assessment instrument is included in the survey in Appendix B, Part 3 (Project Management Behaviors).

Assessment of Personality Traits

Most broad-bandwidth personality inventories are proprietary instruments, whose items are copyrighted by the test authors (Goldberg, 1999). Consequently, these instruments cannot be used freely by other researchers. Goldberg (1992) presented an inventory for use in measuring the "Big Five" taxonomy of personality traits. This inventory is a simple test with an obvious purpose that the participant will understand. This increases the likelihood of the participant remaining engaged during the taking of

the test, producing better results (Babbie, 1998). The 50-marker form of the inventory was used in this survey since it did not require more than ten minutes to complete.

The personality inventory is included in the survey in Appendix B, Part 4 (Personal Attributes).

Assessment of Career Success

The assessment of project manager career success was based upon a self-evaluation of the project manager's self-perceived success in comparison to his or her colleagues. This structure was utilized to remove the uncertainties of self-assessment of career performance. Because most people consider themselves to be above average, a relative scale enables a more complete measurement of project success than does an absolute scale. The career success assessment instrument measured five key variables: compensation, promotions and title level, awards and recognition, project opportunities, and job satisfaction. The career success assessment instrument is included in the survey in Appendix B, Part 5 (Work Profile). The operational measurement of Career Success was calculated as the simple arithmetic average of the above construct elements.

Factor analysis of the Career Success instrument. Any new instrument needs to demonstrate that it is measuring what it intends to measure. The first step is to establish that items on a scale relate more to each other than to items on other scales. In this way, one establishes the unitary property of a scale. The Career Success Instrument was analyzed to ascertain if its eight questions load upon a single factor. This was done to determine if the instrument is measuring a consistent value across the questions.

Examination of the factor analysis in Table 11 demonstrated that all of the eight questions load upon the first factor. The first factor represents 46.1% of the variation in

the sample scores for the career success construct. Although there was another factor that had an eignenvalue greater than one, the scree plot in Figure 2 showed this to be insignificant compared to the first factor. Therefore, the career success instrument was treated as though it were a single continuous factor representative of the career success of the participant in the research survey.

Table 11

Factor Analysis of Career Success Instrument

Rotated factor loadings and communalities (Varimax rotation)				
Variable	Factor1	Factor2	Factor3	Communality
Compensation	0.671	0.148	0.570	0.797
Promotions/Title	0.707	0.222	0.413	0.719
Ability to move up	0.673	0.326	-0.122	0.575
Awards/Recognition	0.716	0.363	-0.282	0.723
Commendations	0.670	0.270	-0.432	0.708
Project opportunities	0.699	-0.486	-0.215	0.770
Choice in projects	0.666	-0.523	-0.045	0.720
Job satisfaction	0.628	-0.365	0.126	0.543
Variance	3.6898	1.0249	0.8406	5.5553
% Var	0.461	0.128	0.105	0.694

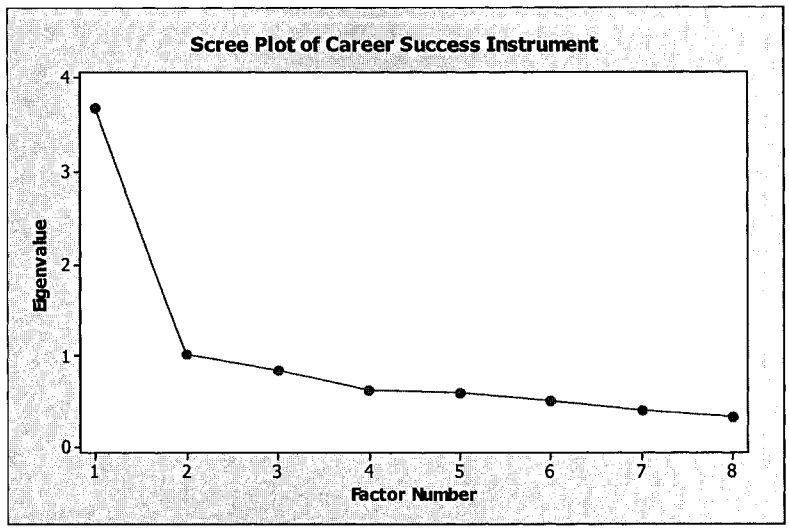

Figure 2. Scree plot of career success instrument.

Reliability

Reliability is a measure of consistency of the results obtained in a survey. The basic idea of reliability is summed up by the word "consistency" (Huck & Cormier, 1996). Reliability is an indicator of instrumentation error. Reliability refers to the extent to which an instrument contains measurement errors that cause scores to differ for reasons unrelated to the respondent; the fewer errors contained, the more reliable the instrument. According to Huck and Cormier (1996), comparison of Cronbach's alpha, or the coefficient alpha, is a versatile method for assessing internal consistency or reliability for the survey instrument.

Reliability of established instruments. The Leadership Profile instrument, Social Power Style instrument, and Personality Inventory instrument have been tested for both reliability and validity by their respective publishers or authors. The results of the previously published reliability studies (Goldberg, 1992; Inscape Publishing, 1994; &

Frost & Stehlski, 1988) are presented in Tables 12, 13, and 14. Reliability and validity of these instruments are shown to be high, so the instruments were included in the survey.

Table 12

Reliability of Leadership Profile Instrument (Inscape Publishing, 1994)

Focus	Dimension	Number of items	Coefficient alpha
Character	Enthusiasm	5	.83
	Integrity	5	.80
	Self-Renewal	5	.61
Analysis	Fortitude	5	.73
	Perceiving	5	.72
	Judgment	5	.75
Accomplishment	Performance	5	.76
	Boldness	5	.68
	Team Building	5	.65
Interaction	Collaborating	5	.66
	Inspiring	5	.78
	Serving Others	5	.66

Table 13

Reliability of Social Power Style Instrument (Frost & Stehlski, 1988)

Social Power Base	Number of items	Coefficient alpha
Reward	5	0.66
Coercive	5	0.66
Legitimate	3	0.58
Expert	6	0.61
Referent	4	0.57

Table 14

Reliability of Personality Inventory Instrument (Goldberg, 1992)

Big-Five domain	Number of items	Coefficient alpha
Openness	7 + 3 = 10	0.84
Conscientiousness	6 + 4 = 10	0.79
Extraversion	5 + 5 = 10	0.87
Agreeableness	6 + 4 = 10	0.82
Emotional Stability	2 + 8 = 10	0.86

Reliability of Career Success instrument. The coefficient alpha for the Career Success instrument was found to be 0.832. The split-half reliability was also calculated as another method for estimating internal consistency. The eight items of this instrument were split into two measures, which were then scored separately. The half-test reliability,

as determined by the correlation between the two scores, was found to be 0.774 ($p < 0.001$). The Spearman-Brown formula (Hinkle, Wiersma, & Jurs, 1998) was applied to adjust the half-test reliability to full-test reliability. The adjusted reliability was found to be 0.873. Both methods validate the reliability of this instrument.

Validity of the Constructs

If findings need to be appropriate, meaningful, and useful, they need to be valid. Three distinct types of validity measures were addressed: Content-Related, Construct-Related, and Criterion-Related. Although each assesses a different view of the same validity, each was considered as though each view is a separate type. This was done to clarify the specific elements of validity being addressed.

Content-Related Validity is intended to determine whether the measurement procedure adequately assessed the desired universe of situations (Cascio, 1997). Therefore, the issue of coverage of the domain is considered when ascertaining this type of validity. One must consider if the constructs selected measure an adequate amount of the domain. Content-Related validity was accomplished by using existing, well-tested instruments, and by face-validity via ties to the literature.

Construct-Related Validity is defined as the ability of a construct to measure what it intends to measure. This is crucial in determining whether a specific construct is appropriate as a measure for the information of interest. Therefore, we are less interested in this case as to whether a specific construct is being measured than we are in what class of construct is being measured (Cascio, 1997). Construct-Related validity was proven by high reliability (Cronbach's alpha) and the unidimensionality of the constructs via factor analysis.

Criterion-related validity is based upon the ability of the constructs to measure the domain of interest with adequate depth, and the ability of the constructs to truly measure what they are designed to measure. Concurrent criterion-related validity compares an instrument's scores with external criteria known or believed to measure the attribute under study (Kerlinger, 1973). Criterion-related validity was established by correlating the Career Success scores to job performance ratings based on the results of the Annual Performance Reviews, which is a proxy measure of career success. Based on 230 responses that reported job performance, the correlation between career success and job performance was 0.429 ($p<0.001$).

Selection of Subjects

The potential participants for this study consisted of 450 project managers employed at various firms in the Architectural and Engineering Design Services Industry. A cross-section of firms from various segments of the AE Industry was selected for participation to ensure broad viewpoints. Firms for this study were classified into five generally accepted categories as listed in Table 1. Eighteen firms from each category were selected. The 18 firms in each category consisted of the top 15 in terms of annual revenue as ranked by leading industry trade publications (ENR, 2004), and the 3 fastest growing firms as ranked by a leading industry consultant (ZweigWhite, 2004).A total of 90 firms were selected for the study. Each firm received 5 surveys for a total of 450 potential participants.

Procedures

Data Collection

The researcher contacted the chief executive of each firm to solicit participation in the study. The initial form of contact was a brief letter describing the study and asking the executive to consider having his or her firm participate. Two weeks after the initial letters were sent, the researcher began to contact each executive by telephone to further explain the study and personally ask for the firm's participation. Only three firms declined participation; two firms cited heavy workload as the reason, the other stated a concern for privacy. These three firms were replaced by the next firms in the ranking in the same firm category. Firms that agreed to participate were sent a package of 5 surveys. Two firms requested additional surveys in order to include their entire project management departments. These requests were denied by the researcher in order to ensure each firm had the same level of participation regardless of size. The surveys were sent directly to the firms' chief executives, who were asked to randomly distribute the survey to their project managers and request prompt participation. The selected project managers were asked to sign a Statement of Informed Consent (Appendix A) prior to being given a survey document. The chief executive was asked to return the signed Consent Statements directly to the researcher.

Data Entry

As the responses to the surveys were received, the survey forms were inspected for completeness. Incomplete forms were discarded as inappropriate. Data were systematically recorded by the researcher in a Microsoft Excel® spreadsheet. A research assistant verified all scoring and data entry for accuracy. Survey forms were then placed

into a physical storage location. Survey forms were stored until the completion of the dissertation project, and then destroyed, when the usefulness of the forms had been exhausted. Survey forms were under the control of the researcher, and no other parties were given access to the data except in composite form.

Discussion of Data Processing

Scoring of the Survey Form

The survey forms were inspected for completeness. Incomplete forms were discarded as inappropriate. All survey forms were sealed after inclusion in the database, and were scheduled to be destroyed upon completion of the study.

The Leadership Style portion of the survey was scored using the scoring key contained in the *Dimensions of Leadership Profile*® (Inscape Publishing, 1994). The resulting "Focus of Attention" scores and associated leadership dimensions were entered into the database.

The Social Power Style portion of the survey was scored using the scoring key provided by the authors (Frost & Stehlski, 1988). The resulting Social Power Style scores were entered into the database.

The Personality Traits portion of the survey was scored using the scoring key provided by the author (Goldberg, 1992). The resulting Personality Traits were entered into the database.

Reliability of the data was maintained as cohesively as possible. The researcher performed all initial scoring and data entry. A research assistant verified all scoring and data entry for accuracy.

Data Analysis

The MINITAB® Statistical Software package was used to analyze the data. Various statistical procedures were employed in the evaluation and interpretation of the data. In this study, the researcher attempted to determine the relationship between the independent variables of project manager personality traits, leadership style, social power style, educational and training background, and professional experience, and the dependent variable, project manager career success in a non-experimental environment.

A logical progression of statistical analysis was followed, from simple descriptive statistics through correlation analysis (Alreck & Settle, 1995). When the objective was to test the degree and significance of the relationship between two continuous variables from interval or ratio scales, Pearson's correlation analysis was used.

Pearson's correlation analysis is not appropriate for the analysis of nominal data. In those cases, Pearson's Chi-Square analysis was used.

Stepwise multiple linear regression analysis was used to test the data model depicted by equation (1). The model included all independent variables and all respondents.

Methodological Assumptions and Limitations

The major limitation of this study was that it was limited to a survey of Project Managers currently employed in the Architectural and Engineering Design Services Industry who were willing to participate in the study. Because of this limitation, it was not possible to make generalizations about project managers employed in other industries.

Several uncontrollable factors may have been present in this study. These factors may have affected the results of this study.

The chief executive of each participating firm distributed the survey instruments to the participants. It is not known if the participants were randomly selected as requested.

The responses to the survey instruments were self-reported. The participants may have answered the questions in an inconsistent or unpredictable manner. The participants may not have considered the questions adequately before offering their answers.

It is common for professional firms to have cultural expectations. The participants may have answered the questions in a way consistent with their firm's cultural trends or other perceived expectations and not in a manner reflecting true preferences.

Some of the participants may have previously completed the survey instruments for other studies thus presenting the possibility that in those cases the results may be somewhat less reliable.

Ethical Assurances

The desired participants in the survey were randomly selected by each firm's chief executive as requested in the invitation to participate letter sent directly to each chief executive (Appendix A). The participants were informed of the purpose of the study in the survey instructions and the Statement of Informed Consent that accompanied the survey.

In an effort to receive honest and accurate responses from the study participants, the survey participants were informed that the information provided would be

confidential and the names of the participants and the firm name would remain anonymous. Borg and Gall (1989) state that, "information obtained about a research participant during the course of an investigation is confidential unless otherwise agreed upon in advance" (p. 85). There was no possibility of matching a specific individual to a survey instrument since the signed Consent Statements were not returned with the completed surveys. The signed Consent Statements were returned directly to the researcher by the chief executive. The participants were instructed to return the completed surveys directly to the researcher using a provided stamped, pre-addressed envelope. The participants were also instructed not to write their names on the survey document or the return mail envelopes. Therefore, this study protected the rights of the participants in accordance with the submitted procedure approved by Northcentral University's Institutional Review Board.

Chapter 4: Findings

Overview

The purpose of this study was to identify the factors that may influence the career success of project managers in the Architectural and Engineering Design Services industry. The variables examined were the project managers' personality traits, leadership style, social power style, educational and training background, and professional experience. Organizational structure and company type were considered to determine their possible association with the constructs of career success. This chapter reviews and analyzes the data collected for this study. The results presented in this chapter were based on descriptive and inferential statistical analysis.

Survey Responses

The potential participants for this study consisted of 450 project managers employed at various firms in the Architectural and Engineering Design Services Industry. Of the 450 surveys distributed, a total of 341 responses were returned, for an initial responses rate of 76%. Several responses were discarded due to incomplete or obviously erroneous data from the participants. Removal of the deficient surveys left a total of 332 useable responses. The useable surveys represented a 74% response rate.

The survey response rate exceeded the minimum recommended sample size. Using the sample size for one proportion with a 5 percent confidence interval, a null proportion of 0.5 and a 10 point effect size, the sample size was calculated as 194 participants (Lenth, 2005). The 10 point difference represents the convention for small effect size suggested by Cohen (1988) for research in the social sciences. The actual

sample size of 332 provided a statistical power of 0.9572, which is greater than the minimum 0.8 recommended by Trochim (2001).

Findings

Descriptive Statistics

Gender. As shown in Table 15, the majority of the respondents, 292 (88%), were male and 40 (12%) were female. It was anticipated that a large majority of the respondents would be male. While the number of females employed in the industry has been steadily increasing, their advancement into project management is only now being realized.

Table 15

Frequency Distribution of Gender

Gender	Count	Percent
Male	292	87.95
Female	40	12.05
Total	332	100

Education. A total of 167 (50.3%) of the project managers reported a Bachelor's degree as the highest education level. Another 34 (10.2%) reported having a Bachelor's degree and currently being enrolled in a Master's degree program. Beyond the Bachelor's level, a total of 119 (35.8%) of the respondents reported to have attained the level of Master's degree, and another 8 (2.4%) reported having a Master's and currently working

on a Doctoral degree. Finally, 4 (1.2%) of the respondents reported having earned a Doctorate degree. The education results are summarized in Table 16.

Table 16

Frequency Distribution of Educational Level

Educational level	Count	Percent
Bachelor	167	50.30
Bachelor +	34	10.24
Master	119	35.84
Master +	8	2.41
Doctorate	4	1.20
Total	332	100

Project management training. A total of 245 (73.8%) of the project managers reported having received some formal Project Management training, while 87 (26.2%) of the respondents indicated no formal PM training. This is summarized in Table 17.

Table 17

Frequency Distribution of Project Management Training

PM training	Count	Percent
Yes	245	73.80
No	87	26.20
Total	332	100

This result was not anticipated since most project managers develop through on the job training and, unlike the Information Technology industry, few formal training programs exist for project managers in the AE industry. However, since the question as posed did not probe into the extent of the training, the respondents likely answered in the affirmative for even the most basic training efforts.

Project management certification. A total of 74 (22.3%) of the project managers reported having attained some form of Project Management Certification. The majority of the respondents, 258 (77.7%) indicated that they have no formal PM Certification. This is summarized in Table 18.

Table 18

Frequency Distribution of Project Management Certification

PM certification	Count	Percent
Yes	74	22.29
No	258	77.71
Total	332	100

This result was anticipated since the value of formal certification is only beginning to be recognized in the AE industry. The AE industry is regarded as a mature industry, where advancement into leadership positions is generally based more on job performance and perceived abilities than third-party credentials.

AE industry experience. All levels of AE industry experience were represented in the study. The industry experience results are summarized in Table 19.

Table 19

Frequency Distribution of AE Industry Experience

AE industry experience	Count	Percent
0-5 Years	45	13.55
6-10 Years	50	15.06
11-15 Years	48	14.46
16-20 Years	50	15.06
20+ Years	139	41.87
Total	332	100

Slightly less than a third of the participants (28.6%) reported having ten or less years of AE industry experience. Approximately another third of the participants (29.5%) had between 11 and 20 years of industry experience. The largest group of participants (41.9%) reported having 20 or more years of industry experience. This was expected since project managers typically must progress through several technical leadership roles on many projects before being considered ready to assume a project management role.

One surprising result was that 13.6% of the participants reported having 5 or less years of industry experience. It is not clear whether any of the participants were employed in other industries prior to entering the AE industry.

Project management experience. All levels of project management experience were represented in the study. The project management experience level results are summarized in Table 20.

The majority of participants reported having 10 or less years of project management experience. Another 47 (14.2%) reported having between 11 and 15 years of project management experience. Approximately a quarter of the participants (25.9%) reported having 16 or more years of project management experience.

Table 20

Frequency Distribution of Project Management Experience

PM experience	Count	Percent
0-5 Years	74	22.29
6-10 Years	125	37.65
11-15 Years	47	14.16
16-20 Years	38	11.45
20+ Years	48	14.46
Total	332	100

Firm type. All firm types were represented in the study. The frequency distribution of firm types is summarized in Table 21.

The largest group of participants 107 (32.2%) reported working in a Full Service Engineering firm. The majority of participants (58.1%) reported being employed in the more technically challenging segments of the industry (FSE and EC firms). The remaining 41.9% reported working in the less technically challenging segments of the industry (SE, MDE, and AE firms), with fairly equal distribution among the three firm types.

Table 21

Frequency Distribution of Firm Type

Firm type	Challenge level *	Count	Percent
SE	1 (low)	46	13.86
MDE	2	41	12.35
AE	3	52	15.66
FSE	4	107	32.23
EC	5 (high)	86	25.90
Total		332	100

* The categorization of challenge level is based on the types of projects typically undertaken by the specific firm type and the complexity of the interdisciplinary coordination required on these types of projects.

Organizational structure. All organizational structures were represented in the study. The frequency distribution of organizational structures is summarized in Table 22.

More than half of the participants (56%) reported working in one of the organizational structures that is more supportive of the project management role (SM and Proj.). With the addition of the participants employed in the Balanced Matrix structure, in which project managers share authority with functional managers, the majority of participants (78%) work in organizational structures favorable to project management authority. Slightly less than a quarter of the participants (22%) work in organizational structures in which the project management role is less dominate (Func and WM).

Table 22

Frequency Distribution of Organizational Structure

Org structure	Count	Percent
Functional	35	10.54
Weak matrix	38	11.45
Balanced matrix	73	21.99
Strong matrix	133	40.06
Projectized	53	15.96
Total	332	100

Regression Analysis

The regression model was constructed using linear regression software. Stepwise regression was performed to define the factors and regression equation that was most descriptive of the data sample. The summary analysis included an Analysis of Variance (ANOVA) that was used to assess the strength of the regression model based upon the data present in the sample. The regression model was then analyzed and modified to achieve the best fit to the data. In order to assure that the model effectively fit the sample data, outliers were removed from the data set as appropriate. The criterion for removing observations from the sample was to assess unusually large residuals. In the event the residuals exceeded two standard deviations, the observation was removed.

The complete final model was constructed by combining all main factors present in the regression fit with all possible moderating factors. The model was accepted when each factor in the resulting equation was statistically significant at the 0.05 level.

Finally, the regression model was reported with the equation of the actual regression model, the coefficients and p-values, and summary statistics. The resultant fit and residual data were then analyzed to determine if the model's residuals were normal, independent and identically distributed. This was analyzed by means of graphical output describing the variances, the distribution of residuals, and an assessment of the graphing of residuals versus the factors of interest.

The regression model included all respondents and considered all independent variables including demographic data, firm type and organizational structure as potentially significant independent variables. Binary coding was used for nominal and ordinal variables. Interaction terms were not considered due to the complexity of the model and since the literature does not suggest interactions between the specific domains considered in this study.

Regression model. The regression model utilized a starting sample size of 332. For this model, 16 outliers were eventually removed from the data set. Using the stepwise method, a statistically significant model emerged. The resulting equation and summary statistics for this model are shown below. The complete regression model with ANOVA analysis is included in Appendix C.

$$\text{Career Success} = 1.64 + 0.0158\ \text{Interac} + 0.0525\ \text{Reward} + 0.0223\ \text{Extro} + 0.0236\ \text{EmStab} + 0.0276\ \text{Open} \quad (2)$$

Adjusted R square = 15.4%; $F(5, 310) = 12.48$, $p = 0.0005$.

Significant variables are shown below in Table 23.

Table 23

Significant Variables – Regression Model

Predictor variable	Beta	p
Interaction	0.016	p = 0.028
Reward	0.052	p = 0.005
Extroversion	0.022	p = 0.014
Emotional Stability	0.024	p = 0.005
Openness	0.028	p = 0.023

Residual plots for this model are included in Figure C1. Analysis of the plots indicated that the residuals were normal, independent and identically distributed.

Hypotheses Testing

Pearson's Product Moment Correlation Analysis was used to test each of the hypotheses. Abramowitz and Stegun (1972) defined a methodology for determining the minimum significant correlation coefficient (r) for a given sample size. Table 24 summarizes the minimum significant r for various sample sizes of interest. These values were used to determine the existence of statistically significant correlations based on the subset of the data under consideration. For example, for Strong Matrix organizational structures (n=133), r values of 0.1704 or greater would be statistically significant.

Table 24

Minimum Significant Correlation Coefficients

Category	Type	n	p<0.05	p<0.01	p<0.001
	Functional	35	0.3339	0.4297	0.5322
	Weak matrix	38	0.3202	0.4128	0.5126
Org structure	Balanced matrix	73	0.2303	0.2997	0.3773
	Strong matrix	133	0.1704	0.2227	0.2822
	Projectized	53	0.2706	0.3509	0.4393
	SE	46	0.2908	0.3761	0.4694
	MDE	41	0.3082	0.3978	0.4951
Firm type	AE	52	0.2733	0.3542	0.4432
	FSE	107	0.1900	0.2480	0.3137
	EC	86	0.2120	0.2764	0.3488
All respondents		332	0.1077	0.1412	0.1798

Null Hypothesis 1 – Personality domain. The null hypothesis is stated as follows:

$H_0 1$ In the population of Project Managers in the Architectural and Engineering Professional Design Services Industry, there will be no significant differences in career success based upon the measures of personality captured in Goldberg's "Big Five" inventory.

Table 25 summarizes the correlations of each personality factor with career success for all participants.

Table 25

Summary Correlation Results – Personality Factors vs. Career Success

Factor	r
Extroversion	0.168 **
Agreeableness	0.125 *
Conscientiousness	0.092
Emotional stability	0.208 ***
Openness	0.246 ***

* p<0.05, ** p<0.01, *** p<0.001

Table 26 summarizes the correlations of each personality factor with career success by firm type.

Table 26

Summary Correlation Results – Personality Factors by Firm Type

	SE	MDE	AE	FSE	EC
Extroversion	0.105	0.346 *	0.024	0.178	0.200
Agreeableness	-0.008	0.231	-0.075	0.247 **	0.063
Conscientiousness	0.092	-0.032	0.097	0.096	0.072
Emotional stability	0.180	0.001	0.267	0.130	0.296 **
Openness	0.240	0.301	0.034	0.383 ***	0.164

* p<0.05, ** p<0.01, *** p<0.001

Table 27 summarizes the correlations of each personality factor with career success by organizational structure.

Table 27

Summary Correlation Results – Personality Factors by Organizational Structure

	Func	WM	BM	SM	Proj
Extroversion	0.220	0.167	0.201	0.136	0.166
Agreeableness	-0.009	-0.002	0.305 **	0.055	0.122
Conscientiousness	-0.020	-0.014	0.272 *	0.075	-0.046
Emotional stability	0.314	-0.147	0.281 *	0.265 **	0.115
Openness	0.200	0.142	0.414 ***	0.132	0.359 **

* $p<0.05$, ** $p<0.01$, *** $p<0.001$

When considering all respondents (Table 25), significant correlations were found between Career Success and four of the five personality factors, Extroversion, Agreeableness, Emotional Stability, and Openness. No significant correlation was found between Conscientiousness and Career Success.

When segmenting the data by firm type (Table 26), correlations were found for the same four factors, but specific correlations varied by firm type.

When segmenting the data by organizational structure (Table 27), correlations were found between Career Success and four of the five personality factors, Agreeableness, Conscientiousness, Emotional Stability, and Openness, but specific correlations varied by firm type. No correlation was found between Extroversion and Career Success.

Null Hypothesis 2 – Qualifications domain. The null hypothesis is stated as follows:

> Ho2 In the population of Project Managers in the Architectural and Engineering Professional Design Services Industry, there will be no significant differences in career success based upon Professional Qualifications (Education and Training, and Experience).

Since professional qualifications are defined by nominal data, Pearson's Chi Square analysis was used to determine if any significant relationship existed between the specific qualifications and Career Success.

Table 28 presents the Chi Square analysis for Educational Level. No significant relationship was found between Education Level and Career Success.

Table 28

Chi Square Test of the Relationship Between Educational Level and Career Success

Educational level	Very Low	Moderately Low	Average	Moderately High	Very High	Total
Bachelor (fo)*	32	33	75	34	27	201
Bachelor (fe)**	27.58	36.77	72.31	31.87	32.48	
Grad degree (fo)	13	27	43	18	26	127
Grad degree (fe)	17.42	23.23	45.69	20.13	20.52	
Total	45	60	118	52	53	328

Pearson Chi-Square = 5.844, DF = 4, p-Value = 0.211

* fo = frequency observed ** fe = frequency expected

Table 29 presents the Chi Square analysis for Project Management Training. No significant relationship was found between Project Management Training and Career Success.

Table 29

Chi Square Test of the Relationship Between PM Training and Career Success

PM training	Very Low	Moderately Low	Average	Moderately High	Very High	Total
No (fo)*	13	19	35	12	8	87
No (fe)**	12.05	15.98	31.18	13.63	14.15	
Yes (fo)	33	42	84	40	46	245
Yes (fe)	33.95	45.02	87.82	38.37	39.85	
Total	46	61	119	52	54	332

Pearson Chi-Square = 5.390, DF = 4, p-Value = 0.250

* fo = frequency observed ** fe = frequency expected

Table 30 presents the Chi Square analysis for Project Management Certification. No significant relationship was found between Project Management Certification and Career Success.

Table 30

Chi Square Test of the Relationship Between PM Certification and Career Success

PM certification	Very Low	Moderately Low	Average	Moderately High	Very High	Total
No (fo)*	34	46	93	46	39	258
No (fe)**	35.75	47.40	92.48	40.41	41.96	
Yes (fo)	12	15	26	6	15	74
Yes (fe)	10.25	13.60	26.52	11.59	12.04	
Total	46	61	119	52	54	332

Pearson Chi-Square = 4.992, DF = 4, p-Value = 0.288

* fo = frequency observed ** fe = frequency expected

Table 31 presents the Chi Square analysis for Architect/Engineer Industry Experience level. No significant relationship was found between Architect/Engineer Industry Experience and Career Success.

Table 31

Chi Square Test of the Relationship Between AE Industry Experience and Career Success

AE industry experience	Very Low	Moderately Low	Average	Moderately High	Very High	Total
0 - 5 Yrs (fo)*	7	14	17	2	5	45
0 - 5 Yrs (fe)**	6.23	8.27	16.13	7.05	7.32	
6 - 10 Yrs (fo)	8	9	19	7	7	50
6 - 10 Yrs (fe)	6.93	9.19	17.92	7.83	8.13	
11 - 15 Yrs (fo)	5	9	19	5	10	48
11 - 15 Yrs (fe)	6.65	8.82	17.20	7.52	7.81	
16 - 20 Yrs (fo)	8	10	18	9	5	50
16 - 20 Yrs (fe)	6.93	9.19	17.92	7.83	8.13	
20+ Yrs (fo)	18	19	46	29	27	139
20+ Yrs (fe)	19.26	25.54	49.82	21.77	22.61	
Total	46	61	119	52	54	332

Pearson Chi-Square = 17.928, DF = 16, p-Value = 0.328

* fo = frequency observed ** fe = frequency expected

Table 32 presents the Chi Square analysis for Project Management Experience level. No significant relationship was found between Project Management Experience and Career Success.

Table 32

Chi Square Test of the Relationship Between Project Management Experience and Career Success

PM experience	Very Low	Moderately Low	Average	Moderately High	Very High	Total
0 - 5 Yrs (fo)*	25	25	44	14	17	125
0 - 5 Yrs (fe)**	17.32	22.97	44.80	19.58	20.33	
6 - 10 Yrs (fo)	9	17	26	12	10	74
6 - 10 Yrs (fe)	10.25	13.60	26.52	11.59	12.04	
11 - 15 Yrs (fo)	6	5	14	12	10	47
11 - 15 Yrs (fe)	6.51	8.64	16.85	7.36	7.64	
16 - 20 Yrs (fo)	4	6	15	8	5	38
16 - 20 Yrs (fe)	5.27	6.98	13.62	5.95	6.18	
20+ Yrs (fo)	2	8	20	6	12	48
20+ Yrs (fe)	6.65	8.82	17.20	7.52	7.81	
Total	46	61	119	52	54	332

Pearson Chi-Square = 20.663, DF = 16, p-Value = 0.192

* fo = frequency observed ** fe = frequency expected

Null Hypothesis 3 – Leadership domain. The null hypothesis is stated as follows:

Ho3 In the population of Project Managers in the Architectural and Engineering Professional Design Services Industry, there will be no significant differences in career success based upon the measures of Leadership Style captured in the *Dimensions of Leadership Profile*® (Inscape Publishing).

Table 33 summarizes the correlations of each Leadership Style with Career Success for all participants.

Table 33

Summary Correlation Results – Leadership Style

	Career success
Character	0.004
Analysis	-0.040
Accomplishment	-0.046
Interaction	0.059

Table 34 summarizes the correlations of each Leadership Focus with Career Success by firm type.

Table 34

Summary Correlation Results – Leadership Style by Firm Type

	SE	MDE	AE	FSE	EC
Character	0.059	0.182	-0.255	0.005	-0.024
Analysis	0.037	-0.004	0.117	-0.127	-0.035
Accomplishment	-0.212	-0.167	0.197	-0.044	0.031
Interaction	0.098	-0.007	-0.038	0.152	-0.009

Table 35 summarizes the correlations of each Leadership Style with Career Success by organizational structure.

Table 35

Summary Correlation Results – Leadership Style by Organizational Structure

	Func	WM	BM	SM	Proj
Character	0.069	-0.069	-0.058	0.056	-0.026
Analysis	-0.166	-0.021	0.030	-0.081	0.048
Accomplishment	-0.225	0.355 *	-0.034	-0.065	-0.213
Interaction	0.308	-0.163	0.048	0.074	0.077

* $p<0.05$

No significant correlation was found between Leadership Style and Career Success for all respondents (Table 33).

When segmenting the data by firm type (Table 34), there was no significant correlation between Leadership Style and Career Success.

Segmenting the data by organizational structure (Table 35) revealed a moderate correlation between Accomplishment and Career Success in Weak Matrix organizational structures only.

Since no correlation was found between Leadership Style and Career Success, additional analysis was performed on the Leadership Dimensions that underlie the four Leadership Focuses.

Table 36 summarizes the correlations of each Leadership Dimension with Career Success for all participants.

Table 36

Summary Correlation Results – Leadership Dimensions

Dimension	Career Success
Enthusiasm	0.059
Integrity	0.036
Self-Renewal	-0.083
Fortitude	0.025
Perceiving	-0.040
Judgment	-0.060
Performance	-0.062
Boldness	-0.037
Team Building	0.023
Collaborating	0.022
Inspiring	0.126 *
Serving Others	-0.022

* $p<0.05$

In regards to Leadership Dimensions, the results revealed only a low significant correlation between the Inspiring dimension and Career Success

Table 37 summarizes the correlations of each Leadership Dimension with Career Success by firm type.

Table 37

Summary Correlation Results – Leadership Dimensions by Firm Type

	SE	MDE	AE	FSE	EC
Enthusiasm	0.235	0.131	-0.168	0.081	-0.030
Integrity	0.067	-0.115	-0.206	0.049	0.123
Self-Renewal	-0.215	0.302	-0.117	-0.112	-0.135
Fortitude	-0.067	0.200	0.196	-0.072	0.013
Perceiving	0.010	-0.043	-0.079	-0.055	0.042
Judgment	0.141	-0.177	0.158	-0.141	-0.127
Performance	-0.240	-0.203	0.154	-0.104	0.113
Boldness	-0.025	-0.113	0.157	-0.093	-0.002
Team Building	-0.131	0.009	0.050	0.140	-0.063
Collaborating	-0.050	-0.194	-0.137	0.103	0.084
Inspiring	0.245	0.015	0.104	**0.192** *	0.029
Serving Others	-0.013	0.167	-0.042	0.015	-0.134

* $p<0.05$

When segmenting the data by firm type, again the only significant correlation found was between the Inspiring dimension and Career Success in Full Service Engineering firms

Table 38 summarizes the correlations of each Leadership Dimension with Career Success by organizational structure.

Table 38

Summary Correlation Results – Leadership Dimensions by Organizational Structure

	Func	WM	BM	SM	Proj
Enthusiasm	-0.042	-0.210	0.046	0.225 **	-0.100
Integrity	0.267	0.000	-0.002	0.030	-0.056
Self-Renewal	-0.146	0.052	-0.159	-0.110	0.105
Fortitude	-0.114	-0.055	-0.017	0.054	0.114
Perceiving	-0.066	0.110	-0.006	-0.106	0.029
Judgment	-0.134	-0.100	0.081	-0.094	-0.047
Performance	-0.281	0.207	-0.025	-0.101	-0.094
Boldness	-0.289	0.455 **	-0.037	**-0.021**	**-0.394** **
Team Building	0.098	-0.067	0.004	0.017	0.094
Collaborating	0.240	-0.389	-0.023	0.028	0.267
Inspiring	0.38 *	0.142	0.060	0.095	0.049
Serving Others	-0.120	-0.175	0.075	0.037	-0.145

* $p<0.05$, ** $p<0.01$

When segmenting the data by organizational structure, three dimensions were found to be significant. A significant correlation was found between the Inspiring dimension and Career Success in Functional organizational structures.

A significant correlation was found between the Enthusiasm dimension and Career Success in Strong Matrix organizational structures.

Additional significant correlations were found between the Boldness dimension and Career Success in Weak Matrix and Projectized organizational structures.

Null Hypothesis 4 – Social Power domain. The null hypothesis is stated as follows:

Ho4 In the population of Project Managers in the Architectural and Engineering Professional Design Services Industry, there will be no significant differences in career success based upon the measures of Social Power Style captured in the Frost/Stehlski Social Power Questionnaire.

Table 39 summarizes the correlations of each Social Power Style with Career Success for all participants.

Table 39

Summary Correlation Results – Social Power Style

	Career Success
Reward	0.163 **
Coercive	-0.035
Legitimate	0.104
Expert	0.070
Referent	0.16 **

** $p<0.01$

Table 40 summarizes the correlations of each Social Power Style with Career Success by firm type.

Table 40

Summary Correlation Results – Social Power Style by Firm Type

	SE	MDE	AE	FSE	EC
Reward	0.110	0.41**	0.121	0.084	0.175
Coercive	0.158	0.031	-0.049	-0.135	0.078
Legitimate	0.215	0.194	0.148	-0.019	0.122
Expert	0.210	0.309*	-0.072	0.082	0.024
Referent	0.251	0.381*	0.177	0.048	0.042

* $p<0.05$, ** $p<0.01$

Table 41 summarizes the correlations of each Social Power Style with Career Success by organizational structure.

Table 41

Summary Correlation Results – Social Power Style by Organizational Structure

	Func	WM	BM	SM	Proj
Reward	0.315	0.041	0.314 **	0.038	0.151
Coercive	0.114	-0.006	-0.079	0.092	-0.266
Legitimate	0.355 *	0.051	0.142	0.065	-0.032
Expert	0.092	0.132	-0.042	0.043	0.154
Referent	0.226	-0.057	0.377 ***	0.048	0.044

* $p<0.05$, ** $p<0.01$, *** $p<0.001$

When considering all respondents (Table 39), significant correlations were found between Career Success and two of the five social power styles, Reward and Referent.

When segmenting the data by firm type (Table 40), significant correlations were found only in Multi-discipline Engineering firms. In MDE firms, the analysis found correlations between Career Success and three of the five social power styles, Reward, Expert, and Referent

When segmenting the data by organizational structure (Table 41), significant correlations were found only in Functional and Balanced Matrix structures, but specific correlations varied by structure type. The analysis found correlations between Career Success and three of the five social power styles, Reward, Legitimate, and Referent

Analysis and Evaluation of Findings

Hypothesis 1 – Personality Domain

The null hypothesis is stated as follows:

$H_0 1$ In the population of Project Managers in the Architectural and Engineering Professional Design Services Industry, there will be no statistically significant differences in career success based upon the measures of personality captured in Goldberg's "Big Five" inventory.

Openness personality factor. The alternate hypothesis is stated as follows:

$H_1 1A$ Project Managers who have high Openness will have greater career success than those with lower Openness.

The analysis indicated a moderate correlation between Openness and Career Success. Referring to Table 25, the correlation was 0.246 ($p<0.001$) across the entire population. Therefore, in regards to the Openness factor, the null hypothesis was rejected and it was concluded that project managers who exhibit high Openness are more likely to have greater Career Success than those who exhibit lower Openness.

When segmenting the data by firm type (Table 26), the correlation between Openness and Career Success is only significant in FSE firms. For FSE firms, the correlation was 0.383 ($p<0.001$). This correlation is higher than that for the entire population, although it is still only moderate. FSE firms typically undertake complex projects, often involving new technologies. Project managers who are open to new ideas will likely enjoy greater career success than project managers who focus on more "tried and true" methods.

When segmenting the data by organizational structure (Table 27), the correlation between Openness and Career Success is only significant in Balanced Matrix and Projectized organizational structures. For BM structures, the correlation was higher than that for the entire population (0.414, $p<0.001$), although it is still moderate. For Projectized structures, the correlation was moderate and somewhat lower than that for the entire population (0.359, $p<0.01$). In BM organizations, project managers need to share power with functional managers. Project managers who are open to new and differing viewpoints will likely be more successful than project managers who maintain more narrow and restrictive ideas on how to accomplish project goals. In Projectized organizations, project managers have prime responsibility for both project work and personnel. Project managers who are open will likely be more successful in dealing with complex project issues while being attentive to the feeling and career needs of project personnel.

Conscientiousness personality factor. The alternate hypothesis is stated as follows:

$H_1$1B Project Managers who have high Conscientiousness will have greater career success than those with low Conscientiousness.

The analysis failed to demonstrate a significant correlation between Conscientiousness and Career Success. Therefore, in regards to the Conscientiousness factor, the null hypothesis could not be rejected and it was concluded that there will be no expected measurable difference in the Career Success of project managers based on Conscientiousness. This was quite surprising since Conscientiousness has been shown to be a valid predictor of career success across various occupations. Perhaps Conscientiousness is less desirable for project managers where the focus needs to be more on coordination than on individual contributions to the completion of project deliverables. It has been established that project management career success is based not only upon the completion of the job, but also upon the manner in which the job was completed. This leads to the consideration that those individuals with exceptionally high Conscientiousness might focus solely upon task completion at the expense of the process of job completion. Although this might be effective in the short term, long-term performance will likely suffer. This might be recognized by the organization as lower job effectiveness. Those individuals who exhibit a more balanced approach might achieve higher career success.

Luthans (1988) contended that managers can only be considered truly successful if they have satisfied, committed subordinates. Smith and Canger (2004) found that low levels of supervisor Conscientiousness are related to subordinate rating of satisfaction with supervisor and affective commitment. They concluded that highly Conscientious supervisors might be overbearing and "nit-picky."

When segmenting the data by firm type (Table 26), there was no significant correlation between Conscientiousness and Career Success.

Segmenting the data by organizational structure (Table 27), revealed a moderate correlation between Conscientiousness and Career Success in Balanced Matrix organizational structures. For BM structures, the correlation was 0.272 ($p<0.05$). In Balanced Matrix organizations, project managers must share power with functional managers, who by virtue of their influence over the career success of their employees, tend to enjoy more respect within the organization. As technical gatekeepers in technology-oriented firms, functional managers also enjoy a high status since they contribute to project deliverables. In contrast, project managers are typically not viewed as "doers" since they usually do not contribute to the work product in Balanced Matrix organizations. Project managers who are more conscientious in this environment may increase their status among the technical staff and as a result may experience greater career success.

Agreeableness personality factor. The alternate hypothesis is stated as follows:

$H_1$1C Project Managers who have high Agreeableness will have greater career success than those with lower Agreeableness.

The analysis indicated a low correlation between Agreeableness and Career Success. Referring to Table 25, the correlation was 0.125 ($p<0.05$) across the entire population. Therefore, in regards to the Agreeableness factor, the null hypothesis was rejected and it was concluded that project managers who exhibit high Agreeableness are more likely to have greater Career Success than those who exhibit lower Agreeableness.

When segmenting the data by firm type (Table 26), the correlation between Agreeableness and Career Success was only significant in Full Service Engineering firms. For FSE firms, the correlation was 0.247 ($p<0.01$). This correlation was higher than that for the entire population, although it is still only moderate. FSE firms typically employ many highly talented professional with diverse, and at times, conflicting career and project goals. The reporting relationships are complex and each individual discipline places high priority on their portion of the project. To be successful in this environment, project managers must recognize and accept the individual differences. Project managers who exhibit high Agreeableness are more likely to be able to coordinate conflicting goals through compromise.

When segmenting the data by organizational structure (Table 27), the correlation between Agreeableness and Career Success was only significant in the Balanced Matrix organizational structure. For BM structures, the correlation was significantly higher than that for the entire population (0.305, $p<0.01$), although it was still moderate. In BM organizations, project managers must share power and control with functional managers. Agreeable project managers are more likely to be successful in this environment since the ability to compromise and accept conflict between departmental and project goals is paramount. Project managers who are less agreeable will likely have more conflicts and less cooperation with functional managers resulting in lower success in getting project goals accomplished.

Emotional Stability personality factor. The alternate hypothesis is stated as follows:

$H_1$1D Project Managers with high Emotional Stability will have greater career success than those who have high Neuroticism.

The analysis indicated a moderate correlation between Emotional Stability and Career Success. Referring to Table 25, the correlation was 0.208 ($p<0.001$) across the entire population. Therefore, in regards to the Emotional Stability factor, the null hypothesis was rejected and it was concluded that project managers who exhibit high Emotional Stability are more likely to have greater Career Success than those who exhibit high Neuroticism.

Engineering projects are complex and have many potential internal and external sources of conflict. Project managers who are emotionally stable will likely have more success in dealing with these issues and will, therefore, be more successful than project managers who are less able to handle the stress associated with these issues.

When segmenting the data by firm type (Table 26), the correlation between Emotional Stability and Career Success is only significant in Engineer/Constructor firms. For EC firms, the correlation was 0.296 ($p<0.01$). This correlation is higher than that for the entire population, although it is still only moderate. EC firms typically undertake the most difficult projects. These projects tend to have highly challenging technical and financial issues and complex internal and external relationships. Project managers who are emotionally stable will likely better handle the emotional stress associated with complex projects better than project managers who are less emotionally stable.

When segmenting the data by organizational structure (Table 27), the correlation between Emotional Stability and Career Success is only significant in Balanced Matrix and Strong Matrix organizational structures. For these two organizational structures, the

correlations were higher than that for the entire population although they are still moderate. For BM structures the correlation was 0.281 ($p<0.05$), and for SM structures, the correlation was 0.265 ($p<0.01$). In BM organizations, emotional stability may help project managers deal with the power sharing issues that are present in these organizations. In SM organizations, project managers are the focal point of the project and key organizational managers. They must deal with personnel issues in addition to project coordination and client relationship issues. Emotionally stable project managers will likely be better able to handle the dual responsibilities in these organizations.

Extroversion personality factor. The alternate hypothesis is stated as follows:

$H_1$1E Project Managers who are Extroverted will have greater career success than those who are Introverted.

The analysis indicated a statistically significant, but relatively low correlation between Extroversion and Career Success. Referring to Table 25, the correlation was 0.168 ($p<0.01$) across the entire population. Therefore, in regards to the Extroversion factor, the null hypothesis was rejected and it was concluded that project managers who are Extroverted are more likely to have greater Career Success than those who are Introverted.

When segmenting the data by firm type (Table 26), the correlation between Extroversion and Career Success is only significant in Multi-discipline Engineering firms. For MDE firms, the correlation was 0.346 ($p<0.05$). This correlation is higher than that for the entire population, although it is still only moderate. Extroversion is an important factor in MDE firms since project managers need to coordinate the work of various disciplines in order to be successful. While interdisciplinary coordination is

required in other types of firms, MDE firms tend to be smaller and have less formal systems than other firms that employ more than a single engineering discipline. Project managers who are extroverted will likely be more successful in coordinating multiple disciplines in MDE firms than project managers who are less extroverted.

When segmenting the data by organizational structure (Table 27), there was no significant correlation between Extroversion and Career Success.

Hypothesis 2 – Qualifications Domain

The null hypothesis is stated as follows:

Ho2 In the population of Project Managers in the Architectural and Engineering Professional Design Services Industry, there will be no statistically significant differences in career success based upon Professional Qualifications (Education and Training, and Experience).

Education and Training qualification. The alternate hypothesis is stated as follows:

$H_1$2A Project Managers who possess more Education and Training will exhibit significantly higher career success than those with less Education and Training.

Table 28 presented the Chi Square analysis for Educational Level. The analysis failed to show any significant relationship between Education Level and Career Success. Therefore, in regards to the Education Level qualification, the null hypothesis could not be rejected and it was concluded that there will be no expected measurable difference in the Career Success of project managers based on Education Level.

Table 29 presents the Chi Square analysis for Project Management Training. The analysis failed to show any relationship between Project Management Training and Career Success. Therefore, in regards to the Project Management Training, the null

hypothesis could not be rejected and it was concluded that there will be no expected measurable difference in the Career Success of project managers based on Project Management Training.

Table 30 presents the Chi Square analysis for Project Management Certification. The analysis failed to show any relationship between Project Management Certification and Career Success. Therefore, in regards to the Project Management Certification qualification, we fail to reject the null hypothesis and state that there is expected to be no measurable difference in the Career Success of project managers based on Project Management Certification.

Professional Experience qualification. The alternate hypothesis is stated as follows:

$H_1$2B Project Managers with more Project Management Experience will have significantly greater career success than those individuals with less Project Management Experience.

Table 31 presents the Chi Square analysis for Architect/Engineer Industry Experience level. The analysis failed to show any relationship between Architect/Engineer Industry Experience and Career Success. Therefore, in regards to the Architect/Engineer Industry Experience qualification, the null hypothesis could not be rejected and it was concluded that there will be no expected measurable difference in the Career Success of project managers based on Architect/Engineer Industry Experience.

Table 32 presents the Chi Square analysis for Project Management Experience level. The analysis failed to show any relationship between Project Management Experience and Career Success. Therefore, in regards to the Project Management Experience qualification, the null hypothesis could not be rejected and it was concluded

that there will be no expected measurable difference in the Career Success of project managers based on Project Management Experience.

Hypothesis 3 – Leadership Domain

The null hypothesis is stated as follows:

Ho3 In the population of Project Managers in the Architectural and Engineering Professional Design Services Industry, there will be no statistically significant differences in career success based upon the measures of Leadership Style captured in the *Dimensions of Leadership Profile*® (Inscape Publishing).

The alternate hypothesis is stated as follows:

$H_1 3$ In the population of Project Managers in the Architectural and Engineering Professional Design Services Industry, career success will be associated with one or more specific Leadership Style captured in the *Dimensions of Leadership Profile*® (Inscape Publishing).

When considering all respondents (Table 33), the analysis failed to show a correlation between Leadership Focus and Career Success. Therefore, the null hypothesis could not be rejected and it was concluded that there will be no expected measurable difference in the Career Success of project managers based on Leadership Focus.

When segmenting the data by firm type (Table 34), there was no significant correlation between Leadership Focus and Career Success.

Segmenting the data by organizational structure (Table 35), revealed a moderate correlation between Accomplishment and Career Success in Weak Matrix organizational structures. For WM structures, the correlation was 0.355 ($p<0.05$). In WM organizations, project managers must compete with functional managers for the respect of team members. Project managers who focus on Accomplishment are more visible to team

members and may be afforded more respect as individuals who are able to complete project goals.

Since no correlation was found between Leadership Focus and Career Success, additional analysis was performed on the Leadership Dimensions that underlie the four Leadership Focuses.

In regards to Leadership Dimensions, the analysis revealed only a low significant correlation between the Inspiring dimension and Career Success. Referring to Table 36, the correlation was 0.126 ($p<0.05$) across the entire population. It is not surprising that the Inspiring dimension correlates to career success, since inspiring team members is a key function of project managers across all firm types and organizational structures.

When segmenting the data by firm type (Table 37), again the only significant correlation found was between the Inspiring dimension and Career Success in Full Service Engineering firms. For FSE firms, the correlation was 0.192 ($p<0.05$). This correlation is marginally higher than that for the entire population, but it is still low.

When segmenting the data by organizational structure (Table 38), three dimensions were found to be significant. A significant correlation was found between the Inspiring dimension and Career Success in Functional organizational structures. The correlation (0.38, $p<0.05$) was significantly higher than that for the entire population, although it is still only moderate.

A significant correlation was found between the Enthusiasm dimension and Career Success in Strong Matrix organizational structures. The correlation was moderate at 0.225 ($p<0.01$). Project managers are influential leaders in SM organizations. Project managers who exhibit enthusiasm will likely have more highly committed and motivated

teams, which leads to more successful projects. Enthusiastic project managers will likely enjoy greater career success.

Additional significant correlations were found between the Boldness dimension and Career Success in Weak Matrix and Projectized organizational structures. For WM structures, the correlation was significantly higher than that for the entire population (0.455, $p<0.01$), although it is still moderate. For Projectized structures, a moderate negative correlation was found (-0.394, $p<0.01$). In WM organizations, project managers have less influence and control over team members. Project managers who exhibit boldness will likely get more attention and response from team members in meeting project goals. In projectized organizations, team members report directly to the project manager. Given this level of organizational authority, boldness is not as critical a factor in influencing team member as in other structure. Project managers who exhibit boldness in this environment may appear to be overly dominating, which could alienate team members and diminish project performance.

Hypothesis 4 – Social Power Domain

The null hypothesis is stated as follows:

Ho4 In the population of Project Managers in the Architectural and Engineering Professional Design Services Industry, there will be no statistically significant differences in career success based upon the measures of Social Power Style captured in the Frost/Stehlski Social Power Questionnaire.

The alternate hypothesis is stated as follows:

$H_1$4 In the population of Project Managers in the Architectural and Engineering Professional Design Services Industry, career success will be associated with one or more specific Social Power Styles captured in the Frost/Stehlski Social Power Questionnaire.

Reward Power. When considering all respondents, the analysis indicated a low correlation between Reward Power and Career Success. Referring to Table 39, the correlation was 0.163 ($p<0.01$) across the entire population.

When segmenting the data by firm type (Table 40), the correlation between Reward Power and Career Success is only significant in Multi-discipline Engineering firms. For MDE firms, the correlation was 0.41 ($p<0.01$). This correlation is significantly higher than that for the entire population, although it is still only moderate. In MDE firms, project managers are typically senior organizational managers or partners. Given their influential status within the firm, they have the means to reward project team members.

When segmenting the data by organizational structure (Table 41), the correlation between Reward Power and Career Success is only significant in Balanced Matrix organizational structures. For BM structures, the correlation was again higher than that for the entire population (0.314, $p<0.01$), although it is still moderate. In BM organizations, project managers must compete with functional managers for employee loyalty and influence. In this environment, project managers who use their influence to reward team member are likely to experience great success.

Coercive Power. When considering all respondents (Table 39), the analysis failed to show a correlation between Coercive Power and Career Success. Segmenting the data by firm type (Table 40) and organizational structure (Table 41) still did not find any significant correlation between Coercive Power and Career Success. It is not surprising that project managers did not exhibit Coercive power. In most organizations, project

managers do not have the organizational status to use Coercive power. In situations where the exercise on such power was warranted, project managers typically defer such issues to the functional managers.

Legitimate Power. When considering all respondents (Table 39), the analysis failed to show a correlation between Legitimate Power and Career Success. This was expected since project managers do not have legitimate power in most organizations. Segmenting the data by firm type (Table 40) still did not find any significant correlation between Legitimate Power and Career Success.

Segmenting the data by organizational structure (Table 41), revealed a moderate correlation between Legitimate Power and Career Success in Functional organizational structures. For FM structures, the correlation was 0.355 ($p<0.05$). It was surprising to find correlation in FM organizations, since project managers typically have the least amount of organizational power in this structure. The exception to this is in SDE and MDE firms, where the project management role is typically undertaken by individuals who also have functional management responsibilities or are senior managers with organizational power.

Expert Power. When considering all respondents (Table 39), the analysis failed to show a correlation between Expert Power and Career Success. This was somewhat of a surprise since project managers are usually technical experts in their own right, who have advanced into management. In most engineering organizations, project managers tend to be involved in technical issues and often make technical decisions based on input from

the project's technical leaders. The lack of correlation indicates that project managers are not viewed as technical experts, but as managers who at times make technical decisions.

Segmenting the data by firm type (Table 40), revealed a moderate correlation between Expert Power and Career Success in Multi-discipline Engineering firms. For MDE firms, the correlation was 0.309 ($p<0.05$). In MDE firms, project managers often also have functional management responsibility or are lead discipline engineers who perform the project management role. In this environment, project managers tend to make technical contributions to the project and often work on projects in a dual capacity as a discipline lead engineer.

Segmenting the data by organizational structure (Table 41) did not result in finding any significant correlation between Expert Power and Career Success.

Referent Power. When considering all respondents, the analysis indicates a low correlation between Referent Power and Career Success. Referring to Table 39, the correlation was 0.160 ($p<0.01$) across the entire population.

When segmenting the data by firm type (Table 40), the correlation between Referent Power and Career Success is only significant in Multi-discipline Engineering firms. For MDE firms, the correlation was 0.381 ($p<0.01$). This correlation is significantly higher than that for the entire population, although it is still only moderate. In MDE firms, project managers are held in high regards as technical leaders who also perform the overall project management role. Project managers in this environment are often role models that team members can identify with and seek to emulate their career path.

When segmenting the data by organizational structure (Table 41), the correlation between Referent Power and Career Success is only significant in Balanced Matrix organizational structures. For BM structures, the correlation was again higher than that for the entire population (0.377, $p<0.001$), although it is still moderate. In BM organizations, the project management role is prestigious and highly regarded. In these organizations, the functional managers usually deal with technical and personnel problems, somewhat isolating the project managers from these problems.

Social Power summary. Since significant correlations were found between Social Power Style and Career Success, the null hypothesis was rejected and it was concluded that there are measurable differences in the career success of project managers based upon measure of Social Power Style. Project managers who exhibit high Reward or Referent Power are expected to have greater Career Success than those who exhibit lower Reward or Referent Power.

Summary

For the Architectural and Engineering Design Services Industry, the results of the project managers' assessment indicated that project manager career success was low to moderately correlated with personality traits and social power style. The findings indicated that professional qualifications and leadership focus are not important factors for predicting project manager career success. Segmenting the data by firm type and organizational structure yielded some variability in the results. This illustrated that the effect of company context on the factors that contribute to project manager career success can be significant.

Chapter 5: Summary, Conclusions, and Recommendations

Chapter 5 includes a summary of the investigation, conclusions of the study based on the research findings, and recommendations. The summary section includes an overview of the study, a brief review of the pertinent literature, a summary of the methodology, and a summary of the research findings. The conclusions section addresses the main research problem and each research question that guided the investigation. The recommendation section includes recommendations for further research

Summary

Overview

This study sought to advance the understanding of key variables that might be good predictors of project managers' career success. Specifically, this study focused on analyzing the significance of personality traits, leadership style, social power style, educational and training background, and professional experience. This study intended to enhance and extend the understanding of the noted variables so that the information provided by this study could be considered in the design and implementation of project manager selection criteria for use in the Architectural and Engineering Design Services Industry.

This study also sought to provide industry leaders with empirical data for factors that may be used in the training and development of future project managers. Another desired outcome of this study was for project managers to utilize the results of this study as a guide for self-development.

The following specific research questions were examined in this study:

What, if any, differences exist in the career success of project managers based upon measures of personality traits?

What, if any, differences exist in the career success of project managers based upon the attainment of professional qualifications?

What, if any, differences exist in the career success of project managers based upon measures of leadership style?

What, if any, differences exist in the career success of project managers based upon measures of social power style?

The study was limited to project managers currently employed in the Architectural and Engineering Design Services Industry. This study did not attempt to make generalizations about project managers employed in other industries.

Literature Review

Projects and project management are the wave of the future in global business (Dinsmore, 1997; Heerkens, 2003). Increasingly technically complex products and processes, vastly shortened time-to-market windows, and the need for cross-functional expertise make project management an important and powerful tool in the hands of organizations that understand its use. However, the expanded need for such techniques is not always being met by a concurrent increase in the pool of competent project managers. Unfortunately, and perhaps ironically, it is the very popularity of project management that presents many organizations with their most severe challenges. They often belatedly discover that they simply do not have sufficient numbers of competent project managers. Senior managers in many companies readily acknowledge the ad hoc manner in which

most project managers acquire their skills, but they are unsure how to better develop and provide for a supply of well-trained project leaders for the future.

Though much has been written on how to improve the process of project management (Clark, 1999; Gannon, 1994; PMI, 1996; Rosenau, 1992), less is known about the sorts of skills and challenges that specifically characterize project managers. What is known tends to offer a portrait of successful project managers as strong leaders, possessing a variety of problem-solving, communication, motivational, visionary, and team-building skills. Authors such as Posner (1987), Einsiedel (1987), and Pettersen (1991) are correct: Project managers are a special breed. Managing projects is a unique challenge that requires a strategy and methodology all its own. Perhaps most important, project management requires people willing to function as leaders in every sense of the term. They must not only chart the appropriate course, but also provide the means, the support, and the confidence for their teams to attain these goals. Effective project managers often operate less as directive and autocratic decision makers than as facilitators, team members, and cheerleaders (Flannes & Levin, 2001; Pinto & Trailer, 1998). In effect, the characteristics we look for in project managers are varied and difficult to define.

Academic abilities and technical competence are not the sole predictors of career success for project managers. The other contributing factors may be described in terms of the project manager's traits and behaviors. It is of interest to define the most appropriate constructs that will describe these factors. The construct of "career success" is considered most appropriate in assessing the long-term ability of the project manager to perform well (Gattiker & Larwood, 1988; Posner, 1987; Shenhar, 1997).

The Big Five are bipolar dimensions of personality that have been found to form the taxonomic core of personality models and also capture laypersons descriptions of personality as found in everyday language (Goldberg, 1990). The five factors include: (a) Openness to Experience, (b) Conscientiousness, (c) Extroversion, (d) Agreeableness, and (e) Emotional Stability.

Costa & McCrae (1992a) evaluated the Big Five and discovered that the five factors load differently depending on what format of test is administered. In general, they noted that the factors load strongly on Emotional Stability and Extroversion (Costa & McCrae, 1992a), and less strongly on the other factors. In fact, Eysenck (1991) took this position strongly when he proposed a three-factor model made up of Emotional Stability, Extroversion, and P, a Psychoticism variable. Furthermore, it was noted that P may be made up of both Agreeableness and Conscientiousness as both these factors load heavily on P (reversed). Costa noted that in order of validity, the factors load in the order of Emotional Stability, Extroversion, Openness, Agreeableness and Conscientiousness. Therefore, one must consider the validity of the constructs when evaluating the results of the study.

Salgado (1997) noted that Conscientiousness and Emotional Stability are valid predictors across all occupational groups studied. This is an interesting finding, as these factors were not determined as being significant in this study. Salgado also noted that within occupational groups other factors act as valid predictors, leading to the conclusion that when evaluating predictor criterion relationships with personality data, separation by industry or occupation is the most appropriate segmentation.

To further illustrate the necessity of this pragmatic assessment, Barry & Stewart (1997) investigated the role of personality in job performance and found strong validity for Emotional Stability, but little support for Conscientiousness. This example again illustrates the need for segregation of the data set by occupation, as those participants studied by Barry are not identical to those studied by Salgado (1997).

Barrick & Mount (1991) also made an interesting comment on the nature of personality traits in predicting job performance. They noted that a trait such as Extroversion should be predictive of jobs such as management and sales, but would not be predictive for a production worker or engineer. This statement is not clarified further, although it is clear that Barrick & Mount were referring to occupations requiring a higher degree of interaction correlating with extroversion. However, Barrick & Mount clearly exhibited a common (and erroneous) assumption in occupational studies. That erroneous assumption is that all engineers are alike, and secondly, that the engineering profession is made up chiefly of individuals seeking individual ends. This is obviously not the case, as a typical engineering project manager spends the majority of his or her time on intercommunication requirements and issues.

As education, training, or experience increase, the project manager can generally adapt behavior to overcome trait limitations with an increased focus on the domain specific knowledge related to the process of project management. The project manager can then increase skills in varying knowledge areas in order to supplement his or her skills in project management. Those who demonstrate an ability and willingness to learn new skills will generally enjoy the greatest success. Much like Darwinian theory, the most adaptable project managers survive. Therefore, educational level, project

management training, and project management experience are constructs that may affect career success.

Many of the skills required of project managers have been defined by various project management authors (Belzer, 2001; Benator & Thumann, 2003; Posner, 1987), and include descriptors like leadership, team building, consensus building, organizational skills, people skills, conflict management, and many others. In most cases, these descriptors are difficult to precisely define, and represent a large body of knowledge. It is of value for the project manager to understand the metrics that will be used to define the success of their project management endeavors.

Successful project managers are those that accomplish project objectives and simultaneously maintain harmonious working relationships within the organization. Effective project management not only depends upon the final completion of the project's objectives, but also upon the effective implementation of the process or methods by which those objectives were achieved.

A successful career in project management is one characterized by consistent project success, and the feeling of job satisfaction as a result of the work experience.

Methodology

Null and alternative hypotheses were developed for each of the four research questions. A self-administered survey was used in this study. The survey included questions that were designed to measure personality traits, leadership style, social power style, and other constructs of interest. The questions were derived from established, validated instruments designed to assess the constructs of interest.

The study consisted of a survey of project managers from various segments of the Architectural and Engineering Design Services industry. Ninety firms were selected for the study. The firms represented a diverse cross-section of the various types and organizational structures that characterize the Architectural and Engineering Design Services industry. Participants were randomly selected by each of the participating firm's chief executive.

Statistical analysis was used to determine the significance of correlations among various constructs and project managers' career success. The career success construct is an objective measure of career performance (Bray & Howard, 1980). Variables include compensation, promotions, awards, project opportunities, and overall job satisfaction. A logical progression of analysis was followed, from simple descriptive statistics through multiple regression analysis. Chi-square analysis was used to test relationships among nominal data. A data model was developed to relate the various constructs of interest (independent variables) to the dependent variable of project management career success. In order to analyze the appropriateness of this model, a regression equation was constructed to define the significant variables and coefficients.

Results

The response rate for the study was 74 percent (n=332) from the surveyed population of 450 project managers. The survey response rate exceeded the minimum sample size required for the minimum recommended statistical power at a 5 percent confidence interval. The actual sample size of 332 provided a statistical power of 0.9572, which is greater than the minimum 0.8 recommended by Trochim (2001).

The respondents were mainly male. All had at least a Bachelors degree and approximately half had graduate degrees. Most reported having received formal project management training, but few had obtained professional certification. All levels of industry and project management experience were represented in the study. Each of the five firm types and five organizational structure were represented in the study.

Significant correlations were found between personality traits and career success. The correlations were present when considering all respondents and when segmenting the sample by firm type and organizational structure. The significance of the correlations between career success and specific personality traits varied by firm type and organizational structure.

No significant relations were found between professional qualifications and career success. This finding was consistent when segmented by firm type and organizational structure.

No significant correlations were found between leadership style and career success when considering all respondent and when segmenting by firm type. A moderate significant correlation was found when segmenting by organizational structure.

Significant correlations were found between social power style and career success. The correlations were present when considering all respondents and when segmenting the sample by firm type and organizational structure. The correlation of specific social power styles varied by firm type and organizational structure.

In reviewing the literature, no studies were found that had the same scope or focus as the current study. Several studies in other occupational fields have addressed analogous research questions. A brief review of their findings is included here.

Nicol (1988) found that personality significantly predicted monetary success, and the combination of personality and background history showed some degree of prediction of overall career satisfaction. Personality was also found to be able to predict career interest and was a factor in career choice.

Nguyen (2000) found that engineers-turned-managers had a significantly higher score on the dominance personality scale than engineers. Most notable, he found no significant relationship between job satisfaction and personality factors for both groups.

Sanchez (2003) found that personality was a significant predictor of the motivation to lead. Among the five personality factors, the most consistently significant found were Extroversion, followed by Conscientiousness and Emotional Stability.

Williams (2005) found that personality was significantly related to success. Extroversion was found to be the most significant personality factor.

Lipsky (1996) found that managerial leadership behaviors were significantly related to both effectiveness and career success, but that behaviors related to success measures had a weaker relationship. Behaviors that had the strongest link between effectiveness and success included Team Motivation, Staff Development, Influence, and Performance Feedback.

Martini (1999) found that, depending upon the situation, leadership style affected project manager effectiveness. The relationship varied by type of project and level of project responsibility. The study was inconclusive as to whether educational background was related to project manager effectiveness. An interesting result of the study was the negative relationship found between experience and project manager effectiveness in several situations. He reasoned that perhaps the extensive experience is honored by

assigning especially difficult projects to project managers deemed more capable based on higher experience levels.

Vitek (2002) studied the relationship between leadership behavior and managerial success in a Fortune 50 manufacturing company. Vitek (2002) tested three different leadership theories as possible predictors of managerial success. He found that all three leadership theories were poor predictors of success.

Day (2003) found that project members rated project leaders higher on leadership practices than the project leaders rated themselves. Significant differences were found in the leadership effectiveness of project leaders and project members. The study suggested that leadership, identified as an activity, may contribute to the overall effectiveness of project leaders as they perform in a project environment.

Morrissey (1987) found that CEO's tended to rely more on Referent power than all other power bases combined. CEO's who tended to rely on Referent power were more satisfied with the achievement of their work objectives. Subordinates who reported to CEO's who were perceived to rely on Referent power were more satisfied with their working relations and their supervision.

Bearden (1990) found that functional managers used more positional powers than project managers, and that there was no significant difference in the use of personal power between functional and project managers. Higher-level managers were found to use more positional powers, except when the manager had both functional and project responsibilities. She found no differences between men and women in power usage.

Richardson (1996) found a significant difference between project and functional managers in their perceived use of Reward power, Legitimate power, and Referent power, but not in their perceived use of Coercive power or Expert power.

Chansler (1997) studied the use of social power in a public utility organization. Of greatest significance in this study was the result that employees in this organization perceive Coercive power as the most important base of power. In addition, the employees believed Referent power to be the least important.

Conclusions

Null Hypothesis 1 – Personality Domain

Ho1 In the population of Project Managers in the Architectural and Engineering Professional Design Services Industry, there will be no significant differences in career success based upon the measures of personality captured in Goldberg's "Big Five" inventory.

Openness personality factor. When considering the entire sample, the study found a moderate correlation between Openness and Career Success. Therefore, the null hypothesis was rejected and it was concluded that project managers who exhibit high Openness are expected to have greater Career Success than those who exhibit lower Openness.

Conscientiousness personality factor. When considering the entire sample, the study found no significant correlation between Conscientiousness and Career Success. Therefore, the null hypothesis could not be rejected and it was concluded that there is expected to be no measurable difference in the Career Success of project managers based on Conscientiousness.

Agreeableness personality factor. When considering the entire sample, the study found a low correlation between Agreeableness and Career Success. Therefore, the null hypothesis was rejected and it was concluded that project managers who have exhibit high Agreeableness are expected to have greater Career Success than those who exhibit low Agreeableness.

Emotional Stability personality factor. When considering the entire sample, the study found a moderate correlation between Emotional Stability and Career Success. Therefore, the null hypothesis was rejected and it was concluded that project managers who have exhibit high Emotional Stability are expected to have greater Career Success than those who exhibit high Neuroticism.

Extroversion personality factor. When considering the entire sample, the study found a low correlation between Extroversion and Career Success. Therefore, the null hypothesis was rejected and it was concluded that project managers who are Extroverted are more likely to have greater Career Success than those who are Introverted.

Personality factor summary. Personality traits have been discussed and challenged at length in the literature. Opinions range from the 16-factor model (McKenzie, 1988) to the five-factor model (Barrick & Mount, 1993; Costa & McCrae, 1992a) to the three-factor model (Eysenck, 1991). Each has merits and limitations. Although the meanings of the various factors might be argued vehemently, what has been demonstrated is that personality traits are appropriate for use as predictors of project management career success in the Architectural and Engineering Design Services industry.

General themes emerged from within the discussion surrounding the applicability of personality traits in personnel selection. Almost all researchers agree that there is a significant contribution made by personality in a person's behavior. The discussions have primarily focused upon how many factors are most appropriate, and what those factors describe. As might be expected, the Big Five structure has both proponents and opponents. In general, however, it agreed that the Big Five structure describes personality well, although perhaps not optimally so.

Four of the five personality traits measured within this study had significant correlation with career success. When viewed from the perspective of the regression equations, however, some personality traits were not always present within a specific company context. Given the above discussion, the variability found in this study was commensurate with the findings of other studies.

Null Hypothesis 2 – Qualifications Domain

Ho2 In the population of Project Managers in the Architectural and Engineering Professional Design Services Industry, there will be no significant differences in career success based upon Professional Qualifications (Education and Training, and Experience).

Education and Training. The study failed to find any significant relationship between Education Level and Career Success. The study also failed to find any significant relationship between Project Management Training and Career Success. Therefore, the null hypothesis could not be rejected and it was concluded that there will be no measurable expected difference in the Career Success of project managers based on Education Level and Project Management Training.

Professional Certification. The study failed to find any significant relationship between Project Management Certification and Career Success. Therefore, the null hypothesis could not be rejected and it was concluded that there will be no expected measurable difference in the Career Success of project managers based on Professional Certification.

Professional Experience. The study failed to find any significant relationship between Architect/Engineer Industry Experience and Career Success. The study also failed to find any relationship between Project Management Experience and Career Success. Therefore, the null hypothesis could not be rejected and it was concluded that there will be no expected measurable difference in the Career Success of project managers based on Professional Experience.

Professional Qualifications summary. The study failed to find any significant relationship between the various measures of Professional Qualifications and Career Success. Therefore, the null hypothesis could not be rejected and it was concluded that there will be no expected measurable difference in the Career Success of project managers based on Professional Qualifications.

In considering education and training, this study focused on the level of formal education and training. It did not consider the specific program curriculum or the quality of the educational program or the institution from which the individuals received their degrees or training. Perhaps greater resolution may have found some relationships not apparent in the context of this study.

In considering professional experience, this study focused on the number of years of experience in the industry and in performing the project manager function. Years is a commonly used experience measure. It is used by many organizations including the Project Management Institute for certification requirements (Martin, 1988). However, a drawback to using years as the experience measure is that an individual may be performing the same task year after year. An individual may have ten years of experience but it may be one year of applicable experience performed routinely for the next nine years. This study has raised the issue that experience measured in years may not be an appropriate measure for professional experience. A more robust measure needs to be created for the experience criteria. This measure would need to consider the quality, type, and breadth of the experience.

Null Hypothesis 3 – Leadership Domain

Ho3 In the population of Project Managers in the Architectural and Engineering Professional Design Services Industry, there will be no measurable differences in career success based upon the measures of Leadership Style captured in the *Dimensions of Leadership Profile*® (Inscape Publishing).

Character leadership focus. When considering the entire sample, the study found no significant correlation between Character Leadership Focus and Career Success. Therefore, the null hypothesis could not be rejected and it was concluded that there will be no expected measurable difference in the Career Success of project managers based on Character Leadership Focus.

Analysis leadership focus. When considering the entire sample, the study found no significant correlation between Analysis Leadership Focus and Career Success.

Therefore, the null hypothesis could not be rejected and it was concluded that there will be no expected measurable difference in the Career Success of project managers based on Analysis Leadership Focus.

Accomplishment leadership focus. When considering the entire sample, the study found no significant correlation between Accomplishment Leadership Focus and Career Success. Therefore, the null hypothesis could not be rejected and it was concluded that there will be no expected measurable difference in the Career Success of project managers based on Accomplishment Leadership Focus.

Interaction leadership focus. When considering the entire sample, the study found no significant correlation between Interaction Leadership Focus and Career Success. Therefore, the null hypothesis could not be rejected and it was concluded that there will be no expected measurable difference in the Career Success of project managers based on Interaction Leadership Focus.

Leadership focus summary. The study failed to find any significant relationship between the four distinct Leadership Focuses and Career Success. Therefore, the null hypothesis could not be rejected and it was concluded that there will be no expected measurable difference in the Career Success of project managers based on Leadership Focus.

Contemporary leadership research (Kotter, 1990) take a holistic approach to leader-follower interaction by considering leadership behaviors and practices, the situation, the context in which leadership is practiced, the organizational or team environment, and the characteristics of the followers. Thus, as discovered in this study,

Kotter concluded that project manager career success is not related to any single leadership focus.

Null Hypothesis 4 – Social Power Domain

Ho4 In the population of Project Managers in the Architectural and Engineering Professional Design Services Industry, there will be no measurable differences in career success based upon the measures of Social Power Style captured in the Frost/Stehlski Social Power Questionnaire.

Reward Social Power. When considering the entire sample, the study found a low but statistically significant correlation between Reward Social Power and Career Success. Therefore, the null hypothesis was rejected and it was concluded that there are measurable differences in the career success of project managers based upon measure of Reward Social Power.

Coercive Social Power. When considering the entire sample, the study found no significant correlation between Coercive Social Power and Career Success. Therefore, the null hypothesis could not be rejected and it was concluded that there are no expected measurable differences in the career success of project managers based upon measure of Coercive Social Power.

Legitimate Social Power. When considering the entire sample, the study found no significant correlation between Legitimate Social Power and Career Success. Therefore, the null hypothesis could not be rejected and it was concluded that there are no expected measurable differences in the career success of project managers based upon measure of Legitimate Social Power.

Expert Social Power. When considering the entire sample, the study found no significant correlation between Expert Social Power and Career Success. Therefore, the null hypothesis could not be rejected and it was concluded that there are no expected measurable differences in the career success of project managers based upon measure of Expert Social Power.

Referent Social Power. When considering the entire sample, the study found a low correlation between Referent Social Power and Career Success. Therefore, the null hypothesis was rejected and it was concluded that there are measurable differences in the career success of project managers based upon measure of Referent Social Power.

Social Power style summary. The study found low but significant correlations between Social Power Style and Career Success. Therefore, the null hypothesis was rejected and it was concluded that there are expected measurable differences in the career success of project managers based upon measure of Social Power Style. Project managers who exhibit high Reward or Referent Power are expected to have greater Career Success than those who exhibit low Reward or Referent Power.

The use of social power skills is basic to the success of any manager. Russell (1938) described power as "the most fundamental concept in social science." Dahl (1957, p. 201) wrote, "The concept of power is as ancient and ubiquitous as any that social science can boast."

The social power styles measured within this study show significant correlation with career success. The only style that did not find support in this study was Coercive power. This could be attributable to the dated wording of the three questions within the

topology for measuring Coercive power. The survey was designed by Frost and Stehlski (1988) nearly two decades ago and addresses strong negative actions a supervisor could take toward subordinates. These actions now seem inappropriate in modern, professional organizations that are typical in the Design Services industry.

Implications for Project Based Organizations

The study yielded data and information that can be applicable to the industry studied in several ways. First, the understanding developed as a result of the study can be a valuable tool for professional design organizations, because it revealed factors that may be used in the selection and development of project managers. Second, based on evaluation of personality traits and social power style, organizational leaders have moderate indicators of the future career success of a project manager. Third, regularly scheduled evaluations of a project manager's traits, behavioral style and perceptions can assist senior management in determining the need for targeted training and development programs.

Several unsolicited written comments from respondents indicated a perceived strong relationship between project manager personality and career success. Personal traits and skills such as tenacity, leadership ability, and possession of "soft skills" were mentioned as being critical to career success. Sponsorship by senior management emerged as another factor that the respondents perceived as having a great impact on the career success of the project manager.

The new economy has fostered greater specialization and narrowing of skills. The current rapid growth of technology and information is generating greater task complexity, which demands broader skills and better integration at the project manager level.

According to Heerkens (2001), project management is on the threshold of a significant evolutionary change. The change is due to the organizations' rising expectations of projects and project managers in terms of business results. The focus of project management itself is now beginning to change. In terms of relative importance, the domain of technical knowledge will remain constant while the domains of business considerations and interpersonal considerations will continue to rise in relative importance (Heerkens, 2001).

According to several authors (Dinsmore, 1997; Curling, 2002; & Heerkens, 2003), there is a growing trend to adopt project management techniques in general corporate business management. In the future, the project manager's span of influence will extend beyond the design room all the way to the boardroom. With this evolution, project management will no longer be "the accidental profession," but rather a chosen career path for a new breed of corporate manager.

Recommendations for Future Studies

The conclusions drawn from the findings suggest that the following efforts be undertaken in the future to enhance the understanding of the variables that influence project managers' career success.

First, extend the current study to include project managers from other industries.

Second, conduct further in-depth studies on project managers who have acquired project management specific university degrees.

Third, conduct further in-depth studies on project managers who are employed by firms with in-house leadership training centers.

Fourth, conduct an in-depth study on project managers who manage virtual teams.

Fifth, conduct an in-depth study where the project manger's General Mental Ability (GMA) is considered.

Sixth, develop a more comprehensive regression model that considers possible interactions between personality traits, leadership style, and social power style.

Seventh, consider performance evaluations from external clients in assessing the long term career success of project managers.

This study's conclusions and recommendations were based upon responses from various professional design services organizations. Project managers in all industries largely utilize similar methodologies and techniques. That is the basis for project management as a professional discipline. However, project managers in different industries likely have very different foci based on the underlying technology of their projects. The design of physical plants generally exacts some degree of logical sequencing, which favors hierarchical, linear thinking. By contrast, software development projects are not so constrained, although they too would benefit from a logical, systematic approach. Such projects benefit more from developing team commitment through lateral, cooperative and concurrent thinking. Consequently, the type of project leadership required is also different. The former type of project responds better to "command and control" leadership, whereas the latter responds better to delegation of responsibility and authority within the context of defined goals and objectives. Further studies in other types of companies would enhance the knowledge base of project management by showing industry specific differences in project manager career success as measured against the independent variables in this study.

With the proliferation of various project management undergraduate and graduate programs, the impact of project management specific educational curricula should be evaluated. The results of such a study would also be extremely beneficial to educational institutions that offer degree programs in project management and to organizations looking to recruit future project managers.

Leadership training and the utilization of leadership training consulting firms are on the rise in the design services industry (Simonds, 2001). Many large design firms have established leadership-training centers of their own. Therefore, more detailed studies on the relationship between leadership training and project manager career success could reveal areas or factors in the training that require further enhancement. A more in-depth study and analysis of in-house leadership training would yield results that the project management profession could employ to improve or expand specific skills training courses.

In the past decade, organizations experienced a widespread obsession with speed and technology. One of the major trends in organizations is the utilization of virtual teams. Virtual teams are cross-functional teams that are pulled together to accomplish a specific objective or project. These teams cross time, space, and cultural boundaries and can do so effectively with the use of technology (Johnson, Heimann, & O'Neill, 2001). Virtual teams are to a degree self-managed knowledge work teams with subject matter expertise that function in a fluid, flexible, and boundary-less team structure.

Virtual teamwork presents new challenges and opportunities for a project manager. Hacker and Lang (2000) emphasized several findings that researchers view as critical to virtual team performance and effectiveness due to its unique geographical

dispersion. Therefore, the project manager's role and skills in integrating the team members' expertise, aligning goals, instituting effective procedures, decision-making, conflict resolution, and promoting cultural understanding will be more crucial than ever.

Finally, research conducted over the past twenty years has shown that General Mental Ability (GMA) is related to performance for virtually all jobs and that its validity increases as job complexity increases (Hunter & Hunter, 1984). Hunter (1986) demonstrated that GMA affects job performance indirectly through its effect on job knowledge. Job knowledge is fundamental to effective performance because people who understand the job better are more effective at solving job related problems.

Cognitive ability may be especially important for on-the-job learning due to the need to recognize that an important job event has occurred and identify what information from the event should be retained and extrapolated. Project managers are often confronted by novel situations. They must be able to recognize the similarity between novel situations and previously experienced situations; they must be able to extrapolate from other rules and procedures to successfully complete the current tasks. Those project managers with higher cognitive ability may be more likely to be able to ascertain the solutions to these novel situations and exhibit superior performance, which will likely lead to greater career success.

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Appendix A

Participation Request Letter

PM Survey
P.O. Box 573
Lafayette Hill, PA 19444
email: vji324@comcast.net

(Orginal addressed to Chief Executive of design firm)

June 28, 2004

Dear ( ),

Thank you for allowing your firm to participate in my study. Your support will help to advance Project Management as a respected profession and career path.

As a reminder, my name is Vincent Ionata. I am a doctoral candidate at Northcentral University (Prescott, AZ). I am studying factors that may contribute to project manager career success, specifically in the architectural/engineering services profession. My dissertation will investigate possible correlations between the career success of project managers, the project managers' traits and behaviors, and various environmental factors. The benefit of this research is to aid architectural and engineering organizations in defining criteria for describing project manager career success, as well as criteria for selecting project managers.

Enclosed are five copies of the survey. Please randomly distribute them to five of your Project Managers, Project Architects, or others who manage project teams. The survey should only take 20 minutes to complete. It is strictly confidential. Participants will not be asked to provide their name or firm affiliation. No reporting will be carried out at the single participant or company level. All results will be reported as a conglomerate of the received responses.

Please encourage your team leaders to participate in this study and return the completed surveys promptly. In consideration for your support, I will send you a copy of the research findings. I believe that you will find this information interesting and useful.

Contact me by email if you have any questions. Thanks again for your help.

Sincerely,

(Original signed)

Vincent J. Ionata
Doctoral Candidate - Northcentral University

Appendix B

Survey Questionnaire

Statement of Informed Consent

Career Success Factors for Project Managers in the Architectural and Engineering Professional Design Services Industry

You have been asked to participate in a study to determine the critical success factors associated with project management. We ask that you read this form and ask any questions you may have before agreeing to be in the study. You can forward questions to the investigator by email at pm@pmsurvey.com.

Your participation will only require the completion of a questionnaire. The total time to complete the questionnaire should be approximately 30 minutes. The questionnaire has five parts:

Part 1: Demographic Information
Part 2: Project Leadership Attributes
Part 3: Project Management Behaviors
Part 4: Personal Attributes
Part 5: Work Profile

The questionnaire is Strictly Confidential. You will not be asked to place your name on the questionnaire. No reporting will be carried out at the single participant or small group level. All results will be reported as a conglomerate of the received survey data.

This research is being conducted entirely in pursuit of fundamental academic knowledge and may offer no direct benefit to you. You will receive no monetary compensation for your participation. This study is entirely and privately conducted by Vincent J. Ionata for partial completion of the requirements for the doctoral degree at Northcentral University.

To the best of our knowledge, there are no physical or psychological risks associated with the procedures in this study.

Your participation is entirely voluntary. You can withdraw from the study at any time.

If you are willing to participate, please indicate by signing below.

Your participation is greatly appreciated.

Statement of Consent:

I have read the statement that describes the study and my rights as a participant. I agree to participate.

Signature _____ Date: _____

Career Success Factors for Project Managers in the Architectural and Engineering Professional Design Services Industry

Thank you for participating in this survey. Please be aware that this research is being conducted entirely in pursuit of fundamental academic knowledge and as a foundation for dissertation work in the field of project management at Northcentral University.

Your participation is entirely voluntary, completely confidential, and greatly appreciated.

There are 5 parts to this survey.

Part 1: Demographic Information
Part 2: Project Leadership Attributes
Part 3: Project Management Behaviors
Part 4: Personal Attributes
Part 5: Work Profile

Total time to complete the survey should be approximately 30 minutes.

You can forward questions to the investigator by email at pm@pmsurvey.com.

Part 1 – Demographic Information

	Bachelor	*	Master	**	Doctoral
Formal Education	☐	☐	☐	☐	☐
* Hold Bachelor Degree & Working on Master Degree ** Hold Master Degree & Working on Doctoral Degree					

	Yes	No
Have you received formal training in Project Management techniques?	☐	☐
Do you hold any formal certification as a Project Management Professional (e.g., PMP)?	☐	☐

	0 – 5 years	6 – 10 years	11 – 15 years	16 – 20 years	Over 20 years
How much experience do you have in the Architectural and Engineering Professional Design Services Industry?	☐	☐	☐	☐	☐
How much experience do you have as a Project Manager?	☐	☐	☐	☐	☐

	1	2	3	4	5
What type of firm are you employed by? (Select only one type – See descriptions on Page 10)	☐	☐	☐	☐	☐

1. Architect/Engineer (A/E)
2. Specialty Engineering (Single Discipline)
3. Multiple Discipline Engineering (MEP, Civil/Structural, etc.)
4. Full Service Engineering
5. Engineer/Constructor

Optional Question	
Who is your present employer?	

This information will not be used in any report. It is requested solely to insure proper categorization of company type.

	1	2	3	4	5
What type of Organization Structure does your company use? (See descriptions on Page 10)	☐	☐	☐	☐	☐

1. Functional
2. Weak Matrix
3. Balanced Matrix
4. Strong Matrix
5. Projectized

	Male	Female
Gender	☐	☐

Part 2 – Project Leadership Attributes

Characteristics of project leaders are presented below in 12 groups of five statements. In each group, rank each of the five statements about project leadership in term of importance to your role as a Project Manager. **Rank the statements from the viewpoint of how you see yourself in your role as a Project Manager.**

Use "5" to indicate the most important, "4" to indicate the second most important, "3" for the third most important, "2" for the next most important, and "1" to indicate the least

important statement. There can only be one "5," one "4," one "3," one "2," and one "1" in each group.

NOTE: Due to copyright restrictions from the publisher, the 12 questions from this instrument cannot be reproduced in the study.

Part 3 – Project Management Behaviors

Please use the rating scale below to describe how often you use each behavior to influence project team members. **Describe yourself as you generally are now, not as you wish to be in the future.** Please read each statement carefully, and then check the appropriate box.

In your role as a Project Manager, how often do you use the following behaviors to influence your Project Team Members?					
	Never	**Seldom**	**Occasionally**	**Often**	**Almost Always**
Promote them or recommend them for promotion	☐	☐	☐	☐	☐
Demote them or recommend them for demotion	☐	☐	☐	☐	☐
Advise and assist them.	☐	☐	☐	☐	☐
Set the example and rely upon your people to follow your example	☐	☐	☐	☐	☐
Expect that your orders and requests will be carried out because you are the boss and they will not question an order from a superior	☐	☐	☐	☐	☐
Recommend them for awards or for announcements of recognition	☐	☐	☐	☐	☐
Make on-the-spot corrections.	☐	☐	☐	☐	☐
Use your good relationship with them to get the job done	☐	☐	☐	☐	☐
Let them know that you have a right to expect that your directions will be followed	☐	☐	☐	☐	☐
Give them high performance ratings	☐	☐	☐	☐	☐
Give them low performance ratings	☐	☐	☐	☐	☐
Give them interesting, challenging assignments	☐	☐	☐	☐	☐

In your role as a Project Manager, how often do you use the following behaviors to influence your Project Team Members?					
	Never	**Seldom**	**Occasionally**	**Often**	**Almost Always**
Rely upon your people to get the job done because they don't want to let you down	☐	☐	☐	☐	☐
Discuss with them the logic behind the request	☐	☐	☐	☐	☐
Praise them	☐	☐	☐	☐	☐
Criticize them	☐	☐	☐	☐	☐
Give them boring, routine assignments	☐	☐	☐	☐	☐
Count on them to believe that it is to their advantage as much as it is to yours for them to cooperate with you	☐	☐	☐	☐	☐
Give them extra time off as a reward	☐	☐	☐	☐	☐
Give them extra work as punishment	☐	☐	☐	☐	☐
Get them to accomplish the work by demonstrating that you know how to perform the task	☐	☐	☐	☐	☐
Recommend them for formal disciplinary action or reprimands	☐	☐	☐	☐	☐
Impress them with your overall competence and ability	☐	☐	☐	☐	☐

Part 4 – Personal Attributes

Below are phrases describing people's behaviors. Please use the rating scale below to describe how accurately each statement describes you. **Describe yourself as you generally are now, not as you wish to be in the future.** Please read each statement carefully, and then check the box that corresponds to the number on the scale.

	Very Inaccurate	Moderately Inaccurate	Neither Inaccurate nor Accurate	Moderately Accurate	Very Accurate
Am the life of the party.	☐	☐	☐	☐	☐
Feel little concern for others.	☐	☐	☐	☐	☐
Am always prepared.	☐	☐	☐	☐	☐
Get stressed out easily.	☐	☐	☐	☐	☐
Have a rich vocabulary.	☐	☐	☐	☐	☐
Don't talk a lot.	☐	☐	☐	☐	☐
Am interested in people.	☐	☐	☐	☐	☐
Leave my belongings around.	☐	☐	☐	☐	☐
Am relaxed most of the time.	☐	☐	☐	☐	☐
Have difficulty understanding abstract ideas.	☐	☐	☐	☐	☐
Feel comfortable around people.	☐	☐	☐	☐	☐
Insult people.	☐	☐	☐	☐	☐
Pay attention to details.	☐	☐	☐	☐	☐
Worry about things.	☐	☐	☐	☐	☐
Have a vivid imagination.	☐	☐	☐	☐	☐
Keep in the background.	☐	☐	☐	☐	☐
Sympathize with others' feelings.	☐	☐	☐	☐	☐
Make a mess of things.	☐	☐	☐	☐	☐
Seldom feel blue.	☐	☐	☐	☐	☐
Am not interested in abstract ideas.	☐	☐	☐	☐	☐
Start conversations.	☐	☐	☐	☐	☐
Am not interested in other people's problems.	☐	☐	☐	☐	☐

	Very Inaccurate	Moderately Inaccurate	Neither Inaccurate nor Accurate	Moderately Accurate	Very Accurate
Get chores done right away.	☐	☐	☐	☐	☐
Am easily disturbed.	☐	☐	☐	☐	☐
Have excellent ideas.	☐	☐	☐	☐	☐
Have little to say.	☐	☐	☐	☐	☐
Have a soft heart.	☐	☐	☐	☐	☐
Often forget to put things back in their proper place.	☐	☐	☐	☐	☐
Get upset easily.	☐	☐	☐	☐	☐
Do not have a good imagination.	☐	☐	☐	☐	☐
Talk to a lot of different people at parties.	☐	☐	☐	☐	☐
Am not really interested in others.	☐	☐	☐	☐	☐
Like order.	☐	☐	☐	☐	☐
Change my mood a lot.	☐	☐	☐	☐	☐
Am quick to understand things.	☐	☐	☐	☐	☐
Don't like to draw attention to myself.	☐	☐	☐	☐	☐
Take time out for others.	☐	☐	☐	☐	☐
Shirk my duties.	☐	☐	☐	☐	☐
Have frequent mood swings.	☐	☐	☐	☐	☐
Use difficult words.	☐	☐	☐	☐	☐
Don't mind being the center of attention.	☐	☐	☐	☐	☐
Feel others' emotions.	☐	☐	☐	☐	☐
Follow a schedule.	☐	☐	☐	☐	☐
Get irritated easily.	☐	☐	☐	☐	☐
Spend time reflecting on things.	☐	☐	☐	☐	☐
Am quiet around strangers.	☐	☐	☐	☐	☐
Make people feel at ease.	☐	☐	☐	☐	☐
Am exacting in my work.	☐	☐	☐	☐	☐
Often feel blue.	☐	☐	☐	☐	☐
Am full of ideas.	☐	☐	☐	☐	☐

Part 5 – Work Profile

Please rate yourself with respect to your peers in the following categories:									
	Much Less		Some What Less		Equal To		Some What More		Much More
	1	2	3	4	5	6	7	8	9
Compensation	☐	☐	☐	☐	☐	☐	☐	☐	☐
Promotions/Title	☐	☐	☐	☐	☐	☐	☐	☐	☐
Ability to Move Up	☐	☐	☐	☐	☐	☐	☐	☐	☐
Awards/Recognition	☐	☐	☐	☐	☐	☐	☐	☐	☐
Commendations	☐	☐	☐	☐	☐	☐	☐	☐	☐
Project Opportunities	☐	☐	☐	☐	☐	☐	☐	☐	☐
Choice in Projects	☐	☐	☐	☐	☐	☐	☐	☐	☐
Job Satisfaction	☐	☐	☐	☐	☐	☐	☐	☐	☐

What have been the results of your Annual Review from your direct supervisor over the past 3 years?						
	Poor (1)	Marginal (2)	Competent (3)	Strong (4)	Exceptional (5)	Did Not Get Review
Last Year	☐	☐	☐	☐	☐	☐
2 Years Ago	☐	☐	☐	☐	☐	☐
3 Years Ago	☐	☐	☐	☐	☐	☐

End of Survey

Please check to make sure all questions are answered.

Thank you for completing the survey.

Your participation is greatly appreciated!

Descriptions of Common Firm Types	
Type	Description
Architect/Engineer (A/E)	Firms with architecture plus at least one engineering discipline.
Specialty Engineering (Single Discipline)	Consulting engineering firm practicing in one discipline.
Multiple Discipline Engineering	Consulting engineering firm practicing in more than one discipline, but not a full-service firm. May also practice architecture, but considers itself an engineering firm (as distinguished from A/E firms).
Full Service Engineering	Consulting engineering firm practicing civil, structural, mechanical, and electrical engineering. May also practice in other engineering disciplines. May also practice architecture, but considers itself an engineering firm.
Engineer/Constructor	Consulting engineering firm that also offers construction or construction management services. Derives more than 50 percent of its revenue from construction services.

Descriptions of Common Organizational Structures	
Structure	Description
Functional	The project is divided into segments and assigned to relevant functional areas and/or groups within functional areas. The project is coordinated by functional and upper levels of management.
Weak Matrix	A project manager with limited authority is designated to coordinate the project across different functional areas and/or groups. The functional managers retain responsibility and authority for their specific segments of the project.
Balanced Matrix	A project manager is assigned to oversee the project and shares the responsibility and authority for completing the project with the functional managers. Project and functional managers jointly direct many workflow segments and jointly approve many decisions.
Strong Matrix	A project manager is assigned to oversee the project and has prime responsibility and authority for completing the project. Functional managers assign personnel as needed and provide technical expertise.
Projectized	A project manager is put in charge of a project team composed of a core group of personnel from several functional areas and/or groups, assigned on a full-time basis. The functional managers have no formal involvement.

Appendix C

Regression Analysis

Regression Model – All Independent Variables and Respondents

```
The regression equation is
Career Success = 1.64 + 0.0158 Interac + 0.0525 Reward + 0.0223 Extro +
                 0.0236 EmStab + 0.0276 Open


Predictor       Coef   SE Coef     T      P
Constant      1.6442    0.5246  3.13  0.002
Interac     0.015796  0.007158  2.21  0.028
Reward       0.05248   0.01855  2.83  0.005
Extro       0.022318  0.009052  2.47  0.014
EmStab      0.023637  0.008328  2.84  0.005
Open         0.02759   0.01204  2.29  0.023


S = 0.940600   R-Sq = 16.8%   R-Sq(adj) = 15.4%


Analysis of Variance

Source           DF       SS      MS      F      P
Regression        5   55.217  11.043  12.48  0.000
Residual Error  310  274.266   0.885
Total           315  329.483


Source   DF  Seq SS
Interac   1   7.239
Reward    1  18.208
Extro     1  14.878
EmStab    1  10.243
Open      1   4.648
```

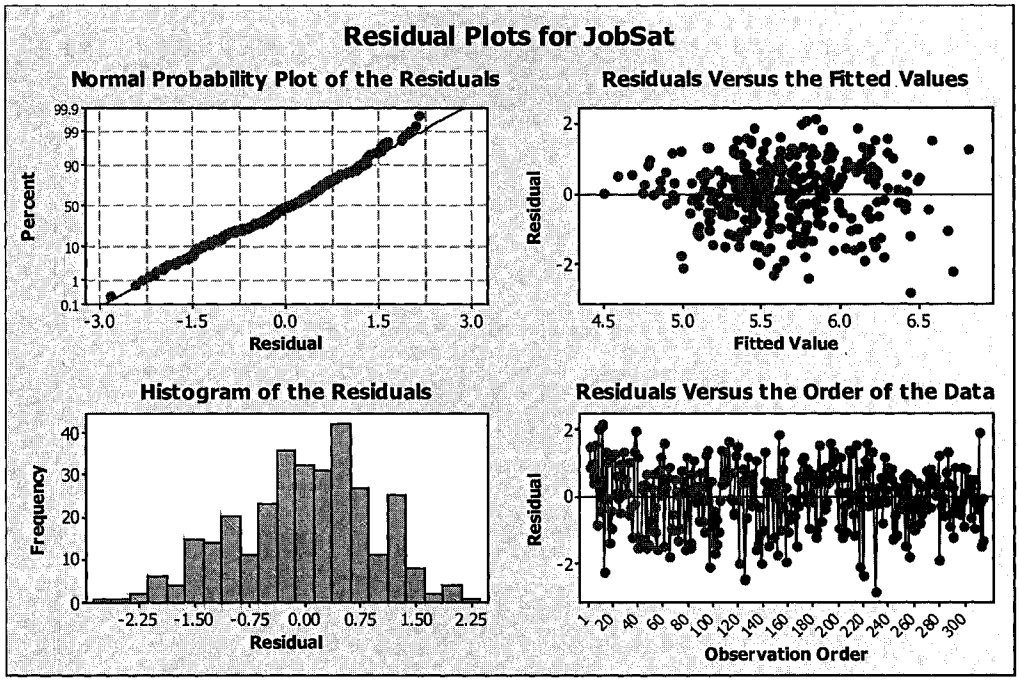

Figure C1. Residual plots – Regression model.